P293   **[3917]-131**

S.Y. B.Sc. (Sem. - I)

मराठी (MARATHI)

पाठ्यपुस्तक – विज्ञान वेध (नवा अभ्यासक्रम)

(2008 पॅटर्न)

वेळ : 2 तास]   **[एकूण गुण : 40**

सूचना :- 1) *सर्व प्रश्न सोडविणे आवश्यक आहेत.*

2) *उजवीकडील अंक पूर्ण गुण दर्शवितात.*

प्रश्न 1) पुढीलपैकी कोणत्याही एका विषयावर 400 शब्दांत निबंध लिहा.   **[10]**

अ)   आधुनिकता आणि अंधश्रद्धा

ब)   भ्रष्टाचार – एक विकृती

क)   पाऊस मनातला ..... (ललित)

प्रश्न 2) '20 व्या शतकात जगाचा चेहरा मोहरा बदलून गेला तो मुलभूत विज्ञानात संशोधन करणाऱ्या आइन्स्टाईनसारख्या संशोधकांमुळेच' या विधानाचा परामर्श घ्या.   **[15]**

<div align="center">किंवा</div>

डॉ. निर्मलकुमार फडकुले यांनी सुशिक्षितांच्या अंधश्रद्धांचे वर्णन कसे केले आहे ?

प्रश्न 3) टिपा लिहा. (कोणत्याही तीन)   **[15]**

अ)   विज्ञानातील भाकिते.

ब)   विज्ञान कथांचे योगदान.

क)   'लीलावती' या ग्रंथाची जन्मकथा.

ड)   कोपर्निकसचा विश्वरचना सिद्धांत.

इ)   जनुक बदलाचे तंत्रज्ञान आणि निसर्गाचा ऱ्हास.

फ)   डॉ. भार्गव.

<div align="center">▯▯▯</div>

P293   **[3917]-131**

S.Y. B.Sc. (Sem. - I)

मराठी (MARATHI)

पाठ्यपुस्तक : विज्ञान कथा विश्व (जुना अभ्यासक्रम)

(2008 पॅटर्न)

वेळ : 2 तास]   [एकूण गुण : 40

सूचना :- 1) *सर्व प्रश्न सोडविणे आवश्यक आहेत.*

2) *उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.*

प्रश्न 1) पुढीलपैकी कोणत्याही एका विषयावर 400 शब्दांत निबंध लिहा.   [10]

अ) वैज्ञानिक दृष्टीकोण आणि समाज.

ब) प्रदूषण : एक समस्या.

क) प्रवासातील गमती जमती ..... (ललित)

प्रश्न 2) 'आकाश आणि जमीन' ही कथा विज्ञान आणि समाज यांचा मेळ सुचविते, स्पष्ट करा. [15]

किंवा

'कनेक्शन' ही कथा विनोदाच्या अंगाने भविष्यकालिन जीवनाचा वेध घेते, विशद करा.

प्रश्न 3) टिपा लिहा. (कोणत्याही तीन)   [15]

अ) 'चंद्रावरचा खून' मधील तत्त्वचिंतन.

ब) 'यंत्रांनी केलं बंड' मधील दीपक.

क) 'यंत्रमानवाच्या हाताने' मधील गमतीदार प्रसंग.

ड) 'गुगली' तील सुनीलपुढील गुंता.

इ) 'अंतराळातील मृत्यु' मधील भावना आणि विज्ञान यांचा मेळ.

फ) 'वामलोचना ....' तील विश्वनाथपंत.

□□□

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S.Y. B.Sc.

हिंदी (HINDI)

(Sem. - I) (General)

(Z`mmR>² `H<$_ –2008 nªQ>Z©)

समय : 2 घंटे]   *[पूर्णांक : 40*

पाठ्य-पुस्तकें :–   1)   प्रतिनिधि कहानियाँ:
                        हिंदी विभाग, एस.एन.डी.टी. विश्वविद्यालय, मुंबई।
               2)   छायावाद : प्रतिनिधि रचनाएँ ।
                        सम्पादक : नीरा परमार।

सूचनाएँ : –   1)   सभी प्रश्न अनिवार्य हैं।
              2)   दाहिनी ओर लिखे अंक प्रश्न के पूर्णांक हैं।

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*प्रश्न 1.*अ)   निम्नलिखित में से <u>किन्हीं दस</u> वाक्यों को शुद्ध करके फिर से लिखिए :–   **[10]**

   i)   मीना ने रोटी खाया।

   ii)   अनिल का किताब मेज में रखा है।

   iii)   वह बहोत दूर रहता है।

   iv)   लड़के मैदान में खेल रहा है।

   v)   पेड़ को फल गिरा।

   vi)   शेर को बकरी ने खाया।

   vii)   शिमला ठंडी शहर है।

   viii) वह लड़की झूठ बोलता है।

   ix)   राम और लक्ष्मण भाई-भाई थी।

   x)   हिमायल को गंगा निकलती है।

   xi)   दस की नोट फ़टी है।

   xii)   कारखाने की काम खत्म हो गया।

P.T.O.

आ) निम्नलिखित अँग्रेज़ी अनुच्छेद का हिंदी में अनुवाद कीजिए : **[4]**

The person with anemia should never attempt to treat himself. He should consult his doctor. His problem may be due to some deficiency. The treatment of anemia is not a hit-or-miss affair. It takes the skill of a competent physician to make the correct diagnosis and prescribe the right treatment in most cases.

*प्रश्न 2.*अ) निम्नलिखित गद्य अवतरण की ससंदर्भ व्याख्या कीजिए : **[5]**

(क) ''महाराज नाराज न हों, आप से तो एक टोकरी भर मिट्टी नहीं उठाई जाती और इस झोंपड़ी में तो हजारों टोकरियाँ मिट्टी पड़ी है। उसका भार आप जन्म भर क्यों कर उठा सकेंगे ? आप ही इस बात पर विचार कीजिए।''

अथवा

''चालाक तो बड़े हो ; पर माँझे का लहना इतने बरस लपटन साहब के साथ रहा है। उसे चकमा देने के लिए चार आँखें चाहिए।''

आ) निम्नलिखित पद्य अवतरण की ससंदर्भ व्याख्या कीजिए : **[5]**

(ख) इसमें सच्ची ममता के दाने बोने हैं,

इसमें जन की क्षमता के दाने बोने हैं,

इसमें मानव-ममता के दाने बोने हैं,

जिसमें उगल सके फिर धूल सुनहरी फसलें,

मानवता की – जीवन श्रम से हँसे दिशाएँ !

अथवा

जग पीड़ित है अति-दुःख से

जग पीड़ित रे अति-सुख से,

मानव जग में बँट जावें

दुःख सुख से औ' सुख दुःख से।

*प्रश्न 3.*अ) निम्नलिखित प्रश्नों में से <u>किन्हीं दो</u> के उत्तर लिखिए : **[8]**

(च) प्रसाद लिखित 'गुंडा' कहानी के नन्हकूसिंह का चरित्रचित्रण कीजिए।

(छ) कालिंदीचरण के विचित्र स्वभाव पर प्रकाश डालिए।

(ज) 'पूस की रात' कहानी के हल्कू और जबरा कुत्ता के आत्मिय संबंध समझाइए।

(झ) परदा कहानी में उठाई गई समस्याओं पर अपने विचार प्रस्तुत कीजिए।

आ) निम्नलिखित प्रश्नों में से किन्हीं दो के उत्तर लिखिए : [8]

(प) 'जूही की कली' कविता की प्रतीकात्मकता स्पष्ट कीजिए।

(फ) 'आवाहन' कविता का आशय अपने शब्दों में स्पष्ट कीजिए।

(ब) कवि पंत मानव को ईश्वर की श्रेष्ठ रचना क्यों कहते हैं ? 'मानव' कविता के आधार पर विशद कीजिए।

(भ) 'ताज' कविता का आशय अपने शब्दों में लिखिए।

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[3917]-133

S.Y. B.Sc.

संस्कृत (SANSKRIT)

गीर्वाणभारती

(Sem. - I) (New)

Time : 2 Hours]   *[Max. Marks : 40*

Q1) Write short answers in <u>any 2 - 4 lines</u> of the following questions.   **[16]**

पुढील प्रश्नांची <u>2 - 4</u> ओळीमध्ये उत्तरे लिहा.

i)   What was शर्यात's request to च्यवन ?
     शर्याताने च्यवनाला काय विनंती केली ?

ii) What was सुकन्या's answer to the request of अश्विनीकुमार ?
     अश्विनीकुमारांच्या विनंतीला सुकन्येने काय उत्तर दिले ?

iii) Which are चतुष्कला in प्रकाशवान् वाद ?
     'प्रकाशवान् वादातीक चतुष्कला कोणत्या ?

iv) Who is the adviser of 'ज्योतिष्मान् वाद and which are the चतुष्कला of
     ज्योतिष्मान् वाद' ?
     'ज्योतिष्मान् वादाचा उपदेशकर्ता कोण व ज्योतिष्मान् वादातील' चतुष्कला कोणत्या' ?

v)   What is कश्यपा's thoughts about daughter ?
     कश्यपांचे कन्येविषयीचे विचार कोणते ?

vi) How many काण्ड of रामायण and which are they ?
     रामायणाचे एकूण काण्ड किती व कोणते ?

vii) Which things are imagined for worshiping in शिवमानसपूजा ?
     शिवमानसपूजेत कोणत्या गोष्टी कल्पिलेल्या आहेत ?

viii)Explain the meaning of 'ज्ञयो मृत्यु: सुदुर्वार:'
     'ज्ञेयो मृत्यु: सुदुर्वार:' याचा अर्थ स्पष्ट करा ?

Q2) Write short notes on <u>any two</u> of the following in <u>8 - 10 lines</u> each.　　**[8]**

पुढीलपैकी <u>क्रोणत्याही दोहोंवर</u> <u>8 - 10 </u>ओळीत संक्षिप्त टीपा लिहा.

i)　Charactersketch of च्यवन.

　　च्यवनाचे व्यक्तिचित्रण.

ii)　उपनिषद्.

iii)　सुभाषिता's in 'सेयं याति शकुन्तला पतिगृहम्'.

　　'सेयं याति शकुन्तला पतिगृहम्' या पाठातील सुभाषिते.

Q3) Write short notes on <u>any two</u> of the following in <u>8 - 10 lines</u> each.　　**[8]**

i)　Charactersketch of हनुमान्.

　　हनुमानाचे स्वभावचित्र.

ii)　Importance of मानसपूजा.

　　मानसपूजेचे महत्त्व.

iii)　Explain 'जनापवादाद् भजेद् भीतिम्'.

　　'जनापवादाद् भजेद् भीतिम्' स्पष्ट करा.

Q4) Answer <u>any one</u> of the following questions in <u>16 - 20 lines</u>.　　**[8]**

पुढीलपैकी <u>कोणत्याही एका</u> प्रश्नाचे उत्तर <u>16 ते 20</u> ओळींमध्ये लिहा.

i)　Write a story च्यवनभार्गव.

　　च्यवनभार्गव कथा लिहा.

ii)　State the advise of 'उपदेशप्रबन्ध:' with the help of stories.

　　'उपदेशप्रबन्धातील' उपदेश कथांच्या माध्यमातून स्पष्ट करा.

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S.Y. B.Sc. (Sem. - I)

ARABIC (Functional)

(2008 Pattern)

Time : 2 Hours]　　　　　　　　　　　　　*[Total Marks : 40*

1. Translate into English/Urdu/Marathi any two
   of the following Passages :　　　　　　　　**[10]**

(ا) هذا دكان الفاكهين ۔ فيه كل قسم من الفاكهة
موجود فيه رمان ۔ وعنب وتفاح متوفر و تين
و برتقال ۔ الترمان مفيد جدا في الصيف والبرتقال
ايضا مفيد فيه فينه السمور معلق ومنه ثمر الصفر

(ب) الولد المجتهد محبوب لده قد نكتبين ۔
فهو مسرور في كل وقت ۔ الوقت عنده شيء
ثمين ۔ ذالك ۔ ولد كسلان ۔ الوكه ۔ الكسلان
مذموم محرورون في كل وقت الوقت
عنده دين لشيء ۔

(ح) هذا رجل هذا رجل مسلم ۔ له خلق له خلق
طيب ۔ في تيده كتاب ۔ في تيد كتاب عربي ۔
و في ذالك الكتاب منهاج حديث ۔ دالا
الرجل مشغول بالقراءة و هذا البيان عربي ۔
العربية لبنات قدريم ۔

P.T.O.

2. Translate and explain any Five couplets of
the following :

[10]

(١) كِتَابِي أَنْتَ الصَّدِيقُ التَّوفِي
سَوَرْنَتَ التَّعْلِيمَ وَالسَّمَرْشِدُ

(٢) بِنُورِكَ أَسْعَى لِنَيْلِ الكَمَالِ
وَفِي دَرَجَاتِ العُلَا أَصْعَدُ

(٣) إِذَا مَا صَحِبْتُكَ أَرْشَدْتَنِي
فَأَنْتَ رَفِيقِي حَيْثُ وَجَدْتُ
إِذَا مَا طَلَبْتُكَ لَا تَبْعُدُ

(٥) نَحْتَ يَا الحَدِيثِ الشَّهِيِّ
وَتَغْيِيرِي بِالبَدَءِ أَنْشُدُ

(٦) وَتَكْشِفَ لِي حِكَمَ السَّالِفِينَ
وَتُسْبِرُ مَكْنُونَ مَا خَلَّدُوا

(٧) كِتَابِي أَنْتَ عَزِيزٌ عَلَيَّ
سَوَرْنَتَ لِمَا أَنْتَهِي مَوْرِدُ

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3. Answer in Arabic any five of the
following : [10]

(١) متى وصلت هنا ؟

(٢) ماذا لبست ؟

(٣) هل أنت كبير ؟

(٤) متى أنت ؟

(٥) أين الولد ؟

(٦) ماذا سئلت ؟

(٧) كيف المزرعة ؟

4. Write the letter in Arabic to the
Company Manager : [10]

أكتب الرسالة في العربية
الى مدير الشركة

□□□

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S.Y. B.Sc. (Sem. - I)
URDU GENERAL - II
(2008 Pattern)

Time : 2 Hours]   *[Total Marks : 40*

Instructions :

   1)   *All questions are compulsory.*

   2)   *Figures to the left indicate full marks.*

[10] سوال نمبر۱:۔ کلامِ اقبال کی خصوصیات بیان کیجیے۔

یا

اقبال کی حیات و شخصیت پر روشنی ڈالیے۔

[10] سوال نمبر۲:۔ بانگِ درا کی حصہ اول کی نظموں کا اجمالی جائزہ پیش کیجیے۔

یا

اقبال کی منظر یہ شاعری پر نقد و تبصرہ کیجیے۔

[10] سوال نمبر۳:۔ ذیل میں سے کسی ایک نظم کا تنقیدی جائزہ پیش کیجیے۔

۱۔ ترانۂ ہندی   ۲۔ ایک آرزو   ۳۔ جگنو

[10] سوال نمبر۴:۔ ذیل میں سے کوئی پانچ اشعار کی تشریح کیجیے۔

۱۔ وہ خموشی شام کی جس پر تکلم ہو فدا   وہ درختوں پر تفکر کا سماں چھایا ہوا

۲۔ پانی کو چھو رہی ہے جھک کے پھول کی ٹہنی   جیسے حسین کوئی آئینہ دیکھتا ہے

۳۔ یونان و مصر و روما سب مٹ گئے جہاں سے   اب تک مگر ہے باقی نام و نشاں ہمارا

۴۔ جگنو کی روشنی ہے کاشانۂ چمن میں   یا شمع جل رہی ہے پھولوں کی انجمن میں

۵۔ شکتی بھی شانتی بھی بھگتوں کے گیت میں ہے   دھرتی کے باسیوں کی مکتی پریت میں ہے

۶۔ تجھ میں کچھ پیدا نہیں دیرینہ روزی کے نشان   تو جواں ہے گردشِ شام و سحر کے درمیاں

۷۔ پربت وہ سب سے اونچا ہمسایہ آسماں کا   وہ سنتری ہمارا، وہ پاسباں ہمارا

□□□

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S.Y. B.Sc.

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Still Photography, Processing and Printing

(Semester - I) (Paper - III) (New Course) (Vocational)

(2008 Pattern)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions :   1)   *All questions are compulsory.*

            2)   *Draw neat and labeled diagrams wherever necessary.*

            3)   *Figures to the right indicate full marks.*

Q1) Answer the following in short :   **[16]**

   a)   Draw a diagram to show the angle of view of a lens.

   b)   How is the 'depth of field' affected by the aperture of a lens?

   c)   What are primary colours? How are they different from secondary colours?

   d)   Draw a diagram and show what happens when white light passes through a yellow filter.

   e)   What is the advantage of center weighted metering pattern?

   f)   Mention one natural and one artificial source of the hard and soft light.

   g)   A close up lens has a focal length of 300 mm. Find out its diopter number.

   h)   Explain the difference between 'daylight' and 'skylight'.

Q2) Attempt <u>any two</u> of the following :   **[8]**

   a)   Draw a diagram and explain the concept of magnification as applicable in photography.

   b)   Discuss the use of UV filter in photography.

   c)   Draw a flash curve and explain the information it provides.

Q3) Attempt any <u>two</u> of the following :   **[8]**

   a)   What are the different artificial light sources used in photography?

   b)   Discuss the effect of over and under exposure on a photographic image.

   c)   What is a polarizing filter? Discuss its use in photography.

Q4) Attempt <u>any one</u> of the following :   [8]

    a) Discuss the features of a wide angle lens and a telephoto lens.

    b) Draw a diagram and show the construction of an electronic flash. Explain the function of each component.

■ ■ ■

P558   **[3917]-145**

S.Y. B.Sc.

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Principles of Acoustics and Sound for Media

(Semester - I) (Paper - IV) (New Course) (Vocational)

(2008 Pattern)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions :

    1)   *All questions are compulsory.*

    2)   *Draw neat and labeled diagrams wherever necessary.*

    3)   *Figures to the right indicate full marks.*

Q1) Answer the following in short :   **[16]**

    a)   Define : Decibel and sound pressure level.

    b)   Show that doubling the intensity gives an increase of 3dB of sound.

    c)   Explain : Synthetic reverberation.

    d)   Give the characteristics of a microphone.

    e)   Calculate the SPL for sound waves having effective pressure of $3N/m^2$ and the reference pressure $10^{(-2)} N/m^2$.

    f)   Draw a neat labelled diagram of a moving coil loudspeaker.

    g)   How is a stereophonic sound reproducing system different from the monophonic sound reproducing?

    h)   Give the Sabine's and Eyring's formula.

    i)   Give the principle of the disc recording system.

Q2) Answer <u>any two</u> of the following :   **[8]**

    a)   With the help of a neat block diagram explain the working of a PA system.

    b)   Find the reverberation of an office which has a volume of 1600 m^3 and total absorption of 80 metric sabine. What is the sound absorption required for an optimum reverberation time of 1.2 sec.?

    c)   Explain with the help of a neat block diagram the working of an electrodynamic loudspeaker.

Q3) Answer any <u>two</u> of the following :   **[8]**

   a)   Explain with the help of a neat block diagram the working of a ribbon microphone.

   b)   i)   What are the requirements of a good auditorium?

        ii) Explain : An anechoic chamber.

   c)   With the help of a block diagram explain the working of magnetic recording and reproducing system.

Q4) Answer <u>any two</u> of the following :   **[8]**

   a)   With the help of a neat block diagram explain the working of the disc reproduction system.

   b)   Explain with the help of a neat diagram the complete working of a three-way network.

   c)   Explain with the help of a neat block diagram the construction and working of a condenser microphone.

■ ■ ■

P386   **[3917]-231**

S.Y. B.Sc. (Sem. - II)

मराठी (MARATHI)

व्यावहारिक मराठी (नवा अभ्यासक्रम) (2008 पॅटर्न)

वेळ : 2 तास]   [एकूण गुण : 40

सूचना :- 1) सर्व प्रश्न अनिवार्य आहेत.

2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.

प्रश्न 1) अ) पुढील उताऱ्याचे मराठीत भाषांतर करा.   **[8]**

With the growth of civilization and the concentration of people into cities, naturalresource requirements increased as secondary needs expanded. It became essential to organize and direct agriculture over large areas in order to provide for urban people.

Effective transportation from farmlands to cities became essential, as did metals and all kinds of other minerals, stones and timber suitable for the construction of buildings, ships and vehicles; in addition, great numbers of domestic animals (cows, sheeps etc.) were required. Human requirements wers further increased as the greater peace of civilized life enabled part of the population to look beyond the problem of mere survival. Thus, a desire for contact with wild nature developed as the urban population became increasingly separated from it through city life.

ब) पुढील उताऱ्याला समर्पक शीर्षक देऊन एक तृतीयांश सारांश करा.   **[7]**

भारत इ. 2020 मध्ये महाशक्ती होईल असा विश्वास माजी राष्ट्रपती डॉ. अब्दुल कलाम यांनी व्यक्त केला आहे. महाशक्ती होण्यासाठी आपल्याकडे आवश्यक त्या सगळ्या क्षमता आहेत. विज्ञान आणि तंत्रज्ञानात आपण जगाला थक्क करणारी प्रगती केली आहे. कृषी, उद्योग–व्यवसाय आणि सेवाक्षेत्रामध्येही आश्चर्यकारक मुसंडी मारली आहे. 30 कोटीं पेक्षा मोठा मध्यमवर्ग आणि तरूणांची संख्या ही देखील आपली बलस्थाने आहेत. परंतु महाशक्ती होण्यासाठी एवढ्या गोष्टी पुरेश्या आहेत का ?

[P.T.O.

आज विविध क्षेत्रांमधील भ्रष्टाचाराने देशाची प्रतिमा खराब होते आहे. जीवनाचे सगळेच क्षेत्र भ्रष्टाचाराने व्यापले आहे. ही भयावह परिस्थिती आहे. एकीकडे शहरी जीवनामध्ये आमुलाग्र बदल होत आहेत. जीवनमान ऊंचावत आहे, पण त्याच वेळेस देशात हजारो शेतकरी आत्महत्या करताहेत. कृषीक्षेत्र उध्वस्त होत आहे. अशा वेळेस प्रश्न पडतो की, प्रगती म्हणजे नक्की काय ? महाशक्ती होण्याच्या प्रयत्नात एवढी मोठी आहुती द्यावी लागणार आहे का ?

खऱ्या अर्थाने प्रगती म्हणजे शेवटच्या माणसाच्या घरातही पुरेसें अन्न उपलब्ध असणे. अभावातून आत्महत्या करण्याची वेळ कुणावरही येऊ नये. देशातल्या प्रत्येक मुलाच्या हातात पाटी आणि पेन्सिल असावी. हा दिवस उजाडेल तेव्हा भारत आपोआपच महासत्ता झालेली असेल.

शब्द संख्या 160

प्रश्न 2) पुढीलपैकी कोणत्याही दोन प्रश्नांची उत्तरे लिहा. **[15]**

अ) विज्ञान प्रदर्शन या विषयावर वर्तमानपत्रासाठी 300 शब्दांत लेख लिहा.

ब) हरितक्रांती या विषयावर आकाशवाणीसाठी 300 शब्दांचे भाषण तयार करा.

क) 'अतिवृष्टीमुळे शेतीचे झालेले नुकसान' या विषयावर दूरदर्शनसाठी लघुपट तयार करावयाचा आहे. 5 मिनिट कालावधीसाठी संहिता लेखन करा.

प्रश्न 3) पुढील इंग्रजी शब्दांसाठी मराठीतील पारिभाषिक शब्द लिहा. **[10]**

i) Elocution.

ii) Member of Legislative Assembly.

iii) Member of Legislative Council.

iv) Additional.

v) Residentional.

vi) Nuclear power.

vii) Astronomy.

viii) Intestine.

ix) Fellowship.

x) Director.

□□□

P387   **[3917]-232**

S.Y. B.Sc. (Sem. - II)

हिंदी (Hindi)

(नया पाठ्यक्रम)(2008 Course)

समय : 2 घंटे]   [पूर्णांक : 40

पाठ्यपुस्तकें :– 1) प्रतिनिधि कहानियाँ

संपादक – हिंदी विभाग, एस.एन.डी.टी. विश्वविद्यालय, मुंबई.

2) छायावाद : प्रतिनिधि रचनाएँ

संपादक – नीरा परमार

सूचनाएँ :–   1) सभी प्रश्न अनिवार्य हैं।

2) दाहिनी ओर लिखे अंक प्रश्न के पूर्णांक हैं।

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*प्रश्न 1)*अ) निम्नलिखित में से किन्हीं दस संक्षिप्तियों के हिंदी पूर्ण पर्याय लिखिए।   [10]

i) C.I.D.   ii) C.T.B.T.

iii) D.C.C.   iv) I.B.A.

v) I.D.B.I.   vi) M.P.

vii) N.I.B.M.   viii) Ph.D.

ix) R.B.I.   x) S.E.T.

xi) U.G.C.   xii) W.H.O.

आ) निम्नलिखित अनुच्छेद का एक–तिहाई सारांश लिखते हुए उसे उचित शीर्षक दीजिए।   [4]

कंप्यूटर उत्पादकता को बढ़ा देता है। खासकर वहाँ जहाँ खतरनाक, उबाऊ या नियमित काम जुड़ा हुआ हो। किसी धातु में सुराख करना या पानी के स्तर पर नजर रखने जैसे काम को कंप्यूटर ज्यादा कुशलता से कर सकता है। श्रमिक संगठन जो एक समय कंप्युटर को खतरा मान रहे थे, आज कंप्यूटर के सहारे अपने दफ्तर का कामकाज निपटा रहे हैं। उन्होंने यह महसूस किया है कि यद्यपि कंप्यूटर कुछ नौकरियां खा सकता है। लेकिन वह मनुष्य की क्षमता के ज्यादा अनुरूप नौकरियों के लिए श्रमिकों को स्वतंत्र करता है। उदाहरण के तौर पर जब दफ्तर में कंप्यूटर लगता है तो इस बदलाव के पीछे पहली उम्मीद यह रहती है कि उत्पादकता में वृद्धि होगी, क्योंकि कर्मचारी अपने काम को बेहतर और ज्यादा तेज गति से करने के लिए कंप्यूटर का इस्तेमाल करना सीखते हैं।

P.T.O.

*प्रश्न 2)*अ) निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर लिखिए। [8]

       i)   बड़ी बहू के मायके पहुँचने पर हरगोबिन की मनोदशा कैसी हुई ?

       ii)   सोमा बुआ की सेवाभावी वृत्ति को स्पष्ट कीजिए।

       iii)   सुबोध का चरित्र–चित्रण कीजिए।

       iv)   ‘चीफ की दावत’ कहानी में शामनाथ दावत की तैयारी किस प्रकार करते हैं ?

    आ) निम्नलिखित अवतरण की ससंदर्भ व्याख्या कीजिए। [5]

       i)   तू तो जानती है कि नई फैशन में लड़की की शादी में क्या दिया जाता है ? समधियों का मामला ठहरा, सो भी पैसे वाले।

अथवा

       ii)   जो शायर दिलों को काटने की बात करते हैं, इन्सानी रिश्तों को तोड़ने की बात करते हैं, उनका अदब कोयला है, जिसे छूकर हाथ काले होते हैं और दिमाग तारीक।

*प्रश्न 3)*अ) निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर लिखिए। [8]

       i)   ‘जागो फिर एक बार’ कविता का भावार्थ संक्षेप में लिखिए।

       ii)   ‘वनबेला’ कविता में कवि अमीर बनने के सपने किस प्रकार देखता है ?

       iii)   ‘द्रुत झरो जगत के जीर्ण पत्र।’ ऐसा कवि क्यों कहता हैं ?

       iv)   ‘भारत माता’ कविता में भारतवासियों की कौन–सी विशेषताओं का वर्णन कवि ने किया है ?

    आ) निम्नलिखित अवतरण की ससंदर्भ व्याख्या कीजिए। [5]

       i)   पशु नहीं, वीर तुम;

          समर–शूर, क्रूर नहीं;

          कालचक्र में हो दबे,

          आज तुम राजकुँवर,

          समर सरताज !

अथवा

       ii)   निष्प्राण विगत युग ! मृत विहंग !

          जग–नीड़ शब्द औ’ श्वास–हीन,

          च्युत, अस्त–व्यस्त पंखों से तुम

          झर–झर अनन्त में हो विलीन !

❏❏❏

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S.Y. B.Sc. (Sem. - II)

SANSKRIT (संस्कृत)

गीर्वाणभारती

(New) (2008 Pattern)

Time : 2 Hours]   [*Max. Marks : 40*

Q1) Write short answers in any 2-4 lines of the following questions.   **[16]**

पुढील प्रश्नांची 2-4 ओळीत उत्तरे लिहा.

   i)   Explain the meaning of title 'सद्धर्मपुण्डरीक'.

       सद्धर्मपुण्डरीक या शीर्षकाचा अर्थ स्पष्ट करा.

   ii)   How the old man protected his children from the fire?

       वृद्ध मनुष्याने अग्निपासून आपल्या मुलांचे संरक्षण कसे केले ?

   iii) State the 3 names of scientist related to ज्योतिःशास्त्र.

       ज्योतिःशास्त्राशी संबंधित 3 शास्त्रज्ञांची नावे लिहा.

   iv) Who has described the consciousness of the trees and when?

       वृक्षांच्या चेतनत्वाचे वर्णन कोणी केले आहे ? व कधी ?

   v)   In which book of रसायनशास्त्र 'रसशाला' is described?

       रसायनशास्त्राच्या कोणत्या ग्रंथात रसशालेचे वर्णन आढळते ?

   vi) In which subjects भास्कराचार्य has written the books?

       भास्कराचार्यांनी कोणकोणत्या विषयावर ग्रंथ लिहिले ?

   vii) Explain the meaning of 'मूढः परप्रत्ययनेयबुद्धिः'.

       'मूढः परप्रत्ययनेयबुद्धिः' चा अर्थ स्पष्ट करा.

   viii) How did poet describe the 'धीर' ?

       धीराचे वर्णन कवी कसे करतो ?

Q2) Write short notes on <u>any two</u> of the following in 8-10 lines each. **[8]**

पुढीलपैकी <u>कोणत्याही दोहोंवर</u> 8–10 ओळींत संक्षिप्त टीपा लिहा.

   i)   गणितशास्त्रम्

   ii)   विमानभेदाः

   iii)   Cleverness of the old man in सद्धर्मपुण्डरीककथा.

       सद्धर्मपुण्डरीक कथेतील वृद्धाचे चातुर्य.

Q3) Write short notes on <u>any two</u> of the following in 8-10 lines each. **[8]**

पुढीलपैकी <u>कोणत्याही दोहोंवर</u> 8-10 ओळींत संक्षिप्त टीपा लिहा.

   i)   Condition of विवेकभ्रष्ट

       विवेकभ्रष्टाची अवस्था.

   ii)   भावस्थिराणि जननान्तरसौहृदानि।

   iii)   Thoughts about the wealth in 'नीतिशतक'.

       नीतिशतकातील धनविषयक विचार.

Q4) Answer <u>any one</u> of the following questions in 16-20 lines. **[8]**

पुढीलपैकी <u>कोणत्याही एका</u> प्रश्नाचे उत्तर 16-20 ओळींत लिहा.

   i)   Explain in detail 'वास्तुशास्त्र' and 'पदार्थविज्ञानम्'.

       वास्तुशास्त्र व पदार्थविज्ञानम् यांचे सविस्तर स्पष्टीकरण करा.

   ii)   Explain the thoughts of Kālidāsa with the lesson सुभाषितानि.

       'सुभाषितानि' या पाठात आलेले कालिदासाचे विचार स्पष्ट करा.

□□□

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[3917]-234

S.Y. B.Sc. (Sem. - II)

ARABIC (Functional)

(New Course) (2008 Pattern)

Time : 2 Hours]　　　　　　　　　　　　　　　　[*Max. Marks : 40*

1. Translate into English/Urdu/Marathi any two of the following Passages: **[10]**

(الف) هذا رجلٌ ‐ هذا رجلٌ مسلمٌ، له خُلُقٌ طيبٌ ‐
في يده كتابٌ ... تبدو كـ ...
عربيٌّ ... وهو ذا المـ ... الكتابَ نفسَه
صديقٌ ... إذ الـ ... الرجلُ مشغولٌ بالقراءة
هذا اللسانُ عسرٌ ... العربيةَ لسانٌ قديمٌ ‐

(ب) الولدُ المجتهدُ محبوبٌ له قوّةٌ كبيرةٌ
منصوبٌ مسرورٌ في كل وقتٍ ‐ الوقتُ عندَه
شيءٌ ثمينٌ ‐ وذلك وذاك كسلانٌ ‐ الولدُ
الكسلانُ مذمومٌ صحوٌ محزونٌ ‐ في كل وقتٍ
الوقتُ عندَه حينٍ بشيءٍ ‐

(ج) هذا دكّانُ الفاكهاتِ فيه كلّ قسمٍ من الفاكهة

P.T.O.

موجود فيها رمان - و عنب - و تفاح - و
موز و تين - و برتقال - الرمان مفيد فيه
فيتامين المملكة - و فيه موز أصفر -

2. Translate and explain any Five couplets
   of the following: **[10]**

(١) كتاب أنت المدلل الوفي
    وأنت الكاتب والمرشد

(٢) بجود كف أسقى النيل المال
    وقد خبأت الخلا أصحن

(٣) إذا ما صديقك أي شئ تمنى
    وعلمتني ما به أسأل

(٤) فما أنت بمنفق من وحسنت
    إذا ما الملك لا ينهل

(٥) ينصحني بالحديث الشيق
    وتخبرت بالكتب أكتسب

(٦) وتكشف لي حكم السائلين
    وتبرز مكنون ما كتموا

3. Answer in Arabic any Five of the following : [10]

(١) مَنْ هٰذَا ؟

(٢) مَاذَا الْكِتَابُ ؟

(٣) هَلْ أَنْتَ كَبِيرٌ ؟

(٤) مَنْ أَنْتَ ؟

(٥) أَيْنَ الْكُرْسِيُّ ؟

(٦) أَيْنَ الْوَكِيلُ ؟

(٧) كَيْفَ الزُّهُورُ ؟

4. Write the letter in Arabic to the Company Manager : [10]

أَكْتُبِ الرِّسَالَةَ وَالْمَكْتُوبَةَ إِلَى مُدِيرِ الشَّرِكَةِ.

□□□

P430   **[3917]-235**

S.Y. B.Sc. (Sem. - II)
URDU (General Paper - II)
(New Course) (2008 Pattern)

Time : 2 Hours]   *[Total Marks : 40*

Instructions :

1) *All questions are compulsory.*
2) *Figures to the left indicate full marks.*

[10]   سوال نمبر۱:- پریم چند کے افسانہ نگاری کی خصوصیات بیان کیجیے

[10]   سوال نمبر۲:- " بڑے گھر کی بیٹی " اس افسانے کا خلاصہ لکھیے

[10]   سوال نمبر۳:- ذیل میں سے کوئی دو کرداروں پر روشنی ڈالیے ۔

۱) گھیسو   (۲) آنندی   (۳)۳ بہاری لال (۴) الوکی حسین

[10]   سوال نمبر۴:- کوئی دس انگریزی الفاظ کے لیے اُردو الفاظ لکھیے

Radiation   Mixture   Voltage

Conduction   Pesticide   Vaccine

Haemophilia   Biomass   Density

Micro Organism.

□□□

S.Y. B.Sc.
PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION
(2008 Pattern) Colour Photography
(Semester - II) (Paper - III) (New Course) (Vocational)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions :

   1)   *All questions are compulsory.*

   2)   *Draw neat and labeled diagrams wherever necessary.*

   3)   *Figures to the right indicate full marks.*

Q1) Answer in short :   **[16]**

   a)   The colour temperature of day light is 5500 K and that of overcast sky is 7000 K. What is the difference between them?

   b)   Draw the curve to show the light sensitivity of the normal human eye and explain it.

   c)   Explain the difference between a white light source and a monochromatic light source. Give one example of each.

   d)   Convert the colour temperature of 8000 K into mired.

   e)   A colour film is exposed to a scene with red, green and blue colours. Which colours are produced in the film?

   f)   What is a neutral density filter? How is it density filter useful in photography?

   g)   Draw a diagram and show what happens when white light passes through a yellow filter.

   h)   Define the colour temperature of a light source.

Q2) Attempt <u>any two</u> of the following :   **[8]**

   a)   Draw a diagram and show the colour negative image.

   b)   What is a black body? Draw a diagram and show the black body radiation spectrum at three different temperatures. Discuss these curves.

   c)   What is a Mired shift? Explain, with suitable examples, the difference between positive and negative Mired shift.

Q3) Write short notes on <u>any two</u> of the following :   **[8]**

    a)   Use of filters in a colour enlarger.

    b)   Colour vision.

    c)   Light sources used in photography.

Q4) Attempt <u>any one</u> of the following :   **[8]**

    a)   Draw a labeled diagram of a colour negative film and describe its cross section.

    b)   Draw a labeled diagram and discuss the three point lighting set up. Clearly mention the importance of each light used in this setup.

■ ■ ■

P560   **[3917]-245**

S.Y. B.Sc. (Sem. - II)
PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION
Principles and Applications of Analog and Digital Communications
(Paper - IV) (New Course) (Vocational) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions :
     1)   *All questions are compulsory.*
     2)   *Draw neat and labeled diagrams wherever necessary.*
     3)   *Figures to the right indicate full marks.*

Q1) Attempt the following questions :   **[12]**

   a)   State True or False of the following.   **[2 × 1 = 2]**

      i)   Antenna is used for conversion of RF current into electromagnetic waves and vice versa. ....

      ii)   Vestigial side band is not used for picture signal transmission. ....

   b)   Comment on the following statements. (any two)   **[2 × 2 = 4]**

      i)   Define the terms "Selectivity" and "Fidelity".

      ii)   Comment on need of modulations and explain how mixing of signals can be avoided.

      iii)   Why SSB generation is preferred over DSB?

   c)   Attempt the following :   **[3 × 2 = 6]**

      i)   Consider the analog signal $x(t) = 2\sin 50\pi t + 5\sin 500 \pi t - \cos 100 \pi t$, Find maximum frequency present in x(t) and Niquist rate for this signal.

      ii)   State and explain the Shannon's Channel Capacity theorem.

      iii)   Give the importance of Nyquist criteria in Sampling.

Q2) Attempt the following : (any two) **[2 × 4 = 8]**

    a)   Write a short note on MODEM.

    b)   Explain the Filter method for SSB generator.

    c)   What is Data transmission and explain any one method in short.

Q3) Attempt the following : (any two) **[2 × 4 = 8]**

    a)   Discuss the advantages of parallel transmission over serial transmission?

    b)   Explain FDM with the help of block diagram.

    c)   Compare AM and FM?

Q4) Attempt following :(any two) **[2 × 6 =12]**

    a)   A transmitter radiates 10kW power with the carrier unmodulated and 10.5kW when the carrier is modulated by one sinusoidal signal. Calculate the modulation index. If another modulating signal corresponding to 30% modulation is transmitted simultaneously determine the total radiated power.

    b)   Draw block diagram of communication system and explain in details.

    c)   A modulating signal $10 \sin (2\pi \times 10^3 t)$ is used to modulate a carrier signal $20 \sin (2\pi \times 10^4 t)$. Find percentage of modulation, side band frequencies, bandwidth and amplitudes of sidebands.

■ ■ ■

P286   **[3917]-28**

F.Y. B.Sc.
FOUNDATION COURSE
(Restructuring)
(New 2008 Pattern)

Time : 3 Hours]   [*Max. Marks : 80*

Instructions:

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

Q1) Explain the following concepts in **50** words each (any two):   **[10]**

    a)   Culture.

    b)   Hypothesis.

    c)   Global Warming.

    d)   Liberalization.

Q2) Write the following short notes in **100** words each (any four):   **[20]**

    a)   National Integration.

    b)   Food problem in India.

    c)   Science.

    d)   Superstitions.

    e)   Liberty.

    f)   Problem of Energy.

Q3) Write answers of the following questions in **200** to **250** words each (any three):   **[30]**

    a)   Write the importance of Religion in Indian society.

    b)   State the causes of unemployment.

    c)   Describe the various problem of Reservation in India.

    d)   State the effects of Science and Technology on Transport and Communication and Rural Development.

    e)   Write the merits of Indian Democracy.

P.T.O.

Q4) Write the answer of any <u>one</u> of the following in **500** words. **[20]**

    a)   What is Population Explosion? Write the causes and effects of growing population in India.

    b)   Define Society and state the characteristics of Indian Society.

☐☐☐

P286   **[3917]-28**

प्रथम वर्ष विज्ञान (F.Y. B.Sc.)

पायाभूत अभ्यासक्रम (नवीन 2008 पॅटर्न)

(मराठी रूपांतर)

वेळ : 3 तास]   **[एकूण गुण : 80**

सूचना :– 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.

2) उजवीकडील अंक पूर्ण गुण दर्शवितात.

3) संदर्भांसाठी मूळ इंग्रजी प्रश्नपत्रिका पहावी.

प्रश्न 1) पुढील संकल्पना 50 शब्दांत स्पष्ट करा. (फक्त दोन)   **[10]**

अ)   संस्कृती.

ब)   गृहितक.

क)   जागतिक तापमान वाढ.

ड)   उदारीकरण.

प्रश्न 2) पुढील टिपा प्रत्येकी 100 शब्दांत लिहा. (फक्त चार)   **[20]**

अ)   राष्ट्रीय एकात्मता.

ब)   भारतातील अन्नसमस्या.

क)   विज्ञान.

ड)   अंधश्रद्धा.

इ)   स्वातंत्र्य.

फ)   ऊर्जा समस्या.

प्रश्न 3) पुढील प्रश्नांची उत्तरे 200 ते 250 शब्दांत लिहा. (फक्त तीन)   **[30]**

अ)   भारतीय समाजातील धर्माचे महत्व लिहा.

ब)   बेकारीची कारणे लिहा.

क)   भारतातील आरक्षणाच्या विविध समस्या विशद करा.

ड)   वाहतूक दळणवळणाची साधने आणि ग्रामीण विकास यावरील विज्ञान व तंत्रज्ञानाचे परिणाम सांगा.

इ)   भारतीय लोकशाहीचे गुण लिहा.

P.T.O.

प्रश्न 4) पुढीलपैकी एका प्रश्नाचे उत्तर 500 शब्दांत लिहा. [20]

अ) लोकसंख्या विस्फोट म्हणजे काय ? व भारतातील वाढत्या लोकसंख्येची कारणे व परिणाम लिहा.

ब) 'समाज' व्याख्या द्या, आणि भारतीय समाजाची वैशिष्ट्ये सांगा.

☐☐☐

P555 **[3917]-31**

F.Y. B.Sc.

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION
(Paper - I) (Vocational) (2008 Pattern)
Basic photography and appreciation of media

Time : 3 Hours] *[Max. Marks : 80*

Instructions : 1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Draw neat and labeled diagrams wherever necessary.*

Q1) Answer the following : **[16]**

a) Draw a diagram and explain the difference between refraction and diffraction of light.

b) Write two equivalent exposures for : f 8 @ 1/60 sec. For ISO 100.

c) Explain the difference between monochromatic light and white light.

d) Draw a diagram and show the difference between pincushion and barrel distortion.

e) Explain why the mirror in a SLR camera is front coated.

f) Mention any four applications of photography.

g) What does pixel mean?

h) How is the aperture of a camera lens useful?

Q2) Answer any <u>four</u> of the following : **[16]**

a) Draw a diagram and show the image formation by a pinhole. Discuss the features of the image so formed.

b) Explain what you mean by the magnification produced by a simple lens.

Explain what is life size, smaller than life size and larger than life size magnification.

c) What do you mean by f number? Write down the f number scale and differentiate between small and large f number.

d) Discuss the importance of white balance in digital photography.

e) Draw a suitable diagram and explain the rule of thirds used in photographic composition.

Q3) Answer any <u>four</u> of the following : **[16]**

    a)   Draw a diagram to show the working of a focal plane shutter at slow shutter speeds.

    b)   Discuss the qualities of a professional photographer.

    c)   Discuss the advantages and disadvantages of a DSLR camera.

    d)   Differentiate between a 'news' and a 'photo news'.

    e)   Discuss what precautions you would take while handling a DSLR camera.

Q4) Answer the following : **[16]**

    a)   Discuss the importance of photography in various fields.

<p align="center">OR</p>

       Discuss the role of photography as a medium of mass communication. Give suitable examples.

    b)   What is a hard news and a soft news? As photographer how will you prepare for handling a hard news and a soft news?

<p align="center">OR</p>

       Discuss the role of a photograph in a news paper.

Q5) Answer any <u>one</u> of the following : **[16]**

    a)   What is photographic composition? What are the basic rules and elements of composition? Discuss with suitable examples.

    b)   Draw a neat and labeled diagram and describe the construction and working of a DSLR camera.

<p align="center">■ ■ ■</p>

P556   **[3917]-38**

F.Y. B.Sc.

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

(Paper - II) (Vocational) (2008 Pattern)

Introduction to mass communication and media scene in India

Time : 3 Hours]   *[Max. Marks : 80*

Instructions :   *1)*   *All questions are compulsory.*
          2)   *Figures to the right indicate full marks.*
          3)   *Give suitable examples and draw neat and labeled diagrams wherever necessary.*

Q1) Attempt <u>any two</u> of the following :   **[16]**

a)   Discuss the role of radio in rural development of country like India.

b)   Discuss, with suitable examples, different types of communication based on number of participants.

c)   Describe a newspaper organization. Explain the role of the editor, the subeditor and the reporter.

Q2) Attempt any <u>four</u> of the following :   **[16]**

a)   Explain group communication with suitable examples.

b)   Discuss cinema as a medium of mass communication.

c)   Write a short note on Aristotle's model.

d)   Discuss news paper as a medium of mass communication.

e)   Compare the reality shows and news programmes on TV.

Q3) Attempt any <u>four</u> of the following :   **[16]**

a)   Explain, with suitable example, the difference between interpersonal and intrapersonal communication.

b)   Write short note on : phone in programme on radio.

c)   Write short note on : redundancy and entropy.

d)   Write short note on : Five Ws and one H.

e)   Compare a hard news and a soft news by giving suitable examples.

Q4) Attempt <u>any two</u> of the following :   **[16]**

    a)   Discuss different types of fiction and non-fiction programs on television.

    b)   Explain Shanon and Weaver's model of communication with suitable examples.

    c)   You are asked to interview the topper in the university examination. What questions would you ask him/her if this is for a youth magazine?

Q5) Attempt <u>any two</u> of the following :   **[16]**

    a)   Explain the characteristics of mass communication.

    b)   Write a news report of about 100 words on the visit of a film star to your college.

    c)   What are the merits of TV as medium of mass communication?

■ ■ ■

[3917] - 214

S.Y. B.Sc.

STATISTICS

ST - 222 : Continuous Probability Distributions - II and Demography

(Semester - II) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks :40*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

    3)   *Use of calculator & statistical tables is allowed.*

    4)   *Symbols and abbreviations have their usual meaning.*

Q1) Attempt each of the following :

    a)   Choose correct alternative for each of the following :   **[1each]**

        i)   Suppose X_1, X_2 - - - - X_5 are independent and identically distributed N (0, 1) variates. Then the probability distribution of $\dfrac{2X_5}{\sqrt{\sum_{i=1}^{4} X_i^2}}$ is

            A) χ_4^2 B) χ_5^2 C) t_4 D) $F_{1,4}$

        ii)   The disadvantage of crude birth rate (C.B.R.) is

            A)   it ignores age and sex distribution.

            B)   it underestimates fertility rate.

            C)   it provides very approximate fertility rate.

            D)   all of the above.

        iii)   To test the independence of two attributes A and B we use the distribution of test statistic, under H_0 is

            A)   Normal distribution   B)   Chi-square distribution

            C)   t-distribution   D)   F-distribution

b) State whether the following statements are true or false **[1each]**

   i) If $X \sim t_{12}$ then $X^2 \sim F_{12,\ 1}$.

   ii) In a paired t-test observations in two samples are independent of each other.

   iii) The Chi-square distribution is positively skewed and leptokurtic.

c) Define total fertility rate (T.F.R.) **[1]**

d) If X_1, X_2, - - - - X_{10} is a random sample from N (8, 5), find $E(2s^2)$. **[1]**

e) If a continuous random variable X has moment generating function $M_x(t) = (1 - 2t)^{-6}$, identify the distribution of X. **[1]**

f) Define Snedecore's F-distribution. **[1]**

Q2) Attempt any two of the following : **[5 each]**

a) The probability distribution of continuous random variable X is given by

$$f(x) = \frac{1}{\sqrt{2\pi}} . e^{-\frac{1}{2}x^2}, -\infty < x < \infty .$$ Find the distribution of X^2.

Also, if X_1, X_2 ...... X_n be n independent standard normal variates, state the distribution of $Y = \sum_{i=1}^{n} Xi^2$.

b) Explain the test procedure for testing equality of two population means when population variances are unknown. Also state 95% confidence interval for difference in population means.

c) What is standardized death rate? Explain direct method of obtaining standardized death rate.

Q3) Attempt any two of the following : **[5 each]**

a) Define students t-distribution and derive its probability density function.

b) Explain the test procedure for testing $H_0 : \rho = 0$ when a random sample of n pairs of observations is available from normal population.

c) Test whether the following sample can be regarded as a sample drawn from a normal population with variance equal to 4 at 5% level of significance.

   7.95, 4.90, 3.65, 7.07, 4.60.

Q4) Attempt any one of the following :

   a) i)   Derive the expression for r^{th} raw moment of F-distribution with n_1 and n_2 degrees of freedom. Hence, find the mean. **[5]**

      ii) Explain the term sampling distribution of a statistic. Also obtain the sampling distribution of a mean of a random sample of size n drawn from exponential distribution with parameter α. **[5]**

   b) i)   If $X \to \chi_n^2$ then find the probability distribution of $Y = \dfrac{X - n}{\sqrt{2n}}$ as $n \to \infty$. Identify the distribution of Y. **[4]**

      ii) Calculate gross reproductive rate and net reproductive rate for the following data and interpret the results.

Age group	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50
Female Population	18000	15000	14000	14000	16000	13000	12000
Female Births	540	600	700	560	480	442	300
Survival rate	0.95	0.94	0.93	0.92	0.91	0.90	0.88

[6]

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P372

[3917] - 215

S.Y. B.Sc.

GEOGRAPHY

Gg - 221 : Distribution, Development and Planning of Resources

(Semester - II) (Paper - I) (2008 Pattern)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Draw neat diagrams and sketches wherever necessary.*
4) *Use of map stencil is allowed.*

Q1) Answer the following questions in two to three sentences each : **[10]**

a) Name the types of coal.

b) Name any two countries producing bauxite.

c) Name two important petroleum producing states of India.

d) Write names of two plants producing nuclear energy in India.

e) Name the various types of iron ore.

f) Write any two advantages of nuclear power.

g) What do you mean by population density?

h) What are various economic uses of land resources?

i) State any two economic uses of water.

j) What do you mean by resource planning?

Q2) Write notes on any two of the following : **[10]**

a) Distribution of iron ore in India.

b) Population as a resource.

c) Need of resource planning.

Q3) Answer the following questions (Any two) :   **[10]**

    a)   What is the importance of solar power?

    b)   Give an account of production of coal in India.

    c)   Give an account of production of bauxite in the world.

Q4) Explain how mineral resources play an important role in the economic development of any country.   **[10]**

<div align="center">OR</div>

Give an account of world distribution of population.

<div align="center">✪✰✪✰</div>

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[3917] - 216

S.Y. B.Sc.

GEOGRAPHY

Gg - 222 : Surface Water and Ground Water Hydrology
(Semester - II) (Paper - II) (2008 Pattern)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Draw neat diagrams and sketches wherever necessary.

4) Use of map stencil is allowed.

Q1) Answer the following questions in two to three sentences each : **[10]**

a) Define evapotranspiration.

b) Define transpiration.

c) What is meant by stream flow?

d) List the various approaches to the study of urban hydrology.

e) Write any two effects of flood.

f) Write any two methods for controlling evaporation.

g) What is meant by saturation zone?

h) Define ground water.

i) Write any two effects of urbanization on run-off.

j) Define intermediate zone.

Q2) Write short notes on the following (Any two) : **[10]**

a) Saltwater intrusion.

b) Urban run-off management.

c) Evaporation.

P.T.O.

Q3) Answer the following questions (Any two) :   [10]

    a)   Describe the general characteristics of ground water flow.

    b)   Describe the snowmelt hydrology.

    c)   Describe the rational method of peak flow for urban area.

Q4) Define flood. Explain its causes in detail.   [10]

<div align="center">OR</div>

Describe annual hydrograph and river regime.

<div align="center">✪✩✪✩</div>

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[3917] - 217

S.Y. B.Sc.

MICROBIOLOGY

MB - 221 : Bacterial Systematics and Analytical Microbiology

(Semester - II) (Paper - I) (New Course) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks :40*

Instructions to the candidates:

　　1)　*All questions are compulsory.*

　　2)　*Figures to the right indicate full marks.*

　　3)　*Draw neat labeled diagrams wherever necessary.*

　　4)　*Use of calculators, log tables & statistical tables is allowed.*

　　5)　*Use graph paper if necessary.*

Q1) Attempt the following :   [10]

　　a)　Define chemotaxonomy.

　　b)　Calculate mean of the following data
　　　　61, 68, 69, 70, 63, 60, 78

　　c)　Degree celsius scale is an example of _____ i) Ratio scale
　　　　ii) Interval scale iii) Ordinal scale iv) Nominal scale.

　　d)　Write the formula for G + C % determination.

　　e)　Publications of international organizations can be treated as _____ data.

　　f)　State True or False
　　　　　It is possible to measure the range of an open ended distribution.

　　g)　Find the value of $\log_3 9$.

　　h)　In the 9th edition of Bergey's Manual of Determinative Bacteriology
　　　　there are _____ separate phenotypic groupings / sections.

　　i)　Write the formula for similarity coefficient.

　　j)　A grouped frequency distribution in which one of the limits of class
　　　　interval is not specified is called _____
　　　　i) discrete frequency distribution ii) exclusive class distribution
　　　　iii) inclusive class distribution iv) open end distribution.

Q2) Answer the following (Any two) :   **[10]**

   a) Describe DNA hybridization in solution, as a tool for bacterial classification.

   b) Solve the following :

      i) Sketch the graph of $x + y > 2$ & $3x + y < 3$.

      ii) Find the equation of line passing through the point $(5, -3)$ whose slope is -2.

   c) Calculate standard deviation for following data : 4, 8, 16, 9, 3.

Q3) Attempt the following (Any two) :   **[10]**

   a) Find the integral of $\left[x - \left(\frac{3}{x}\right)\right]^2$.

   b) Write the important features of Numerical taxonomy.

   c) Construct a pie diagram for the following data.

Sr.No.	Type of Micro-organism	No. of type of M.O^s.
1	Bacteria	105
2	Protozoa	65
3	Algae	50
4	Fungi	35
5	Actinomycete	50
6	Viruses	25

Q4) Attempt the following (Any two) :   **[10]**

   a) Comment on chemotaxonomy with reference to cell wall composition.

   b) Calculate the Median & Mode for the following data 30, 90, 120, 30, 80, 70.

   c) A certain disease has a mortality rate of 75%. Two patients suffering from the disease are selected at random. What is the probability that at least one of them will recover?

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P375

[3917] - 218

S.Y.B.Sc.

MICROBIOLOGY

MB - 222 : Applied Microbiology - I

(Paper - II) (Sem. - II) (New Course) (2008 Pattern)

Time :2 Hours]   *[Max. Marks :40*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

    3)   *Draw neat labeled diagrams wherever necessary.*

Q1) Attempt the following: **[10]**

    a)   State true or false - Air flora is transient.

    b)   Define : BOD and COD.

    c)   Name any two sources of contamination in a fermentation process.

    d)   Write any two methods used for air sampling.

    e)   Define: Demineralized water.

    f)   Which of the following is an antifoam agent?

        i)   Sulfuric acid

        ii)   Tween 80

        iii)   Acetone

        iv)   Hydrogen peroxide.

    g)   What are aerosols?

    h)   MPN of municipal tap water should be

        i)   0

        ii)   100

        iii)   10

        iv)   5

    i)   Name any two crude nitrogen sources used in commercial scale fermentation.

    j)   Write any two indicators of faecal water pollution.

P.T.O.

Q2) Attempt any two of the following [10]

a) Illustrate diagrammatically a typical continuous stirred tank reacter (CSTR).

b) What is primary screening? Explain any two techniques of primary screening.

c) Describe activated sludge process with the help of suitable diagram.

Q3) Attempt any two of the following [10]

a) Justify : Acetic acid fermentation is a type of dual fermentation.

b) What is air sanitation? Elaborate on sterilization of air.

c) Comment on the advantages and disadvantages of membrane filter technique.

Q4) Attempt any one of the following [10]

a) Explain bacteriological analysis of water with respect to presumptive and confirmed test.

b) i) What are the desirable characteristics of an industrial strain?

ii) Describe sterilization of fermentation medium by filtration and give its significance.

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[3917] - 219

S.Y.B.Sc.

PSYCHOLOGY

Health Psychology

(Paper - 1) (Sem. - II) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

1)   Attempt all questions.

2)   Draw the figures and diagrams wherever necessary.

3)   Figures to the right indicate full marks.

Q1) Answer in <u>two</u> or four sentences.   **[16]**

a)   Define stress.

b)   Define Health Psychology.

c)   What is coping?

d)   Define defense mechanism.

e)   What is post traumatic stress disorder (PTSD)?

f)   What is AIDS?

g)   Define nutrition.

h)   What is alchoholism?

Q2) Attempt any <u>two</u> of the following in eight to ten sentences.   **[8]**

a)   Explain the biopsycho social model of illness.

b)   Explain the concept of burnout.

c)   How should the exercise program be planned?

Q3) Write short notes on any <u>two</u> of the following. [8]

a) Meditation.

b) Mind & body connection.

c) Effects of smoking on health.

Q4) Explain in detail the effects of stress. [8]

OR

Explain in detail problem focused constructive coping.

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[3917] - 220

S.Y.B.Sc. (Sem. - II)

PSYCHOLOGY

Counseling Psychology

(Paper - II) (2008 Pattern)

Time :2 Hours]   *[Max. Marks :40*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Draw the figures and diagrams wherever necessary.*
3) *Figures to the right indicate full marks.*

Q1) Answer in two or four sentences: **[16]**

a)   What is ethical conduct?

b)   State the full form of REBT.

c)   What is consultation?

d)   Whose name is associated with person centered counseling?

e)   What is the variability of individuals within the life stage?

f)   Who is associated with gestalt counseling?

g)   What is depression and demoralization in counseling agenda?

h)   What is substance abuse?

Q2) Attempt any two of the following in eight or ten sentences: **[8]**

a)   Explain the scope of assessment.

b)   Explain how to work with parents.

c)   State reluctance to seek counseling.

Q3) Write short note on any two of the following.   **[8]**

    a)   Ethical principles.

    b)   Assessment tools.

    c)   Normative events.

Q4) Explain in detail the stages of counseling process.   **[8]**

<div align="center">OR</div>

Describe fully the person centered counseling.

<div align="center">☛   ☛   ☛</div>

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[3917] - 223

S.Y.B.Sc.

ELECTRONIC SCIENCE

EL - 221 : Digital System Design

(Paper - I) (Sem. - II) (New Course) (2008 Pattern) (22222)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) All questions are compulsory.

2) Neat diagrams must be drawn wherever necessary.

3) Figures to the right indicate full marks.

Q1) Answer all of the following:

a) What is the basic function of a BCD to seven segment decoder. **[1]**

b) What is ripple counter. **[1]**

c) What do you mean by Totem-pole output stage. **[1]**

d) Define the resolution power of a DAC. **[1]**

e) Higher the Fan-out for the digital ICs is desirable. Comment. **[2]**

f) One can design a modulo – 5 counter using 3-bit ripple counter. Comment. **[2]**

g) Calculate the output voltage for 110100 binary input word. If the applied voltage V = 10V for the binary weighted DAC. **[2]**

h) Convert Gray code 11011 to binary. **[2]**
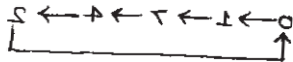
Q2) Attempt any two of the following.

a) Design a 4 : 2 line priority encoder. **[4]**

b) Design a MOD - 7 counter using IC 7490. **[4]**

c) Draw the logic symbol for the BCD - to - 7 segment decoder. Explain its operation using IC 74LS47 in brief. What are other features of it. **[4]**

Q3) Attempt any two of the following.

a) What is Tri-state logic output. Explain Tri-state buffer circuit (non-inverting) symbol and truth table. State any one applications. **[4]**

b) Explain working of binary weighted resistor DAC. **[4]**

c) Draw the block diagram of automobile parking system. Explain its operation. **[4]**

Q4) Attempt all of the following.

a) Design a sequence generator using T flip-flops and K-maps for the given state diagram. **[6]**

$$0 \to 1 \to 4 \to 7 \to 2$$

b) Explain the working of simultaneous or Flash ADC with a neat circuit diagram. **[6]**

OR

Attempt all of the following.

a) Calculate the conversion time for a 4V input successive approximation ADC. Given if f_{clock} = 1 MHz, V_{ref} = 10V and resolution = 16 bits. **[4]**

b) If A = 1000 and B = 0010 binary inputs, compare A with B using 4-bit magnitude comparator IC 7485. **[4]**

c) Find the value of current limiting resistor RS for the given circuit. Assume the voltage drop of LED is 1.8V, standard is in K is 1600 μA. **[4]**
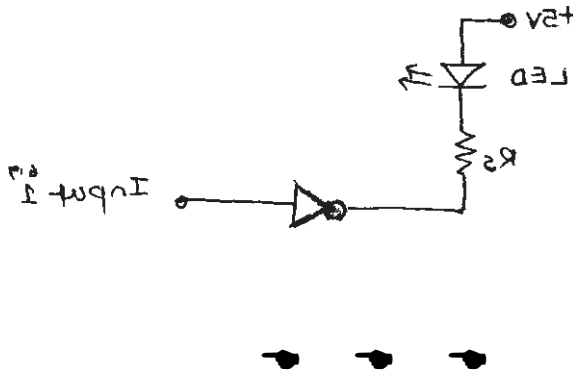
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S.Y.B.Sc.

ELECTRONIC SCIENCE

EL - 222 Communication Systems

(Paper - II) (Sem. - II) (New Course) (2008 Pattern)

Time :2 Hours]   *[Max. Marks :40*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Draw the neat diagram wherever necessary.*
4) *Use of non-programmable calculator is allowed.*

Q1) Attempt all of the following:

    a)   What is FAX?   **[1]**

    b)   Define Selectivity of radio receiver.   **[1]**

    c)   What is FSK?   **[1]**

    d)   Define modulation index of Amplitude Modulated wave.   **[1]**

    e)   "PM is nothing but FM" - Comment.   **[2]**

    f)   "WLL is preferred alternative for typical telephone network". - Comment.   **[2]**

    g)   Find out total number of links required for fully connecting 50 telephone subscribers.   **[2]**

    h)   An AM Wave display on an oscilloscope has value of V_{max} 4.6 divisions and V_{min} 0.7 divisions. Calculate modulation index.   **[2]**

Q2) Attempt any two of the following.

    a)   What is space wave propagation? Explain effect of earth's curvature on space wave propagation.   **[4]**

    b)   With the help of neat block diagram, explain working of superheterodyne AM Receiver.   **[4]**

    c)   Write short note on EPABX system.   **[4]**

Q3) Attempt any two of the following

    a)   Explain cable as a transmission media. Explain fiber optic cable in brief.**[4]**

    b)   Describe classification of telephone exchanges.   **[4]**

    c)   What is internet? State its applications and explain any one of them. **[4]**

Q4) Attempt the following.

    a)   What is SSB? State SSB transmission advantages. Draw the frequency spectrum of SSB.   **[6]**

    b)   What is composite video signal? Sketch the composite video signal for at least two horizontal lines and explain it in brief.   **[6]**

<p align="center">OR</p>

Attempt the following.

    a)   The output voltage of AM transmitter is given by $300 (1+0.4 \sin 6280\, t)$ $\sin 3.14 \times 10^7 t$. This voltage is fed to a load of 500 Ω resistance. Determine

        i)   Carrier frequency.

        ii)   Modulating frequency.

        iii)   Carrier power.

        iv)   Total power output.

        [4]

    b)   In a superheterodyne receiver having no RF amplifier, the loaded Q of antenna coupling circuit is 90. If the IF is 455 kHz. Calculate the image frequency and image frequency rejection at 950 kHz.   **[4]**

    c)   A carrier is being frequency modulated by an AF signal of 2.4V, 400 Hz and M_f being 60. Calculate the maximum deviation. What will be M_f when signal is changed to 250 Hz.   **[4]**

<p align="center">☛   ☛   ☛</p>

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[3917] - 225

S.Y.B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS - 201 : Strategic issues in International Relations

(Sem. - II) (2008 Pattern)

Time :2 Hours]   *[Max. Marks :40*

Instructions to the candidates:

    1)   All questions are compulsory.

    2)   Figures to the right indicate full marks.

Q1) Answer in 2 to 4 sentences each.   **[16]**

    a)   What do you understand by Global Warming?

    b)   What is meant by Integration?

    c)   Name the countries members to ASEAN.

    d)   What is archipelago?

    e)   Define foreign policy.

    f)   What do you mean by Anarchy?

    g)   Explain the meaning of Diplomacy.

    h)   State any two principles of India's foreign policy.

Q2) Answer in 8 to 10 sentences each (any two).   **[8]**

    a)   Explain India's security consideration in SAARC.

    b)   Write in brief on Disarmament.

    c)   Explain the issue of Dual use technology with examples.

Q3) Write short notes on (any two). [8]

    a)   What is security and probe the relationship between National security and International security?

    b)   Role of regional organization in the process of globalization.

    c)   Why is Survival the most basic driving force for the state.

Q4) Answer in 16 to 20 sentences (any one). [8]

    a)   Describe the various functions of Diplomacy.

    b)   Evaluate the Clausewitz dictum "War is a continuation of state policy by other means".

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S.Y.B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS. 202 :- India's National Security

(Sem. - II) (2008 Pattern)

Time :2 Hours]   *[Max. Marks :40*

Instructions to the candidates:

1) *All questions are compulsory.*

2) *Figures to the right indicate full marks.*

Q1) Answer in two to four sentences:-   **[16]**

a) State the meaning of Energy security.

b) State the meaning of Human security.

c) Write the meaning of land border management.

d) Write any two objectives of India's Foreign Policy.

e) Write the meaning of Ethnic Conflict.

f) Define strategic Doctrine.

g) What do you mean by Psychological Operations?

h) What do you mean by Terrorism?

Q2) Answer in 8 to 10 sentences (Any Two)   **[8]**

a) Explain India's National Values.

b) Discuss the causes of Kargil War.

c) Write a note on India's Freedom Struggle.

Q3) Write short notes on (Any Two)   **[8]**

a) Terrorism.

b) Food Security.

c) India's maritime security.

Q4) Answer in 16 to 20 sentences (Any One)   **[8]**

    a)   Write a note on external security challenges to India's security.

    b)   Discuss relationship between energy and national security.

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S.Y.B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS. 203 :- Military Geography

(Sem. - II) (2008 Pattern)

Time :2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) *All questions are compulsory.*

2) *Figures to the right indicate full marks.*

Q1) Answer in 2 or 4 sentences each: **[16]**

a) Define "Military Geography".

b) To whom we called ship of Desert?

c) What do you understand by A.P.C?

d) State the example of grand strategy.

e) State the ideal period of High Altitude warfare.

f) What do you mean by Logistics?

g) What do you understand by D.Z.?

h) Define Tactics.

Q2) Answer in 8 or 10 sentences (Any Two): **[8]**

a) Write in brief uses of Military Geography.

b) Explain the Characteristics of Jungle.

c) Discuss any one example of historical significance of logistics.

Q3) Write short notes on (Any Two): **[8]**

a) Logistics problems during Desert warfare.

b) Process of formation of Grand Strategy.

c) Necessity of study of High Altitude warfare.

Q4) Answer in 16 to 20 sentences (Any One): [8]

    a)   Explain the impact of war on environment.

    b)   Explain any two principles of Logistics.

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[3917] - 228

S.Y.B.Sc.

ENVIRONMENTAL SCIENCE

ENV - 201 : Biological Diversity

(Revised 2008 New Pattern) (Sem. - II)

Time :2 Hours]   *[Max. Marks :40*

Instructions to the candidates:

1) *All questions are compulsory.*

2) *Draw Neat & labelled diagram wherever necessary.*

3) *Figures to the right indicate full marks.*

Q1) Attempt the following in 1 - 2 lines each.   **[10]**

a) Define Biodiversity.

b) What is meant by Exotic Species?

c) Enlist any 2 megabiodiversity countries.

d) Define Agrobiodiversity.

e) Give any 2 National Parks in India.

f) Where was the Earth Summit held?

g) What is meant by Transgenic Organisms?

h) Define Ecosystem.

i) What is meant by Hotspot?

j) Define 'Species Diversity'

Q2) Write short note on <u>any 2</u> of the following.   **[10]**

a) History & Origin of species diversity.

b) Classification of ecosystem.

c) Human - Wildlife conflict.

Q3) Answer <u>any 2</u> of the following. **[10]**

a) Describe any one molecular marker technique used to measure genetic diversity.

b) Discuss major international conventions on biodiversity conservation.

c) Give an account of the ecological significance of biodiversity.

Q4) Answer <u>any one</u> of the following. **[10]**

a) Discuss in detail the in-situ & ex-situ conservation methods with suitable example.

b) What are the centres of diversity? Explain with reference to endemism giving examples.

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S.Y.B.Sc.

ENVIRONMENTAL SCIENCE

ENV - 202 : Soil Science

(Sem. - II) (New Revised 2008)

Time :2 Hours]   *[Max. Marks :40*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Neat diagrams must be drawn wherever necessary.*

    3)   *Figures to the right indicate full marks.*

Q1) Attempt the following in one or two lines each.   **[10]**

    a)   Define the term : Weathering.

    b)   What is soil moisture?

    c)   Enlist all the components of soil.

    d)   Give any 4 physical properties of soil.

    e)   State the difference between organic & green mannures.

    f)   What are wind breaks? Give one example.

    g)   What is eluviation?

    h)   Mention the names of soil mergs which play important role in soil fertility.

    i)   Define soil erosion.

    j)   State the difference between Gully & Rill erosion.

Q2) Answer <u>any two</u> of the following.   **[10]**

    a)   Describe various types of soil found in India.

    b)   Explain various factors affecting soil structure & plant growth.

    c)   Give the detailed account of soil classification.

Q3) Write notes on <u>any two</u> of the following.   **[10]**

    a)   Soil profile with labelled diagram.

    b)   Nitrate solubilising microbes.

    c)   Role of soil water & its types.

Q4) Answer <u>any one</u> of the following.   **[10]**

    a)   Give the detailed account of soil structure.

    b)   Explain chemical & Biological properties of soil in detail.

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[3917] - 230

S.Y.B.Sc. (Sem. - II)

OPTIONAL ENGLISH

Enriching Oral and Written Communication in English

(New Course) (2008 Pattern)

Time :2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) *All questions are compulsory.*

2) *Figures to the right indicate full marks.*

Q1) Attempt **any two** of the following: **[10]**

a) Neha, Ranjan, Veeru and Shamim are participants in a group discussion on the topic 'Use and Abuse of Television'. Write a transcript of the discussion using the following points:

Means of information, knowledge and entertainment - types of programmes - variety of Channels - positive and negative effects - good as well as bad programmes - effect on children, family, and society - health and many other problems - need to control TV viewing.

b) You have applied for a bank loan to study abroad and have been asked to attend an interview by the bank authorities. Think of five questions that could be asked and write them down along with your possible answers.

c) Imagine that you are one of the members attending a meeting. State some of the points that will help you make your participation valuable.

Q2) Attempt **any two** of the following: **[10]**

a) Write a paragraph of about 15 sentences on 'Western Influence on Indian Youth'.

b) Punctuate the following dialogue.

passenger taxi taxi

taxidriver yes sir would you like to hire a taxi sir

passenger yes i want to go to the gateway of india what fare do you charge

taxidriver i will charge by metre reading

c) Summarize the following paragraph to one third of its length. Suggest a suitable title. Prepare a rough draft also.

The feature film 'Camp Fire', produced and directed by Shireesh Verma and released a week ago is an autographical account of a forest ranger that spent all his life in the Manas tiger reserve in Assam. The story is a flashback in the words of Binoy Das, the forest ranger, told to his young granddaughter who has travelled thousands of kilometres to find him and take him with her to Canada. Binoy has had an interesting but difficult life, having known poverty and loneliness, but also having had the opportunity to get a good education, travel widely, learn to understand and love animals, and spend a few short, perfectly happy years with his wonderful wife and baby son.

The plot of 'Camp Fire' unfolds at a steady but slow pace and keeps the audience in suspense until the last few minutes. The film has good music, but the dance choreography is disappointing. The film has some brilliant photography and offers breathtaking shots. The costumes are colourful and attractive, though some of them do not match the setting, 'Camp Fire' is, on the whole, a film that is well made and interesting, and one that would not disappoint filmgoers looking for some clean entertainment.

Q3) Attempt **any two** of the following: [10]

a) Write a review of a TV serial that you liked most. Take into account the following points: plot, character, setting, theme, message, social/moral implication, your opinion.

b) Choose the more powerful of the two words or phrases given.

i) After talking wildly to the policeman, Sanjay (vanished/disappeared) in the crowd.

ii) All the students came out of the hall in spite of (pouring / heavy) rain.

iii) He ran fast but (hit/banged) his head on the wall.

iv) The course will (start / commence) from the next week.

v) In the evening the winds blew (softly / slowly)

c) Write a description of your family doctor. Use creative words and phrases to convey personality, thoughts, working style and mood.

Q4) Attempt **any two** of the following: [10]

    a)   You made a telephone call to your brother but you met with a cross connection. Write a short telephone conversation on this situation.

    b)   You are the principal of your college. Send an e-mail to past students to attend the 'Alumni Meet' organised by the college.

    c)   Prepare 5 slides of about 20 words each for power point presentation that you would like to make in a function on the topic 'AIDS - Causes, Superstitions and Preventive Measures'.

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[3917] - 239

S.Y.B.Sc. (Vocational)
ELECTRONIC EQUIPMENT MAINTENANCE
VOC. EEM - 221: Audio, Video and Office Equipment - B
(Paper - I) (New Course) (2008 Pattern) (Sem. - II)

Time :2 Hours]   *[Max. Marks :40*

Instructions to the candidates:
1)   *All questions are compulsory.*
2)   *Figures to the right indicate full marks.*
3)   *Use of log table and calculator is allowed.*

Q1) Attempt <u>all</u>

a)   What is a light Pen?   **[1]**

b)   List different storage devices of a PC.   **[1]**

c)   State the application areas of slide projector.   **[1]**

d)   What is multimedia?   **[1]**

e)   State the principle of operation of FAX machine.   **[2]**

f)   Give the functional elements of EPABX.   **[2]**

g)   What are the specifications of the display devices?   **[2]**

h)   What are the different optical devices used in Display and Projector systems?   **[2]**

Q2) Attempt any <u>Two</u>

a)   Describe the construction of slide projector.   **[4]**

b)   Give the advantages of Flat-screen display over CRT display.   **[4]**

c)   What is DLP? Discuss the advantages of DLP over Over-Head projector.
                                                             [4]

Q3) Attempt any <u>Two</u>

    a)   Explain the working of bar-code reader with the help of neat diagram.**[4]**

    b)   Describe the steps in generating a photocopy using a photo copier.   **[4]**

    c)   Write short note on video standards used for PCs.   **[4]**

Q4) Attempt <u>all</u>

    a)   Explain the construction and working of over-head projector.   **[6]**

    b)   List different display systems. Write short note on any one of them.   **[6]**

<p align="center">OR</p>

Attempt all

    a)   Draw the functional diagram of a mother board and explain the function of any two elements.   **[6]**

    b)   Explain the construction and working of a laser printer.   **[6]**

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S.Y.B.Sc. (Vocational)
SEED TECHNOLOGY
Vegetable Seed Production
(Paper - III) (Sem. - II) (2008 Pattern)

Time :2 Hours]   *[Max. Marks :40*

Instructions to the candidates:
1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Draw neat and labeled diagrams wherever necessary.*

Q1) Attempt the following: **[10 × 1 = 10]**

     a) Define asexual reproduction.

     b) What is pollen viability?

     c) Define hybridization.

     d) Give any two objectives of population improvement.

     e) Draw the diagrammatic representation for classifying the vegetable crops based on plant parts used for consumption.

     f) What is the isolation distance for foundation seed production in Brinjal?

     g) Define seed storage.

     h) Which type of nursery bed is required for growing Tomato seedlings?

     i) Define CGMS.

     j) Give any two objectives of vegetable seed production.

Q2) Attempt any two of the following: **[2 × 5 = 10]**

     a) What is microsporogenesis? Explain in detail the process of microspore formation with a neat labeled diagram.

     b) Define pollination. Give any two modes of pollination.

     c) Describe any two hybridization types in vegetable crops.

Q3) Write notes on (Any two): **[10]**

    a)   Pure line selection.

    b)   Mass selection.

    c)   Classification of vegetable crops based on growing season.

Q4) Give an account of seed production in Brinjal with reference to land requirement, isolation, nursery management, cultural practices, roughing, plant protection, harvesting, seed extraction, drying and storage. **[10]**

OR

Explain in detail seed production in Onion.

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S.Y. B.Sc. (Vocational)
INDUSTRIAL MICROBIOLOGY
VOC-IND-MIC-221: Microbial Fermentations and Downstream Processing

(2008 Pattern) (Sem. - II) (Theory Paper - I)

Time :2 Hours]   *[Max. Marks :40*

Instructions to the candidates:
   1) *All questions are compulsory.*
   2) *Figures to the right indicate full marks.*
   3) *All questions carry equal marks.*
   4) *Draw neat labeled diagrams wherever necessary.*
   5) *Use of scientific calculators is allowed.*

Q1) Answer each sub-question in one or two lines; Fill in the blanks; State whether the statement is true or false.   **[10]**

   a) Give a synonym for cyanocobalamin.

   b) Name the product(s) produced by the action of alfa-amylase on starch.

   c) Fill in the blank:

      _____ enzyme can be used to lyse bacterial cells.

   d) State whether the statement is True or False

      Ultrasonication is an inconvenient process for lysis of microbial cells during large-scale downstream processing.

   e) State whether the statement is True or False

      Lysine is a secondary metabolite.

   f) Fill in the blank:

      Liquid-liquid extraction of penicillin requires _____ (equipment).

   g) Define: 'Resolution' as referred to in downstream processing.

   h) Name two phosphate solubilizers used as bioinoculants.

   i) State the role of ethyl acetate in downstream processing of fermentation products.

   j) What is meant by 'formulation' with reference to a pharmaceutical product.

Q2) Answer *any two* of the following. **[10]**

a) With the help of a diagram, explain the principle of any process used for solids-liquids separation in downstream processing.

b) What is 'salting out'. Describe its use in downstream processing of a fermentation product.

c) Explain principle of gel exclusion chromatography with the help of suitable example.

Q3) Answer *any two* of the following. **[10]**

a) Draw the flow-chart for explaining steps involved in recovery of lysine.

b) What are bioinoculants? What are the advantages of using bioinoculants over their chemical counterparts?

c) Explain the biochemistry involved in biogas production.

Q4) Answer *any one* of the following. **[10]**

a) With the help of a flow-sheet, describe the production of Streptomycin by fermentation.

b) Describe the principle and working of liquid-liquid extraction process used in down-stream processing.

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[3917] - 5

F.Y. B.Sc.

CHEMISTRY - I

Physical and Inorganic Chemistry

(Paper - I) (2008 Pattern) (Theory) (New Course)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

  1) *All questions are compulsory.*

  2) *Draw neat diagrams wherever necessary.*

  3) *Figures to the right indicate full marks.*

Q1) Answer the following questions: **[16]**

  a) Calculate the value of P in the equation. $\log_e 6.321 = P$.

  b) Define and explain compressibility factor.

  c) Define the term

   i) Lyophillic solution. ii) Lyophobic solution.

  d) Explain the term auto catalysis with suitable example.

  e) Give physical significance of entropy.

  f) State type of hybridisation and shape of following:

   i) BeF_2 ii) $[Ni(CN)_4]^{2-}$

  g) Convert 0.62 gm. of K_2SO_4 in moles.

   (At. wt. of K = 39, S = 32, O = 16)

  h) Define co - ordinate bond with example.

Q2) a) Attempt any four of the following: **[8]**

   i) State any four rules of logarithm.

   ii) Calculate the hydrogen ion concentration if POH of solution is 9.8.

   iii) Find the equation of a line that passes through the point (–3, –2) and has a slope 2.

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iv) Arrange the equation in the form $y = mx + c$.

    A) $2(x + y + 4) = 8x - 7$ B) $15\,y = x + 30$.

v)   If $y = \dfrac{x^2 - 6}{x - 1}$ Find $\dfrac{dy}{dx}$.

vi)   If $y = a^{x^2}$. Find $\dfrac{dy}{dx}$.

vii) $\displaystyle\int_{-2}^{2} 5\,x^4\ dx = ?$

viii) $\displaystyle\int (-4x^{-3} + 3x^{-2} + 3)\ dx = ?$

b)   Derive Van der Waal's equation of state.   **[4]**

c)   Attempt any one of the following: **[4]**

    i)   One mole of diethyl ether occupies 15 litres at 227°C. Calculate the pressure if Van der Waal's constants for diethyl ether are.

    (a = 17.38 atm. lit². mole⁻¹, b = 0.134 lit. mole⁻¹, R = 0.0821 lit. atm. mole⁻¹).

    ii)   10 moles of an ideal gas expand so that its temperature and volume change from 27°C and 8L to 65°C and 80L. Calculate the change in entropy.

    Given: R = 8.314J (mole - K)⁻¹, $C_v = \dfrac{3}{2} \times$ RJ (mole)⁻¹

Q3) a)   Attempt any three of the following: **[12]**

    i)   Explain Millikan's oil drop method to calculate the charge on the electron.

    ii)   State and explain second law of thermodynamics.

    iii)   Define surface tension. Describe its determination by capillary method.

    iv)   Define term catalysis. Explain the general characteristics of catalytic reaction.

b) Attempt any one of the following: **[4]**

    i) Calculate the shortest and longest wavelength in hydrogen spectrum of Lyman series.

    ii) Calculate the energy of an electron in the third orbit of hydrogen atom. Given : $m = 9.109 \times 10^{-28}$ gm, $h = 6.627 \times 10^{-27}$ erg.sec., $e = 4.8 \times 10^{-10}$ esu.

Q4) a) Attempt any three of the following: **[12]**

    i) What are emulsions? How are they prepared?

    ii) Give the properties of cathode rays.

    iii) Discuss the Michaelis and Menten's enzyme catalysis mechanism in detail.

    iv) Explain the catalytic poisoning with suitable example.

    v) State Ritz combination principle and write equation for Lyman series.

b) Attempt any one of the following: **[4]**

    i) What is a Hydrogen bond? What are the essential conditions to form a hydrogen bond?

    Explain : HF is a liquid while HCl, HBr and HI are gases at room temperature.

    ii) What is sp^3d^3 hybridization? Explain with suitable diagram.

Q5) a) Attempt any two of the following: **[6]**

    i) Mention the various isotopes of hydrogen. Explain physical properties of deuterium.

    ii) Define the term overlapping of atomic orbitals. Explain factors affecting magnitude of overlapping of atomic orbitals.

    iii) How will you prepare the following solutions.

        A) 600 ml 3M $CaCO_3$ solution.

        B) 500 ml 0.6M HNO_3 solution.

        (Given : atomic weight of $Ca = 40, C = 12, O = 16, H = 1, N = 14$)

b) Attempt any two of the following: **[10]**

    i)   Give postulates of Pauling - Slater theory.

    ii)   Explain the bonding and shape of ClF_3 and BrF_3 molecules on the basis of VSEPR theory.

    iii)   10 ml of the solution of NaOH containing 2 gms of alkali per litre is exactly neutralized by 15 ml of a solution of H_2SO_4 and 30 ml of HCl solution separately. Calculate strength of the acids in grams per litre.

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[3917] - 103

S.Y. B.Sc.

PHYSICS

PH - 211 : Mathematical Methods in Physics (New)

(Semester - I) (Paper - I) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks :40*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

    3)   *Use of calculators and log tables is allowed.*

    4)   *Neat diagrams must be drawn wherever necessary.*

Q1) Attempt all of the following:

    a)   Show that curl of position vector is zero.   **[1]**

    b)   Transform $Z = 2\sqrt{3} + 2i$ in to polar form.   **[1]**

    c)   Define scalar triple product.   **[1]**

    d)   If $\phi = 4x^2y - 2y^2z^2$ find $\nabla\phi$.   **[1]**

    e)   If $\vec{v} = xyz\,\vec{i} + 4xy^2z\,\vec{j} - xyz\,\vec{k}$ find the value of divergence of $\bar{v}$ at $(1, 1, 1)$.

                                                                                                      [1]

    f)   If $F = e^{xy}$ find F_x and F_y.   **[1]**

    g)   Is $dF = e^y dx + (xe^y + 2y)\,dy$ is exact differential or not. **[1]**

    h)   Define partial differential equation. Give any one example.   **[1]**

    i)   Find degree and order of differential equation $\dfrac{d^2y}{dx^2} + 2\dfrac{dy}{dx} + y = 0$.   **[1]**

    j)   Explain Linearity of differential equation.   **[1]**

Q2) Attempt <u>any two</u> of the following:

    a)   Show that the point $x = 0$ is an ordinary point of the Hermite's differential equation $y'' - 2xy' + 2\lambda y = 0$, where λ is constant.   **[5]**

    b)   If $y = A\sin wt + B\cos wt$, show that $\dfrac{d^2y}{dt^2} = -w^2 y$ **[5]**

    c)   Obtain the quadratic equation in Z, if its roots are $(3 \pm 4i)$ **[5]**

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Q3) Attempt <u>any two</u> of the following:

a) Find the modulus and argument of $1 + i\sqrt{3}$. **[5]**

b) Find the projection of vector $\vec{B} = \vec{i} + 5\vec{j} + 3\vec{k}$ on the vector $\vec{A} = 2\vec{i} + 3\vec{j} + 6\vec{k}$ **[5]**

c) Find the approximate value of $\sqrt{(2.99)^2 + (3.99)^2}$ using method of differentials. **[5]**

Q4) A) Attempt 'a' or 'b'

a) i) Determine the value of $(1 + i)^8 + (1 - i)^8$. **[4]**

ii) Show that $\vec{F} = (y^2 + 2xz^2)\vec{i} + (2xy - z)\vec{j} + (2x^2z + y + 2z)\vec{k}$ is irrotational. **[4]**

b) i) Show that the equation

$dF = (y^2 - y + 2xy)\, dx + (x^2 - x + 2xy)\, dy$ is an exact differential. Hence determine 'F'. **[4]**

ii) If $\vec{A} = 2\vec{i} - 3\vec{j} - \vec{k}$ and $\vec{B} = \vec{i} + 4\vec{j} - 2\vec{k}$ find $\vec{A} \times \vec{B}$. **[4]**

B) Attempt <u>any one</u> of the following:

i) Find the value of $i - i^2 + i^3 - i^4 + i^5$. **[2]**

ii) Find the total derivative of function $F = \sin x + \cos y$. **[2]**

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S.Y. B.Sc.

PHYSICS

PH - 212 : Electronics (New)

(Semester - I) (Paper - II) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks :40*

Instructions to the candidates:

    1) All questions are compulsory.

    2) Figures to the right indicate full marks.

    3) Use of calculators and log - tables are allowed.

    4) Neat diagrams must be drawn wherever necessary.

    5) Symbols have their usual meanings.

Q1) Attempt <u>all</u> of the following:

    a)   Define inductance. Give its SI unit.   **[1]**

    b)   State various types of resistors.   **[1]**

    c)   State Thevenin's theorem.   **[1]**

    d)   A transistor has a current gain (α) = 0.99. If the emitter current is 100 mA. Find the collector current.   **[1]**

    e)   What is meant by Op-amp? Give its symbol.   **[1]**

    f)   Define line regulation of power supply.   **[1]**

    g)   If the d.c. output voltage is 300 V with no load attatched to power supply but decreases to 240 V at full load, find the percentage voltage regulation.   **[1]**

    h)   State different types of filters.   **[1]**

    i)   Draw the circuit diagram of half wave rectifier.   **[1]**

    j)   Convert binary number $(10101)_2$ to its decimal equivalent.   **[1]**

Q2) Attempt <u>any two</u> of the following:

a) State Norton's theorem. Nortonise following circuit between terminals A and B. **[5]**
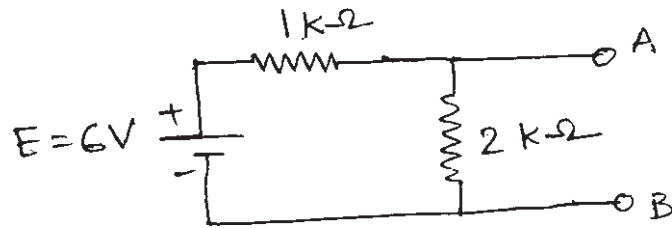
b) Discuss common-emitter configuration of a transistor in detail. **[5]**

c) Discuss Op-amp as non-inverting amplifier. **[5]**

Q3) Attempt <u>any two</u> of the following:

a) Obtain base current in a silicon transister biased by feedback resistor method as shown following circuit. Take $V_{BE} = 0.7V$. **[5]**
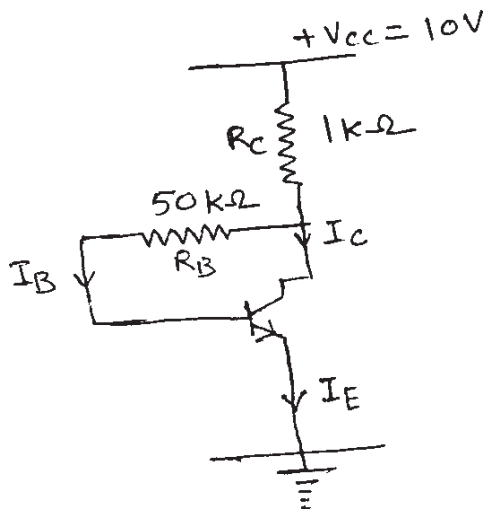
b) Find the output of the following circuit. **[5]**
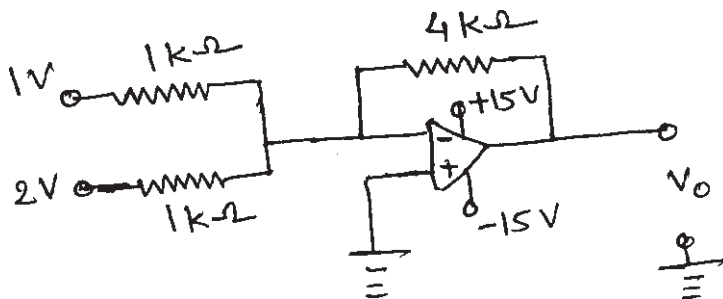
c) Convert following numbers into BCD code.

   i) $(348)_{10}$ ii) $(186)_{10}$ iii) $(132.25)_{10}$ **[5]**

Q4) a) Attempt (i) or (ii) of the following:

    i)   1)   With circuit diagram, explain base resistor method for biasing.

                             [4]

            2)   Explain the concept of virtual ground in op-amp.   **[4]**

    ii)   1)   Explain working of transistor shunt voltage regulator with a neat diagram.   **[4]**

            2)   Draw symbols of NAND and NOR gate. Give their truth tables.

                             [4]

    b) Attempt <u>any one</u> of the following:

    i)   Explain mutual inductance.   **[2]**

    ii)   State superposition theorem. Give its significance.   **[2]**

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S.Y. B.Sc.

PHYSICS

PH - 212: Instrumentation

(Semester - I) (Paper - II) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks :40*

Instructions to the candidates:

    1)   All questions are compulsory.

    2)   Figures to the right indicates full marks.

    3)   Use of calculators and log tables are allowed.

    4)   Neat diagrams must be drawn wherever necessary.

Q1) Attempt all of the following:

    a)   What do you mean by reproducibility of an instrument.   **[1]**

    b)   Define Transducer.   **[1]**

    c)   The dead zone in certain thermometer is 0.125 percent of span. The calibration is 500ºC to 900ºC what temp. change might occur before it is detected?   **[1]**

    d)   What do you mean by cantilever beam?   **[1]**

    e)   What is ECG?   **[1]**

    f)   What is ferromagnetic substance?   **[1]**

    g)   What is load cell?   **[1]**

    h)   State Bernoulli's theorem.   **[1]**

    i)   Define 'Hall effect'.   **[1]**

    j)   State any two characteristics of transducer element.   **[1]**

Q2) Attempt <u>any two</u> of the following:

    a)   What do you mean by variable capacitance transducer? Explain variation in capacitance by changing common area of the plate.   **[5]**

    b)   With block diagram explain working of sound level meter.   **[5]**

    c)   What is static characteristics? Explain the factors affecting static characteristics.   **[5]**

Q3) Attempt <u>any two</u> of the following:

a) A pitot tube is fixed in a water pipeline of diameter 20 cm, a difference of pressure indicated by the gauge is 5 cm of water column. Calculate the rate of flow of water through the pipe. **[5]**

b) A wattmeter having a range of 1000 watt has an error of $\pm 1\%$ of full scale deflection. If the true power is 100 watt, what would be the range of readings? Suppose the error is specified as percentage of true value, what would be the range of the readings? **[5]**

c) The bysterisis loss for a specimen of iron weighing 12kg is equivalent to 300 J/m³ cycle. Find the loss of energy per hour at 50 cycles/s

Given - Density of iron = 7500 kg / m³. **[5]**

Q4) a) Attempt (i) or (ii) of the following:

i) 1) Write a short note on Venturimeter. **[4]**

2) Discuss the various errors in measurement. **[4]**

ii) 1) What is Ringermann chart? Explain it's use for smoke density measurement. **[4]**

2) Explain how displacement is measured with variation in reluctance in inductive transducer. **[4]**

b) Attempt <u>any one</u> of the following:

i) Explain drift with transfer characteristics of an instrument. **[2]**

ii) The diameter of the throat of a venturitube is 6 cm. When it is inserted in a horizontal pipe line of diameter 10 cm, the pressure difference between the pipe and the throat equals to 8 cm of water column. Calculate the rate of flow. **[2]**

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S.Y. B.Sc.

CHEMISTRY

CH - 211 : Physical Chemistry (New)

(Semester - I) (Theory) (2008 Pattern) (51311)

Time : 2 Hours]   *[Max. Marks :40*

Instructions to the candidates:

1) *All questions are compulsory.*

2) *Figures to the right indicate full marks.*

3) *Use of logarithmic table and calculator is allowed.*

4) *Neat diagrams must be drawn wherever necessary.*

Q1) Answer the following: **[10]**

a) State Debye's third power law.

b) What is the partition coefficient?

c) State different forms of clapeyron's equation.

d) Define a freezing point of a liquid.

e) Give the principle of steam distillation.

f) What are Kp & Kc?

g) Why the boiling point 0.1M $BaCl_2$ solution is more than 0.1 M NaCl solution?

h) What are azeotropes?

i) How will you calculate graphically the heat of vaporization from clausis - clapeyron equation?

j) Draw vapour pressure - temperature curve for solvent and solution.

Q2) a) Attempt <u>any two</u> of the following: **[6]**

i) Give properties of equilibrium constant.

ii) State and explain the third law of thermodynamics and give its limitations.

iii) Derive an expression $\alpha = i-1/v-1$.

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b)	Solve <u>any one</u> of the following:	[4]

i)	When 0.946 gm of a sugar is dissolved in 150 gm of water, the resulting solution is observed to have a freezing point of $-0.0650°C$. What is the molecular weight of sugar?

[KF for water $= 1.86$]

ii)	Calculate the entropy of ideal mixing when 6 gm of H_2 and 34 gm of NH_3 are mixed at constant temperature, assuming no chemical reaction is occuring.

(R $= 8.314$ JK^{-1} mole^{-1}, At wt of H $= 1$ & N $= 14$)

Q3) a)	Attempt <u>any two</u> of the following:	[6]

i)	Define ideal and non ideal solutions. Draw (p-x) diagrams for non ideal solutions.

ii)	Show that it is better to extract with small volumes of solvent several times than once with a large volume.

iii)	Define colligative property. State and explain Raoult's law.

b)	Solve <u>any one</u> of the following:	[4]

i)	128 gm of oxygen gas expand isothermally from 800 ml to 10 lit at 27°C. Calculate the change in free energy of the gas.

(R $= 8.314$ JK^{-1} mole^{-1}, At wt of O $= 16$)

ii)	Calculate the solubility of CO_2 in water at 30°C at a partial pressure of 250 mm of Hg.

(Henry's law constant K(CO_2) $= 1.25 \times 10^6$ mm of Hg).

Q4) a)	What is Van't Hoff's reaction isotherm? Derive Van't Hoff's reaction isotherm and give its applications.

OR

Define osmosis and osmotic pressure. How is osmotic pressure of solution determined by Hartley - Berkeley method?	[6]

b)	Attempt <u>any one</u> of the following:	[4]
i)	Explain the criteria for equilibrium in terms of DS, DA & DF.
ii)	Explain construction, working and applications of fractionating coloumn.

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S.Y. B.Sc.

CHEMISTRY

CH - 212 : Organic Chemistry (New)

(Semester - I) (Paper - II) (2008 Pattern) (51321)

Time : 2 Hours]   *[Max. Marks :40*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

    3)   *Draw structures and diagrams if necessary.*

Q1) Answer the following: **[10]**

    a)   Define the term Racemic mixture.

    b)   Give any one test to distinguish aldehydes and ketones with suitable example.

    c)   B.P. of propanoic acid is 141ºC while n-butylalcohol boils at 118ºC. Explain.

    d)   How will you prepare aniline from chlorobenzene.

    e)   Why Anthracene is aromatic?

    f)   What is Mutarotation?

    g)   Give importance of waxes.

    h)   Define peptide bond.

    i)   Give structure of sugar in RNA.

    j)   What is the role of biochemistry in Agriculture?

Q2) a) Assign the structure to (A) and (B) in the following reactions. (any three):

[6]

i) $CH_3-CH-CH_3$ (with OH) $\xrightarrow[H_2SO_4]{K_2Cr_2O_7}$ (A) $\xrightarrow{HCN}$ (B)

ii) (benzene ring with COOH) $\xrightarrow{PCl_5}$ (A) $\xrightarrow{NH_3}$ (B)

iii) (benzene ring) $+$ $\xrightarrow[H_2SO_4]{HNO_3}$ (A) $\xrightarrow{Sn/HCl}$ (B)

iv) $CH_3-CH=CH_2$ $\xrightarrow[Na_2O_2]{HBr}$ (A) Major $\xrightarrow{KOH\ aq}$ (B)

v) (benzene ring with $\overset{\oplus}{N_2}Cl^{\ominus}$) $\xrightarrow{H_2O}$ (A) $\xrightarrow{Br_2\ water}$ (B)
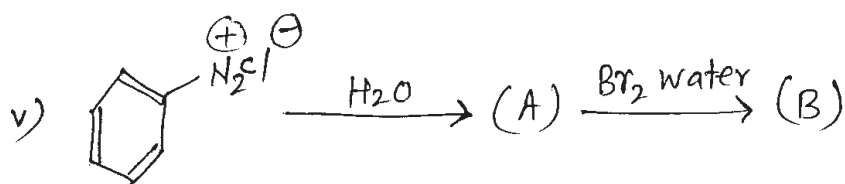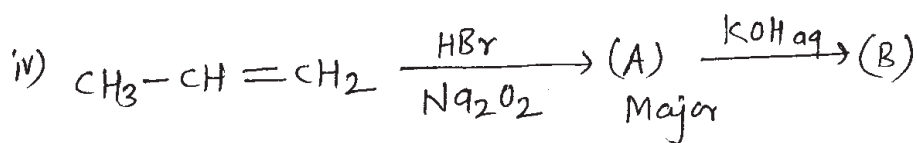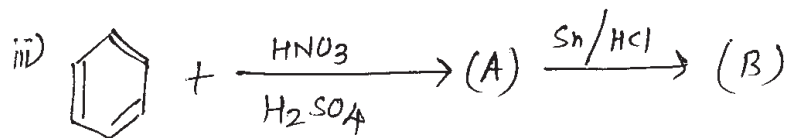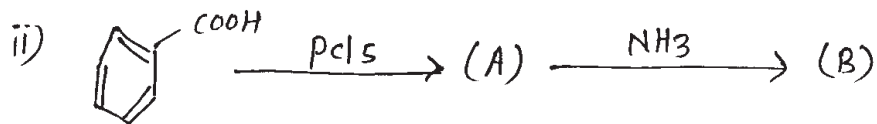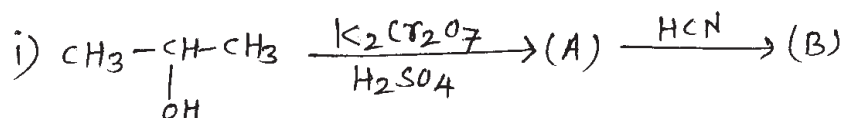
b) How will you bring about the following conversions (any two): **[4]**

i) Ethyl alcohol to acetamide

ii) Acetic acid to methylamine.

iii) Phenol into saly cilic acid.

Q3) Attempt <u>any two</u> of the following: **[10]**

a) Give synthesis of Naphthalene. What is action of the following on furan?

i) SO_3 / pyridine   ii) $CHCl_3$ / KOH

iii) H_2 / Ni

b) What are α-amino acids? Why they are amphoteric? Explain the reaction of α-amino acid with

i) Dansyl chloride   ii) Nitrous acid

iii) Ninhydrin.

c) What are nucleic acids? Explain Watson-crick model of DNA.

Q4) a) Attempt <u>any two</u> of the following: **[6]**

   i) What are carbohydrates? Discuss the classification of carbohydrates with suitable examples.

   ii) What are lipids? How are lipids classified?

   iii) Write a short note on Clemensen's reduction.

b) Answer the following: **[4]**

   i) What are esters? How is ethyl acetate prepared from acetic acid?

   ii) Discuss the Hoffmann's degradation with suitable examples.

OR

Describe the factors affecting the stability of conformations with suitable examples.

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S.Y. B.Sc.
BOTANY

BO - 211 : Fundamentals of Plant Systematics and Plant Ecology

(Semester - I) (Paper - I) (New Course) (51411) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks :40*

Instructions to the candidates:

    1)   All questions are compulsory.

    2)   Figures to the right indicate full marks.

    3)   Draw neat diagrams wherever necessary.

Q1) Answer the following: **[10]**

    a)   What is flora?

    b)   Enlist the phases of Taxonomy.

    c)   Define Phytochemistry.

    d)   What is Botanical nomenclature?

    e)   Give botanical names of any two plants of family solanaceae.

    f)   Define plant ecology.

    g)   What is a community?

    h)   Give any two external adaptive features of Xerophytes.

    i)   What is succession?

    j)   Define food chain.

Q2) Answer <u>any two</u> of the following: **[10]**

    a)   Describe anatomy as data source for plant systematics.

    b)   Give the principles of ICBN.

    c)   Write the salient features of family Liliaceae.

Q3) Write short notes on <u>any two</u> of the following : **[10]**

    a)   Succession on rocks.

    b)   Internal adaptive features of Hydrophytes.

    c)   Importance of ecology.

Q4) Give an outline of Bentham and Hooker's system of classification studied by you. Add a note on its merits and limitations. **[10]**

<div align="center">OR</div>

What is bio-geochemical cycle? Describe the carbon cycle.

<div align="center">❋ ❋ ❋</div>

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S.Y. B.Sc.

CHEMISTRY - I

CH - 221 : Inorganic Chemistry

(Semester - II) (New Course) (51312) (2008 Pattern)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

   1) *All questions are compulsory.*

   2) *Figures to the right indicate full marks.*

   3) *Neat diagrams must be drawn wherever necessary.*

Q1) Answer the following: **[10]**

   a) What is mineral?

   b) What is the role of MgF_2 in electrolytic reduction of Aluminium.

   c) What is Thomas slag?

   d) Draw structure of PCl_5.

   e) Define chemical Toxicology.

   f) Define Acid and Base according to Lux - flood concept.

   g) Why transition metals acts as catalysts?

   h) How passive metal becomes active?

   i) What are hard acid - bases?

   j) Explain the term - nonstoichiometry?

Q2) Attempt <u>any two</u> of the following: **[10]**

   a) Write the names, symbols and electronic configuration of V A group. Explain the trends in following properties of group V A elements.

      i) Atomic size   ii) Ionisation potential.

   b) Explain the concept of acid and base according to Arrehenius theory. Give the advantages and disadvantages of this theory.

   c) Answer the following:

      i) Froath flotation process.

      ii) Explain biochemical effect of Arsenic.

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Q3) Attempt <u>any two</u> of the following : **[10]**

    a)   Write the names and outer electronic configuration of first row transition elements and comment upon their oxidation states.

    b)   What is refining of a metal? Explain the Hoope's process used for refining of aluminium.

    c)   Describe any two methods for the prevention of corrosion of metals.

Q4) a)   Attempt <u>any one</u> of the following: **[6]**

        i)   What is wrought iron? How it is manufactured by puddling process?

        ii)   What is steel? How it is made by acid Bessemer's Process? What are the advantages of Bessemer's Process?

    b)   Attempt <u>any one</u> of the following: **[4]**

        i)   Explain structure and bonding in $Al_2\,Br_6$.

        ii)   What are hydracids? Give the trends in the strength of hydracids.

        iii)   Explain oxide film theory of passivity.

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P363   **[3917] - 206**

S.Y. B.Sc.
CHEMISTRY
CH - 222 : Analytical Chemistry
(Semester - II) (New Course) (51322) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks :40*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

    3)   *Use of logarithmic tables and calculator is allowed.*

    4)   *Neat diagrams must be drawn wherever necessary.*

Q1) Answer the following: **[10]**

    a)   What is a gross sample?

    b)   Define 'common ion effect'.

    c)   What is Lassaigne's test?

    d)   Define 'Neutralization point' in volumetric analysis.

    e)   What is the pH of 0.014M NaOH solution?

    f)   What is the difference between accuracy and precision?

    g)   Give a relation between molecular formula and emperical formula.

    h)   Which is a group reagent for IV group?

    i)   Give the expression for multiple extraction.

    j)   Why iodine solution is prepared by dissolving I_2 in concentrated kI?

Q2) a)   Answer <u>any two</u> of the following: **[6]**

    i)   Write a note on borate removal scheme in qualitative analysis.

    ii)   State the principle of solvent extraction. Give the advantages of solvent extraction.

    iii)   Describe a method of standardisation of $Na_2S_2O_3$ with potassium dichromate.

b) An organic compound contains 32% carbon, 6.68% hydrogen and 18.66% of nitrogen. What is the empirical formula of the compound. **[4]**

Q3) a) Answer <u>any two</u> of the following : **[6]**

i) What is a primary standard? What are the requirements of a primary standard?

ii) What are the causes of

A) Operational and personal errors

B) Instrumental and reagent errors?

iii) How is ketone detected and confirmed? Write general chemical reactions.

b) Solve <u>any one</u> of the following: **[4]**

i) A metal chelate was extracted to the extent of 70% of pH = 5, when equal volumes of aqueous and organic phases were used. Calculate distribution ratio D.

ii) The percentage of calcium in an inorganic sample was found by different students as 10.00, 10.20, 9.90, 10.10 percent. Calculate mean deviation and relative mean deviation.

Q4) a) Explain the titration curve of weak acid and strong base. Which indicator will you choose for this titration? Why? **[6]**

OR

Describe Kjeldahl's method of estimation of nitrogen in an organic compound.

b) Answer <u>any one</u> of the following: **[4]**

i) Explain Fajan's method for estimation of chloride in a given sample.

ii) What is yellow ammonium sulphide? Discuss the use of yellow ammonium sulphide in inorganic qualitative analysis.

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P364 [3917] - 207

S.Y. B.Sc.
BOTANY
BO - 221 : Structural Botany
(Anatomy, Embryology and Palynology)
(New Course) (Paper - I) (Theory) (Sem. - II) (2008 Pattern)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Draw neat and labelled diagrams wherever necessary.*

Q1) Attempt the following: **[10]**

   a) Define anatomy.

   b) What is microsporogenesis?

   c) Define orthotropus ovule.

   d) What is double fertilization?

   e) What is NPC system?

   f) What is linear microspore tetrad?

   g) Write any two applications of embryology.

   h) What is tenuinucellate ovule?

   i) Define palynology.

   j) What is cellular endosperm?

Q2) Answer <u>any two</u> of the following: **[10]**

   a) Define plant tissue. Describe parenchyma and sclerenchyma tissues.

   b) What is normal secondary growth? Explain normal secondary growth in annual stem.

   c) Describe the structure of tetrasporangiate anther.

Q3) Write short notes on <u>any two</u> of the following : **[10]**

a) Exine stratification of pollen grain.

b) Anatropous ovule.

c) Anomalous secondary growth in <u>Bignonia</u> stem.

Q4) Define epidermal tissue system. Describe structure and functions of epidermis and stomata. **[10]**

OR

What is megasporogenesis? Describe the development of monosporic type of embryosac.

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P199

[3917] - 125

S.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS-101: International Relations and Foreign Policy

(Sem. - I)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions:

    1)   All questions are compulsory.

    2)   Figures to the right indicate full marks.

Q1) Answer in 2 to 4 sentences each: **[16]**

    a)   Define "International Relations".

    b)   What is 'Foreign Policy'.

    c)   Write the concept of Power.

    d)   Define National Interest.

    e)   Name any four objects of International Relations.

    f)   Differentiate between Nation and State.

    g)   Write the methods of exercising power.

    h)   Who was Margenthou?

Q2) Answer in 8 to 10 sentences (any two):   **[8]**

    a)   Explain the role of national power in making of foreign policy.

    b)   What are the basic tenets of India's foreign policy?

    c)   Explain the type of National Interest.

Q3) Write short notes on (any two):   **[8]**

    a)   Idealist theory.

    b)   Realist theory.

    c)   Function and purpose of National Interest.

Q4) Answer in 16 to 20 sentences (any one):   **[8]**

    a)   Explain the determinants of Foreign Policy.

    b)   Explain the elements of national power.

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P150

[3917] - 3
F.Y. B.Sc.
PHYSICS - I
Mechanics, Heat and Thermodynamics
(New Course) (Paper - I) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates:

   1)   *All questions are compulsory.*

   2)   *Figures to the right indicate full marks.*

   3)   *Use of log table and calculator is allowed.*

   4)   *Neat diagram must be drawn wherever necessary.*

Q1) Attempt all of the following :

   a)   Define average acceleration. Give its SI unit.   **[2]**

   b)   State and explain Newton's first law of motion.   **[2]**

   c)   A metallic block of mass 1.5 kg initially at rest is moved on a smooth friction less surface of a table by horizontal force of 1 N. Calculate the acceleration of the body.   **[2]**

   d)   Write any two application of surface tension.   **[2]**

   e)   State zeroth law of thermodynamics.   **[2]**

   f)   What is mean by reversible process?   **[2]**

   g)   If the compression ratio for otto engine is 9 and ratio of principal specific heats for the working substance is 1.4, find efficiency of the engine.   **[2]**

   h)   Define critical temperature and critical pressure of the gas.   **[2]**

Q2) Attempt <u>any four</u> of the following :

   a)   A motorcycle starts from rest and maintains a constant acceleration $4 m/s^2$ for 6 seconds. Find the acquired velocity and total distance travelled.   **[4]**

   b)   State and explain Newton's third law with examples.   **[4]**

c)   Explain the workdone. Obtain workdone by a constant force.   **[4]**

d)   A bullet of mass 50 gm was moving with a speed of 800 m/s. After passing through a solid substance, it is continued to move at the rate of 200 m/s. How much work the bullet had to do in passing through a solid substance.   **[4]**

e)   Find the workdone in blowing a soap bubble of radius 5 cm. Surface tension of soap solution is 25 dynes/cm.   **[4]**

f)   State Pascal's law and explain hydraulic lift.   **[4]**

Q3) Attempt <u>any four</u> of the following :

a)   Derive an expression for workdone during an isothermal process. **[4]**

b)   What is carnot's cycle? Explain it with suitable diagram.   **[4]**

c)   The efficiency of otto engine is 50%. If the value of γ for the working substance is 1.5, find the compression ratio.   **[4]**

d)   Describe Andrew's experiment on carbondioxide.   **[4]**

e)   Determine what temperature on the centigrade scale is represented by the same number on the fahrenheit scale. Calculate reaumur scale. **[4]**

f)   Find the coefficient of performance when a carnot's refrigerator working between the temperature 327°C and 127°C.   **[4]**

Q4) Attempt <u>any two</u> of the following :

a)   State and prove Archimede's principle.   **[8]**

b)   i)   What is average velocity? Interpret the average velocity using x-t graph.   **[4]**

     ii)   What force is required to accelerate 3000 kg car from 10 m/s to 40 m/s in time of 1.5 sec?   **[4]**

c)   i)   A body of mass 45 gm is thrown vertically upwords with a speed of 21 m/s. Find the workdone by the force of gravity during the time the body goes vertically up.   **[4]**

     ii)   Explain in brief the Jaeger's method to determine surface tension of a liquid.   **[4]**

Q5) Attempt <u>any two</u> of the following :

    a)   Obtain an expression for the efficiency of the diesel engine in terms of expansion and compression ratio. **[8]**

    b)   i)   Calculate the workdone during an isothermal expansion of 4 moles of an ideal gas from a volume of 4 litres to 16 litres at 0°C. **[4]**

            ii)   Give the difference between real gases and ideal gases. **[4]**

    c)   i)   Calculate the change in entropy when 8 gm of ice at 0°C is converted in to water at the same temperature

               (Latent heat of ice = 80 cal/g) **[4]**

            ii)   Describe liquid thermometer. **[4]**

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P151

[3917] - 4
F.Y. B.Sc.
PHYSICS - II
Emerging Physics and Electricity and Magnetism
(New Course) (Paper - II) (11220)(2008Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates:
    1)   *All questions are compulsory.*
    2)   *Figures to the right indicate full marks.*
    3)   *Use of log tables and calculator is allowed.*
    4)   *Draw neat diagrams and sketches wherever necessary.*

Q1) Attempt all of the following :
    a)   Give any two characteristics of laser beam.   **[2]**
    b)   What is meant by heliocentrism?   **[2]**
    c)   Define the term Negative Temperature Coefficient (NTC).   **[2]**
    d)   The membrane resistance of a cell is 0.1 ohm/m^2 and capacitance of about 1 $\mu F/cm^2$. Calculate the time constant of RC equivalent circuit.**[2]**
    e)   State Coulomb's law in electrostatics.   **[2]**
    f)   An aluminium wire of radius 0.2×10^{-2}m carries a current of 25 ampere. Find the magnetic field at the surface of wire.   **[2]**
           [Given $\mu_0 = 4\pi \times 10^{-7}$ wb/A.m]
    g)   What is hysteresis?   **[2]**
    h)   What is transient current?   **[2]**

Q2) Attempt <u>any four</u> of the following :
    a)   Give the contribution of Newton in physics.   **[4]**
    b)   Explain spontaneous emission and stimulated emission.   **[4]**
    c)   Describe the working of optical Pyrometer.   **[4]**
    d)   The CO_2 laser is one of the most powerful laser. The energy difference between two laser levels is 0.117 eV. Determine the Frequency and wavelength of the radiation [Given C = 3×10^8 m/s].   **[4]**

P.T.O.

e) The distance between two consecutive R peaks on electrocardiograph is 40 mm. If the paper speed of recorder is 50 mm/sec. What is heart rate?**[4]**

f) If a nanoparticle with drift velocity 2×10^3 m/s experiences a scattering after 3 picosecond. What will be the mean free path of that particle.**[4]**

Q3) Attempt <u>any four</u> of the following :

a) Using Gauss's law, obtain an expression for the electric intensity at an external point due to uniformly charged non-conducting sphere. **[4]**

b) State and explain Biot-Savart's law. **[4]**

c) Distinguish between paramagnetic and ferro magnetic substances. **[4]**

d) Calculate the force between two charged bodies each having a charge of 10µC and are 6 cm apart. [Given $\in_0 = 8.85 \times 10^{-12}$ C²/N–m²] **[4]**

e) Calculate the potential due to a dipole of dipole moment 2×10^{-10} c – m at a distance 2 meter from it on its axis.
[Given $\in_0 = 8.85 \times 10^{-12}$ C²/N–m²] **[4]**

f) A charge of 3.0 µC moves with speed 3.0×10^6 m/s along positive x-axis. The magnetic field of strength $(0.10\,\hat{j} + 0.20\,\hat{k})$T exists in space. Find the magnetic force acting on the charge. **[4]**

Q4) Attempt <u>any two</u> of the following :

a) Explain bottom-up approach for synthesis of nanoparticles. What are its advantages? **[8]**

b) i) Give the contribution of Meghnad Saha and Subrahmanyan Chendrasekhar. **[4]**

ii) The resistance of platinum wire at 0°C is 5.5 ohm and at t°C it is 7.5 ohm. Find the temperature 't' of the wire. [Given : Temperature coefficient for platinum $\alpha = 0.0039$/°C] **[4]**

c) i) State and explain Nernst equation. **[4]**

ii) Find the relative population of two states in a ruby laser that produces a light beam of wavelength 6943A° at 300°K.
[Given : h = 6.626×10^{-34} Js, C = 3×10^8 m/s]
k = 8.61×10^{-5} eV/°K **[4]**

Q5) Attempt <u>any two</u> of the following :

    a)   Obtain an expression for capacitance of the parallel plate capacitor with and without dielectric material. **[8]**

    b)   i)   Explain the concept of electric potential. **[4]**

           ii)   A solenoid of 500 turns/m is carrying a current of 4A. Its core is made of iron which has a relative permeability of 5000. Determine the magnitude of the magnetic intensity and magnetization. **[4]**

    c)   i)   State and prove Amper's Circuital law. **[4]**

           ii)   A cell of 1.5 volt is connected across an inductor of 3mH in series with a 2 ohm resistor. What is the rate of growth of current immediately after the circuit is switched ON? **[4]**

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P153

[3917] - 6
F.Y. B.Sc.
CHEMISTRY - II
Organic and Inorganic Chemistry
(New Course) (Paper - II) (2008 Pattern) (Theory)

Time : 3 Hours]   *[Max. Marks : 80*
Instructions to the candidates:
  1) *All questions are compulsory.*
  2) *Draw neat diagrams wherever necessary.*
  3) *Figures to the right indicate full marks.*

Q1) Answer the following questions :   **[16]**
  a) Explain following terms with suitable examples.
      i)   Dihedral angle   ii) Enantiomers.
  b) Give Unique properties of organic compounds.
  c) Alcohols have higher boiling point than hydrocarbons of comparable molecular weight. Explain.
  d) The rotation about >C = C< bond is restricted. Explain.
  e) Discuss Huckel's rule of aromaticity with examples.
  f) What is oxidation number of
      i)   S in H_2SO_4 ii) C in $(C_2O_4)^{2-}$
  g) What are alkali metals? Why are they so called?
  h) Draw the structures of following.
      i) $XeOF_4$ ii) XeF_6

Q2) a) Attempt <u>any two</u> of the following :   **[8]**
      i)   What are phenols? What is the action of following reagents on phenol?
           A) dil.HNO_3 B) conc.H_2SO_4/25°C
      ii) Distinguish between Inductive and Resonance effect with suitable examples.
      iii) Discuss the conformational isomerism in ethane with energy profile diagram.

                                                                          P.T.O.

b) Attempt <u>any two</u> of the following : **[8]**

i) What are ethers? How are they classified? How will you prepare diethyl ether by Williamson's synthesis?

ii) What is Friedel Craft alkylation? How is it carried by using different alkylating agents?

iii) What are hydrocarbons? How are they classified? Illustrate with suitable examples.

Q3) a) Answer <u>any two</u> of the following : **[8]**

i) What is iodoform test? Which of the following compounds will give positive iodoform test.

A) 2-butanol   B) Acetone C) 2-phenyl ethanol

ii) What is mesomeric effect? Explain the concept of resonance by taking suitable examples. Give necessary conditions for it.

iii) Assign E & Z configuration of the following compounds.
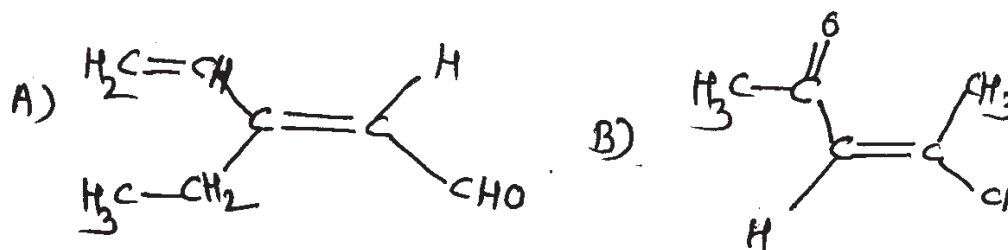
iv) What are alkynes? How is acetylene obtained from

A) Calcium carbide   B) Methane

b) Attempt <u>any two</u> of the following : **[8]**

i) Draw resonance forms of the following molecules.

A) Benzaldehyde   B) Anisole.

ii) What are alkyl halides? What is the action of C_2H_5MgBr on the following compounds.

A) Acetaldehyde   B) Acetone.

iii) Write short notes on.

A) Markovnikoff's rule   B) Dehydrohalogenation.

Q4) a) Attempt <u>any three</u> of the following : **[6]**

i) Draw all possible isomers of the following compound having molecular formula C_5H_{12}.

ii) Define the following :

A) Bond energy   B) Chiral carbon.

iii) Draw the structures for the following compounds.

  A) 1,2 dibromo-2-methyl propane.

  B) 2,5 dimethyl hexane.

iv) Assign R or S configuration of following compound.
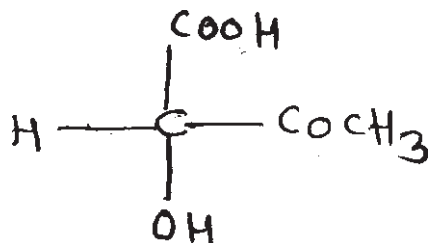
b) Identify the products A and B and rewrite the reactions (any two) : [4]

i) $CH_3-CH_2-CH_2-Br \xrightarrow[\Delta]{alc. KOH} (A) \xrightarrow{H_2O} (B)$

ii)

 $\xrightarrow[AlBr_3]{Br_2} (A) \xrightarrow{Mg/ether} (B)$.

iii)

 $\xrightarrow{NaOH} (A) \xrightarrow[\textcircled{ii} \ H+]{\textcircled{i} CO_2/125°C.} (B)$

iv) $CH_3-CH_2-CH_3 \xrightarrow[U.v. light]{Cl_2} (A) \xrightarrow[\Delta]{alc. KOH} (B)$
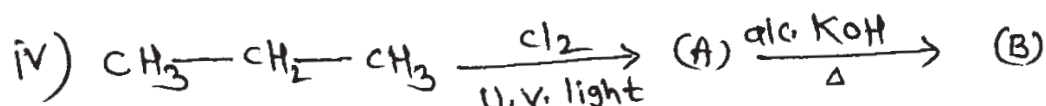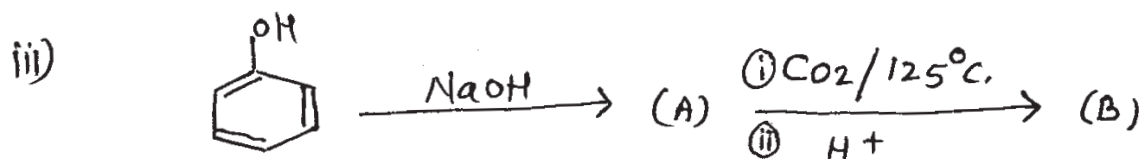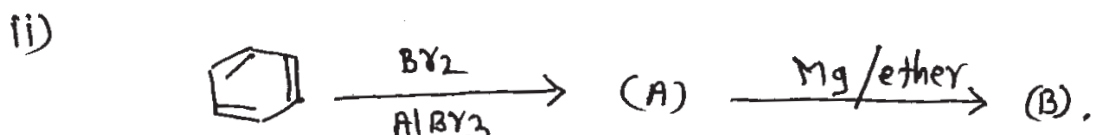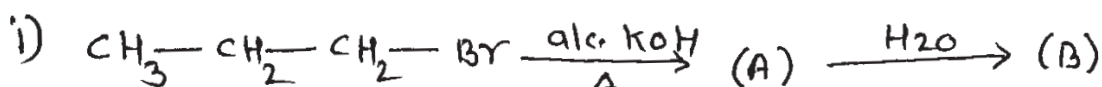
c) Attempt any one of the following :   [6]

  i) Draw the skeleton of the long form of periodic table and show the position of following in it.

    A) Alkali metal   B) First transition series

    C) Boron   D) Most electronegative element

    E) F Block element   F) Noble gases.

  ii) Lithium shows anomalous behaviour in the family of alkali metals; explain.

Q5) a) Attempt <u>any two</u> of the following : **[6]**

    i) Calculate the screening constant and hence Z^* for the valence electron of chlorine (Z = 17)

    ii) Give the names and write electronic configuration of group IIA.

    iii) Give an account of the clathrate compounds of noble gases.

b) Attempt any two of the following : **[10]**

    i) Discuss the bonding and shape of

       A) XeF_4 B) XeO_3

    ii) What are alkaline earth metals? Explain family relationship of alkaline earth metals with reference to following properties.

       A) Size of atom and ion   B) Ionisation potential

    iii) Write note on solution of alkali metal and alkaline earth metals in liquid ammonia.

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[3917] - 7

P154

F.Y. B.Sc.

BOTANY - I

Plant Diversity

(New Course) (2008 Pattern) (Paper - I) (41410)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:
  1) *All questions are compulsory.*
  2) *Draw neat labelled diagrams wherever necessary.*
  3) *Figures to the right indicate full marks.*

Q1) Attempt the following: **[16]**

  a) Define algae.

  b) Give any two general characters of Bryophytes.

  c) What are lichens?

  d) What is the difference between Cryptogams and Phanerogams?

  e) Give any two general characters of Gymnosperms.

  f) What is aestivation?

  g) Give any two differences between dicot and monocot stem.

  h) Define ex-situ conservation.

Q2) Attempt any four of the following: **[16]**

  a) Give general characters of algae.

  b) Describe sporophyte of moss.

  c) Write about nutrition in fungi.

  d) Give schematic representation of life cycle in Gymnosperms with suitable example.

  e) Describe the concept of conservation of plant diversity.

  f) Describe any two forms of Corolla.

P.T.O.

Q3) Write short notes on <u>any four</u> of the following: **[16]**

    a)   Five kingdom system.

    b)   Crustose Lichen.

    c)   Basidiocarp of <u>Agaricus</u>.

    d)   Capitulum inflorescence.

    e)   Monocot stem anatomy.

    f)   Botanical garden.

Q4) Attempt <u>any two</u> of the following: **[16]**

    a)   Describe asexual reproduction in <u>Cystopus</u>.

    b)   Describe antheridium and archegonium of Bryophytes.

    c)   Sketch, label and describe parts of typical flower.

    d)   What is fruit? Describe any three types of simple fruits.

Q5) Describe in detail the life cycle pattern in <u>Ulothrix</u>. **[16]**

<div align="center">OR</div>

What is stele? Describe in detail different types of protostele.

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[3917] - 8

F.Y. B.Sc.

BOTANY

Plant Resources Management and Utilization

(2008 Pattern) (41420) (Paper - II)

Time : 3 Hours]   *[Max. Marks :80*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Draw neat labelled diagrams wherever necessary.*

    3)   *Figures to the right indicate full marks.*

Q1) Attempt the following: **[16]**

    a)   Give Botanical names of any two fiber yielding plants.

    b)   Mention any two methods of seed treatment.

    c)   What are weeds?

    d)   Mention any two limitations in green house technology.

    e)   Define phytoremediation.

    f)   What is Indiara?

    g)   Name three lines of Japanese flower arrangement.

    h)   What is nutritive value of honey?

Q2) Answer <u>any four</u> of the following: **[16]**

    a)   Give brief account of two sources of fodder and timber.

    b)   Describe any one type of manure.

    c)   Explain physical method of Weed Control.

    d)   Give principles used for making flower arrangement.

    e)   Write merits of phytoremediation.

    f)   Describe two sources of paper.

Q3) Write short notes on <u>any four</u> of the following: **[16]**

    a)   Need of Weed Management.

    b)   Drip irrigation.

    c)   Stem cutting.

    d)   Formal Flower arrangement.

    e)   Rhizodegradation.

    f)   Tannins.

Q4) Answer <u>any two</u> of the following: **[16]**

    a)   Describe green house technology applied to ornamentals and vegetables.

    b)   What is grafting? Describe any two methods of grafting.

    c)   Explain source, preparation and uses of Pyrethrins.

    d)   Give biochemical resources obtained from plants.

Q5) What is processing? Describe methods of processing in fruits. Add a note on artificial ripening. **[16]**

<p align="center">OR</p>

Describe part used, products and uses of <u>Aloe</u>, Neem and Kuda.

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[3917] - 9

F.Y. B.Sc.

ZOOLOGY

Non - Chordates and Chordates

(New Course - 2008 Pattern) (Paper - I) (Theory)

Time : 3 Hours]

[Max. Marks :80

Instructions to the candidates:

    1)   All questions are compulsory.

    2)   Draw neat labelled diagrams wherever necessary.

    3)   Figures to the right indicate full marks.

SECTION - I

(Non - Chordates)

Q1) Define/Explain (any ten): **[10]**

    a)   Taxon.

    b)   Biophysics.

    c)   Radial symmetry.

    d)   Metamerism.

    e)   Aquaculture.

    f)   Autotomy.

    g)   Symbiotic bioluminescence.

    h)   Gastrozooid.

    i)   Osmoregulation.

    j)   Fringing reef.

    k)   Spongocoel.

    l)   Systematics.

Q2) Write short notes on (any three): **[15]**

    a)   Ultrastructure of cilium.

    b)   Asconoid type of canal system.

    c)   Pearl formation in pearl oyster.

    d)   Protective mimicry in butter flies.

    e)   Binomial nomenclature.

Q3) Attempt the following: **[15]**
   a) Explain the polymorphism in Cnidaria.
   b) Mention the general characters of Arthropoda.
   c) Describe in brief any two species of earthworm useful in Vermiculture.

<div align="center">OR</div>

What is nutrition? Describe the process of nutrition in <u>Paramoecium</u>.

<div align="center">

SECTION - II
(Chordates)

</div>

Q4) Define/Explain (Any Ten): **[10]**
   a) Protochordata.
   b) Anadromous migration.
   c) Marsupium.
   d) Hibernation.
   e) Urodela.
   f) Chondrichthyes.
   g) Fish meal.
   h) Gametogenesis.
   i) Eosinophils.
   j) Tympanum.
   k) Sanguivorous.
   l) Ingestion.

Q5) Write short notes on (Any Three): **[15]**
   a) Ammowete larva.
   b) Sexual dimorphism in frog.
   c) Aquatic mammals.
   d) Echidna.
   e) Buccal - Cavity of frog.

Q6) Attempt the following: **[15]**
   a) Give general characters of Reptilia.
   b) Sketch and Label-Internal structure of heart of frog.
   c) Adaptive radiation in Reptiles.
<div align="center">OR</div>
Describe Central Nervous System of Frog.

<div align="center">❁ ❁ ❁</div>

P157

[3917] - 10

F.Y. B.Sc.

ZOOLOGY

Genetics and Parasitology

(New Course - 2008 Pattern) (Paper - II) (Theory)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:
1) *All questions are compulsory.*
2) *Neat labelled diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*

SECTION - I
(Genetics)

Q1) Define/Explain the following (Any Ten): [10]
   a) Genotype.
   b) Centromere.
   c) Metacentric chromosome.
   d) Gene therapy.
   e) Haemophilia.
   f) Monohybrid cross.
   g) Kappa particles.
   h) DNA fingerprinting.
   i) Law of segregation.
   j) Polygenes.
   k) Hyperploidy.
   l) Lethal genes.

Q2) Write short notes on (Any Three): [15]
   a) Klinefelter's syndrome.
   b) Alkaptonuria.
   c) Erythroblastosis foetalis.
   d) Colourblindness
   e) Negative eugenics.

Q3) Attempt the following: **[15]**

   a) Explain the inheritance of complimentary genes (9:7 ratio).

   b) What is sex determination? Explain XX - XY method of sex determination.

   c) Work out the genotype and phenotype of possible blood groups in the offsprings of the following crosses with reference to ABO blood group system in man.

   i) $I^A I^B$ × $I^o I^o$

   ii) $I^A I^A$ × $I^B I^B$

   iii) $I^B I^o$ × $I^B I^o$

   iv) $I^A I^o$ × $I^B I^o$

   v) $I^o I^o$ × $I^o I^o$

OR

Explain any three types of structural chromosomal aberrations.

SECTION - II

(Parasitology)

Q4) Define/Explain the following (Any Ten): **[10]**

   a) Medical Helminthology.

   b) Parasitism.

   c) Vector.

   d) Innate immunity.

   e) Metaplasia.

   f) Inflammation.

   g) Zoonosis.

   h) Schizogony.

   i) Ookinete.

   j) Ascariasis.

   k) Miracidium larva.

   l) Definitive host.

Q5) Write short notes on (Any Three):   [15]

    a)   Rabies.

    b)   Periodicity of microfilariae.

    c)   Parasitic effects of Taenia solium.

    d)   Control measures of Sarcoptes scabei.

    e)   Pathogenecity of Head louse.

Q6) Attempt the following: [15]

    a)   Explain ecological host specificity with suitable example.

    b)   Explain any five types of parasites with suitable example each.

    c)   Write in detail about any five effects of parasite on host.

<div align="center">OR</div>

    Explain in detail the life cycle of Entamoeba histolytica. Add a note on its pathogenecity and control measures.

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[3917] - 11

F.Y. B.Sc.

GEOLOGY

Mineralogy and Petrology

(Revised Course) (Paper - I) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks :80*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Neat labelled diagrams must be drawn wherever necessary.*

    3)   *Figures to the right indicate full marks.*

Q1) Answer the following questions: **[16]**

    a)   Define Igneous rock.

    b)   What is Lustre?

    c)   Define the term Pseudomorphism.

    d)   What is Relief?

    e)   What is Sandstone?

    f)   Define Gemology.

    g)   What is Lithophile?

    h)   Define Petrology.

Q2) Answer the following questions (any four):   **[16]**

    a)   Explain the evaporation and precipitation process of mineral formation.

    b)   Explain metallic bonding in minerals with their various modes of packing.

    c)   Explain the cyclosilicate structure with suitable examples.

    d)   Give an account of minerals used as refractories.

    e)   Explain the electrical properties of minerals.

    f)   Explain the types of extinctions in minerals.

Q3) Answer the following questions (any four): **[16]**

a) Explain pyrogenetic minerals and it's classification with suitable examples.

b) Describe the residual deposits.

c) Explain 'rock cycle'.

d) Give the classification of Igneous rocks based on silica content.

e) Give the diagnostic characters of sedimentary rocks.

f) Explain various agents of metamorphism.

Q4) Answer the following questions (any two): **[16]**

a) Give the silicate structure, chemical composition, physical and optical properties of 'Quartz'.

b) Explain the various optical properties of minerals seen in plane polarized light.

c) Explain the clastic and non-clastic texture in sedimentary rocks.

d) Explain cataclastic and thermal metamorphism with suitable examples.

Q5) Give the Crystallographic axes, elements of symmetry, definitions with indices of various forms present in Cubic system, type Galena. **[16]**

OR

a) What is specific gravity? Explain Jolly's spring balance in the determination of specific gravity of minerals.

b) What are concordant intrusive forms. Explain the following forms.

  i) Laccolith ii) Phacolith.

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P159   **[3917] - 12**

F. Y. B.Sc.

GEOLOGY

General Geology & Palaeontology

(Revised Course) (Paper - II) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks :80*

Instructions to the candidates:

    1)   All questions are compulsory.

    2)   Neat labelled diagrams must be drawn wherever necessary.

    3)   Figures to the right indicate full marks.

Q1) Answer the following questions: **[16]**

    a)   Define Erosion and denudation.

    b)   Define palaeontology.

    c)   Define Geology.

    d)   Define Hing line.

    e)   Define Deflation hollows and Deflation armour.

    f)   Define Brachial skeleton.

    g)   Define focus and Epicenter of Earthquake.

    h)   Draw a neat labelled diagram of Gastropod shell.

Q2) Answer <u>Any four</u> questions from the following: **[16]**

    a)   Explain the Big Bang theory for the origin of the universe.

    b)   Explain the concept of continental drift theory.

    c)   Explain with the neat diagram the internal structure of the earth.

    d)   Differentiate between Regular & Irregular Echinoids with diagrams.

    e)   With neat diagrams explain the different types of suture lines in Ammonoids.

    f)   Explain uses of fossils.

Q3) Answer <u>Any Four</u> questions from the following:　　　　　　**[16]**

    a)　Describe the various branches and sub branches of Geology.

    b)　Define weathering. Describe various types of Mechanical Weathering.

    c)　Give the systematic tabular classification of Phanerozoic Eon.

    d)　Describe the hard part morphology of Lamelli branch shell.

    e)　Describe different types of mountains.

    f)　Define soil. Describe soil profile.

Q4) Answer the following questions (Any Two):　　　　　　　　**[16]**

    a)　Describe the various modes of preservation of fossils.

    b)　Describe depositional landforms formed by the action of wind.

    c)　Define an Earthquake and describe the effects of an earthquake.

    d)　Give an account of the different forms of the gastropod shells with the help of neat diagrams and examples.

Q5) What are volcanoes? Explain the structures of a typical central type of volcano with the help of a diagram. Add a note on products of volcano.　　**[16]**

<div align="center">OR</div>

    a)　Define fossil. Describe the necessary conditions for fossilization. Add a note on collection techniques of fossils.　　　　　　**[8]**

    b)　Describe the hard part morphology of trilobites.　　　　**[8]**

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[3917] - 13
F.Y. B.Sc.
STATISTICS / STATISTICAL TECHNIQUES
Descriptive Statistics
(Paper - I) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*
Instructions to the candidates:
1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of statistical tables and calculator is allowed.
4) Symbols have their usual meanings.
5) Graph papers will be supplied on request.

Q1) a) Choose correct alternative for the following :   **[4 × 1 = 4]**

     i) If the population is heterogenous then the better method of sampling is :

        A) SRS   B) Stratified random sampling

        C) Systematic sampling   D) Two-Stage sampling

     ii) If Var(X) = 16, then SD(2X) is :

        A) 8   B) 32   C) 64   D) 16

     iii) If A and B are two independent attributes with N = 100, (A) = 40 and (B) = 70, then (AB) is :

        A) 70   B) 30   C) 28   D) 110

     iv) If bxy = $\dfrac{-3}{2}$, byx = $\dfrac{-1}{6}$, then *r* is ;

        A) $\dfrac{1}{2}$ B) $\dfrac{-1}{2}$ C) $\dfrac{1}{4}$ D) $\dfrac{-1}{4}$

   b) State whether the following statements are true or false :   **[4 × 1 = 4]**

     i) The mean deviation from mean is minimum.

     ii) For a symmetric distribution all odd ordered central moments are zero.

     iii) In case of negatively skewed distributions Mean < Median.

     iv) Arithmetic mean can be obtained graphically.

   c) Define harmonic mean and state the formula in case of individual observations.   **[2]**

d) Is the following information consistent?

(A) = 30, (B) = 40, (AB) = 35, N = 100 **[2]**

e) If the coefficient of variation of a series is 75% and standard deviation is 15, find the arithmetic mean of the series. **[2]**

f) Given, $\sigma_x = 2$, $\sigma_y = 3$ and Corr. (X, Y) = 0.75 obtain Var(2X – 3Y).**[2]**

Q2) Attempt <u>any four</u> of the following : **[4 × 4 = 16]**

a) Write a note on construction of histogram in case of equal and unequal class widths.

b) Construct stem and leaf plot to represent the following data :
10.8, 12.9, 13.0, 12.5, 13.1, 10.4, 10.2, 13.3, 10.8, 11.8, 11.1, 11.3.

c) Explain stratified random sampling with an illustration.

d) Explain the meaning of central tendency of data. What are the requirements of a good measure of central tendency?

e) For a bivariate data we have,

$\overline{X}$ = 50, $\overline{Y}$ = 30, byx = –0.50, bxy = –0.8.
   i) Estimate Y for X = 60
   ii) Estimate X for Y = 40

f) State and prove minimal property of mean squared deviation.

Q3) Attempt <u>any four</u> of the following : **[4 × 4 = 16]**

a) Define quartiles. Explain how to find quartiles for a continuous frequency distribution.

b) Explain the term skewness. Explain different types of skewness with illustrations.

c) With usual notations, show that, $\beta_2 \geq \beta_1 + 1$

d) A sample of n observations on X and Y shows that X and Y are uncorrelated and their variances are 4 and 9 respectively.
Let U = 3X + 4Y and V = 3X – Y, show that U and V are uncorrelated.

e) State Bowley's coefficient of skewness and show that it always lies between –1 and +1.

f) In a certain interview there were 126 candidates of which 70 were boys, 36 candidates were successful, among them 20 were boys. Obtain the coefficient of association between success in interview and attribute boy.

Q4) Attempt <u>any two</u> of the following : **[2 × 8 = 16]**

    a)   Explain the concept of correlation. Define Pearson's correlation coefficient (r). Show that r lies between -1 and +1. **[8]**

    b)   i)   Explain any two problems involved in the construction of index-numbers. **[4]**

          ii) Define the term dichotomy and independence of two attributes.**[4]**

    c)   i)   If the rank correlation coefficient between X and Y is 2/3 and the sum of squares of differences between the ranks is 55, assuming that no rank is repeated, find the number of pairs of observations. **[4]**

          ii) In a group of 200 persons 150 read Marathi newspaper, 100 read English newspaper and 80 read both. Find the number of persons reading 1) no newspaper 2) newspaper in only one language.**[4]**

    d)   i)   Obtain an expression for acute angle between the two regression lines. **[4]**

          ii) Explain the procedure of fitting the curve $y = ab^x$. **[4]**

Q5) Attempt <u>any two</u> of the following : **[2 × 8 = 16]**

    a)   Derive the formula for median for a continuous frequency distribution. **[8]**

    b)   Let (x_i, y_i), i = 1, 2,......, n are the observations on a bivariate random variable (X, Y). Derive the equation of line of regression of Y on X.**[8]**

    c)   i)   Given $\Sigma p_0 q_0 = 1660$, $\Sigma p_1 q_1 = 1340$, $\Sigma p_0 q_1 = 1070$ and $\Sigma p_1 q_0 = 2070$, calculate Laspeyre's, Paasche's and Fisher's price index numbers for the above data. **[4]**

          ii) If (A) = 49, (α) = 57, (AB) = 29, (αB) = 38 are A and B associated? If so, what is the type of association? **[4]**

    d)   i)   If the first three raw moments of a distribution are 1, 4 and 10 respectively, compute coefficient of skewness (V_1) and comment on the type of skewness. **[4]**

          ii) The prices of tea of grade I and II are Rs. 200 and Rs. 160 per kg. respectively. If these two grades of tea are mixed together in the ratio 3:2, find the average price of mixture. **[4]**

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[3917] - 14

F.Y. B.Sc.

STATISTICS / STATISTICAL TECHNIQUES

Discrete Probability and Probability Distributions

(Paper - II) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Use of statistical tables and calculator is allowed.*
4) *Symbols have their usual meanings.*

Q1) a)   Choose correct alternative for the following :   **[4 × 1 = 4]**

   i)   A pair of dice is tossed simultaneously and the outcomes are noted. The number of sample points in the sample space is :

   A)   4   B)   6

   C)   8   D)   36

   ii)   If A and B are two independent events defined on Ω, such that P(A) = 0.5, P(B) = 0.4 then P(A$\cup$B) is equal to :

   A)   0.2   B)   0.7   C)   0.3   D)   0.9

   iii) If Var(X) = 4, then Var(3X + 4) is :

   A)   4   B)   12   C)   36   D)   40

   iv)   If X $\rightarrow$ B (n, p) with $n = 25$, E(X) = 10, then the value of p is :

   A)   2.5   B)   0.4   C)   0.6   D)   None of these.

b)   State whether the following statements are true or false :   **[4 × 1 = 4]**

   i)   Variance of a constant is zero.

   ii)   For a poisson distribution mean is less than variance.

   iii) If X $\rightarrow$ B (10, 0.7) then mode is 15.

   iv)   E(X) is affected by change of origin and scale.

c)   State the p.m.f. of Bernoulli distribution.   **[2]**

d)   Define mutually exclusive events.   **[2]**

e)   State the additive property of Binomial distribution.   **[2]**

f)   Write down the sample spaces for the following random experiments.

   i)   Sex of children in a family with 2 children is recorded.   **[1]**

   ii)   Number of customers arriving at a telephone booth during a day.**[1]**

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Q2) Attempt <u>any four</u> of the following : [4 × 4 = 16]

a) Define the following terms :
   i)   Sample space.
   ii) An event.
   iii) Sure event.
   iv) Complement of an event.

b) Given P(A) = 0.4, P(B) = 0.3, P(A∪B) = 0.6 Find :
   i)   P(A∩B)
   ii) P(A'∩B)
   iii) P(A'∩B')
   iv) P(A'∪B')

c) Define independence of two events. If A and B are independent events, then prove that :
   i)   A' and B are also independent.
   ii) A' and B' are also independent.

d) The marginal probability distributions of random variables X and Y are given below :

X	1	2	3
P(X = x)	0.3	0.3	0.4

Y	1	2	3
P(Y = y)	0.1	0.6	0.3

   Assuming X and Y to be independent, obtain
   i)   The joint probability distribution of (X,Y) and
   ii) P(X = Y)

e) Let X and Y be two discrete random variables defined on finite sample space. Prove that E(X + Y) = E(X) + E(Y).

f) If X is a discrete random variable with p.m.f.
   P(X = x) = Kx; x = 1, 2, 3
             = 0, otherwise
   Find :   i)   The value of K
            ii) E(X)
            iii) E(2X – 4)

Q3) Attempt <u>any four</u> of the following : [4 × 4 = 16]

a) The probability distribution of a discrete random variable X is as follows:

X	0	1	2
P(X = x)	0.25	0.50	0.25

   Find : i)   The cumulative distribution function of X.
          ii) Median
          iii) Mode
          iv) P(X ≥ 0)

b) Two urns identical in appearance, contain respectively 3 white and 2 black balls; and 2 white and 5 black balls. One urn is selected at random, and a ball is drawn from it. If it turns out to be black what is the probability that urn I was chosen.

c) With usual notations; prove that :
$V(aX + b) = a^2V(X)$ where a and b are real constants.

d) Let A and B be two events defined on a sample space Ω, such that
$P(A) = \dfrac{1}{4}$, $P(B/A) = \dfrac{1}{2}$ and $P(A/B) = \dfrac{1}{4}$ show that :
i) $P(A \cap B) = P(A)\,P(B)$
ii) $P(A'/B') = 3/4$.

e) Let A and B be two events on a sample space Ω, write the expressions for the following events. Also draw Venn-diagram for these events.
i) At least one occurs. ii) Both occurs.
iii) None occurs iv) A occurs but not B

f) A bag contains 4 tickets numbered 445, 454, 544 and 555 one ticket is drawn randomly. Let A_i ($i = 1, 2, 3$) be the event that the ith digit of the number of the ticket is 4. Discuss independence of A_1, A_2, A_3.

Q4) Attempt <u>any two</u> of the following : **[2 × 8 = 16]**

a) i) Let $X \to B\left(3, \dfrac{1}{4}\right)$ and $Y \to B\left(4, \dfrac{1}{4}\right)$ be two independent random variables. Obtain :
I) $P(X + Y = 0)$
II) $P(X + Y \geq 1)$
ii) State and prove recurrence relation for probabilities of Binomial distribution with parameters n and p.

b) Define discrete uniform distribution and find its mean and variance.

c) The joint probability distribution of (X, Y) is given below :

X \ Y	0	1	2
0	1/4	0	1/4
1	1/8	1/8	1/4

Compute :
i) Corr(X, Y)
ii) Corr(2X, 3Y)

d) i) If X and Y are two random variables defined on a finite sample space Ω, then prove that $V(aX + bY) = a^2V(X) + b^2V(Y) + 2ab$ cov(X, Y) where a and b are real constants.

ii) The joint probability distribution of (X, Y) is given below :

X \ Y	0	1	2
−1	1/6	0	1/12
1	1/4	1/3	1/6

Find :

I) E(X/Y = 0)

II) V(X/Y = 0)

Q5) Attempt <u>any two</u> of the following : **[2 × 8 = 16]**

a) i) Show that all raw moments of Bernoulli distribution are equal to 'p'.

ii) If X → B (n, p), show that :

I) $E\left(\dfrac{X}{n}\right) = p$

II) $E\left(\dfrac{X}{n} - p\right)^2 = -\text{cov}\left(\dfrac{X}{n}, \dfrac{n-X}{n}\right)$

b) Define hypergeometric distribution and obtain its mean.

c) i) A parcel of 12 books contains 4 books with loose binding. What is the probability that a random selection of 6 books (without replacement) will contain 3 books with loose binding.

ii) 5% of the families in Kolkata do not use gas as a fuel. If a sample of 50 families are selected at random in Kolkata, what will be the probability that less than 4 families in the sample do not use gas as a fuel.

d) i) Define poisson distribution. State its mean, variance and additive property.

ii) Let X → p(m). If $p(X = 5) = \dfrac{3}{10}$ $p(X = 4)$, find $p(X > 3)$.

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F.Y. B.Sc.

GEOGRAPHY

Gg - 110: Physical Geography

(New Course) (Paper - I) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks :80*

Instructions:

    1)   *All questions are compulsory.*

    2)   *All questions carry equal marks.*

    3)   *Draw neat diagrams and sketches wherever necessary.*

    4)   *Use of map stencils is allowed.*

Q1) Answer the following questions in two to four sentences:

    a)   What is Sima?

    b)   Define rock.

    c)   What is mean by weathering?

    d)   Define fold.

    e)   What do you mean by Tsunami?

    f)   What do you mean by Delta?

    g)   What do you mean by Abrasion?

    h)   What do you mean by Swash?

Q2) Explain the following in brief (Any four):

    a)   Seismic Waves.

    b)   Objections raised for Wegner's Continental drift theory.

    c)   Types of faults.

    d)   Biological weathering.

    e)   Formation of an Ox-bow lake.

    f)   Mushroom rock.

Q3) Answer the following (Any Four):

    a)   Rift Valley.

    b)   Types of Volcanoes.

    c)   Types of Mass Movements.

    d)   'U' shaped valley.

    e)   Sea cliff formation.

    f)   Formation of Barchan.

Q4) Answer the following (Any Two):

    a)   Explain Plate Tectonic theory.

    b)   Explain the rock types and classify sedimentary rocks.

    c)   Explain Davisian Cycle of erosion.

    d)   Landforms associated with sea wave deposition.

Q5) Explain the nature and scope of Physical Geography.

<div align="center">OR</div>

Describe various landforms associated with erosional work of river.

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F.Y. B.Sc.

GEOGRAPHY - II

Gg - 120: Geography of Atmosphere and Hydrosphere

(New Course) (Paper - II) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks :80*

Instructions to the candidates:

   1)   *All questions are compulsory.*

   2)   *All questions carry equal marks.*

   3)   *Draw neat diagrams and sketches wherever necessary.*

   4)   *Use of map stencil is allowed.*

Q1) Answer the following questions in two or four sentences.

   a)   What do you mean by horse latitudes?

   b)   Enlist elements of weather and climate.

   c)   Define insolation.

   d)   What do you mean by Lapse rate?

   e)   What do you mean by El - Nino?

   f)   Define submarine relief.

   g)   What do you mean by Coast?

   h)   Define salinity.

Q2) Explain the following in brief (any four):

   a)   Gaseous composition of atmosphere.

   b)   Characteristics of Anti-trade winds.

   c)   Weather conditions associated with Tropical Cyclone.

   d)   Haff Nehrung Coast.

   e)   Causes of Salinity.

   f)   Compound Waves.

Q3) Answer the following (Any Four):

    a)   Cumulo-nimbus clouds.

    b)   Types of airmasses.

    c)   Causes of Global Warming.

    d)   Submergence of coasts.

    e)   Continental shelf.

    f)   Effects of tides.

Q4) Answer the following (Any Two):

    a)   Importance of Oceanography during modern time.

    b)   Heat budget of the earth.

    c)   Explain factors Controlling Salinity.

    d)   NE and SW Monsoon Winds.

Q5) Explain nature and scope of Climatology.

<div align="center">OR</div>

Explain with neat diagram formation of Ocean Currents of Atlantic.

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[3917] - 17

F.Y. B.Sc.

MICROBIOLOGY

Introduction to Microbiology

(Paper - I) (New Course) (2008 Pattern)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Draw neat labelled diagrams wherever necessary.*
3) *Figures in bracket indicate full marks.*

Q1) Attempt the following: [16]

a) Sucrose is an example of a —————

  i) Monosaccharide. ii) Disaccharide
  iii) Oligosaccharide iv) Polysaccharide.

b) Peptide bonds are found in the biomolecules —————

  i) Lipids ii) DNA
  iii) Proteins iv) Carbohydrates.

c) State True or False "Aristotle disapproved the theory of spontaneous generation".

d) Match the following:

	A		B
i)	Alexander Flemming	a)	Endospores
ii)	Elie Metchnikoff	b)	Anthrax bacilli
iii)	Robert Koch	c)	Penicillin
iv)	Tyndall John	d)	Phagocyte.

e) Define-Ionic Bond.

f) Flagella are composed of ————— proteins.

g) What is function of ribosomes.

h) ————— is an example of endospore forming rods.

  i) <u>Sporosarcina</u> spp. ii) <u>Bacillus</u> spp.
  iii) <u>Lactobacillus</u> spp. iv) <u>Streptomyces</u> spp.

Q2) Attempt any <u>four</u> of the following: [16]
    a) Write a note on 'Function of Proteins'.
    b) What are extrachromosomal elements? Give their examples.
    c) Give beneficial aspects of <u>Lactobacillus</u> spp.
    d) Describe the economic importance of algae.
    e) Give the contribution of Anton Von Leeuwenhoek to Microbiology.
    f) Enlist the milestones in the development of 'Vaccination'.

Q3) Attempt any <u>four</u> of the following: [16]
    a) Diagramatically explain the general structure of an 'Atom'.
    b) What are Polysaccharides? Give two examples.
    c) Describe the morphological characters of <u>Staphylococcus</u> spp.
    d) Draw neat and labelled diagram of TMV.
    e) Enlist the salient features of viruses.
    f) Write a note on 'Surgical Antisepsis'.

Q4) Attempt any <u>two</u> of the following: [16]
    a) Compare and contrast Prokaryotes and Eukaryotes.
    b) Explain in detail general characters and life cycle of <u>Saccharomyces</u> spp.
    c) What are protozoa? Enlist their general characters. Give any four examples.
    d) Distinguish between 'Yeasts' and 'Molds'. Describe their commercial applications.

Q5) Attempt any <u>one</u> of the following: [16]
    a) Describe in detail the contribution of '<u>Louis Pasteur</u>' in microbiology.
    b) Describe structure, chemical composition and function of '<u>cell wall</u>' in bacteria.

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[3917] - 18

F.Y. B.Sc.

MICROBIOLOGY

Basic Techniques in Microbiology

(Paper - II) (New Course) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks :80*

Instructions to the candidates:

   1)   *All questions are compulsory.*

   2)   *Draw neat labelled diagrams wherever necessary.*

   3)   *Figures in bracket indicates full marks.*

Q1) Attempt the following: **[16]**

   a)   Give any 2 examples of negative stain.

   b)   Numerical aperture value of lowpower objective is ————.

   c)   Enlist any 2 hazardous chemicals used in the laboratory.

   d)   What does the ZNCF stands for?

   e)   Define auxenic culture.

   f)   Draw any two signs used to designate possible hazards.

   g)   Define specific growth rate of bacteria.

   h)   Enlist 2 modifications of phase contrast microscope.

Q2) Attempt any 4 of the following: **[16]**

   a)   Define selective media. Explain any one in detail.

   b)   Explain the principle & working of TEM.

   c)   Define acidic and basic stain with minimum 2 examples of each.

   d)   Explain how DMC tech is used for enumeration of bacteria.

   e)   Describe the mode of action of formal dehyde as disinfectant.

   f)   Draw a well labelled diagram of fluorescente microscope.

Q3) Attempt any 4 of the following: [16]

   a) Write the principle and methodology of Gram Staining.

   b) Explain the phenomenon of diauxic growth.

   c) Describe mode of action of

      i) Heavy metals   ii) Ethylene oxide.

   d) Enlist the different culture collection centers with their long form.

   e) Give the comparative account of light and electron microscope.

   f) Explain the function of oil while using an oil immersion lense.

Q4) Attempt any two of the following: [16]

   a) What is pure culture? Explain any 2 methods to obtain pure culture in detail.

   b) Define aberration. Explain spherical aberration in detail.

   c) What are extremophiles? Explain different methods of cultivation of extremophiles.

   d) Write the characteristics of an ideal disinfectant.

Q5) Attempt any one of the following: [16]

   a) With proper ray diagram explain principle, working and applications of dark field microscope.

   b) Enlist different methods of enumeration. Explain any 3 methods in detail.

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[3917] - 21
F.Y. B.Sc.
ELECTRONIC SCIENCE
EL1-T1 : Principles of Analog Electronics
(New Course) (Paper - I) (2008 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) All questions are compulsory.

2) Draw neat labelled diagram wherever necessary.

3) Use of log table / calculator is allowed.

4) Figures to the right indicate full marks.

Q1) Answer the following questions in brief : **[16]**

a) What is resistor? List different types of resistors.

b) What do you mean by filter circuit-list different types of filters.

c) State KcL & KvL for electrical network.

d) Define the terms (i) intrinsic stand off ratio (ii) Pinch off voltage.

e) What is rectifier circuit? Define ripple factor.

f) List ideal characteristics of opamp.

g) What is switch? Draw circuit symbol of SPDT switch.

h) State the use of filter circuit in rectifier.

Q2) Answer <u>any four</u> of the following : **[16]**

a) What is relay? Explain constructional detial & working principle of electromagnetic relay.

b) Explain construction & working of NPN Transistor.

c) Explain construction and working of n-channel FET.

d) Describe full wave rectifier with proper circuit & waveforms.

e) What is clipper? Explain series positive clipper.

f) Draw noninverting amplifier circuit using opamp derive the formula for its output voltage.

Q3) Attempt <u>any four</u> of the following :   **[16]**

   a)   State working principle of transformer & define the terms-voltage ratio, current ratio, turns ratio.

   b)   State & prove maximum power transfer theorem.

   c)   Write short notes on (i) optocoupler. (ii) I-V characteristics of UJT.

   d)   What is voltage doubler? Explain Half wave voltage doubler.

   e)   Explain how zener diode works a regulator.

   f)   Write the rules to find thevenine equivalent of the given circuit.

Q4) Attempt <u>any four</u> of the following :   **[16]**

   a)   In calculating RC time constant, R is in ohm, capacitance C is in farad, how it given time in seconds.

   b)   Explain the action of PN function diode in forward bias. Draw its I-V characteristics.

   c)   List the configuration of BJT. Draw different configurations of NPN transistor using proper biasing.

   d)   Draw RC circuit. Apply square wave input. Explain what will be output across C.

   e)   Draw different types of signals used in electronic circuits show their characteristic.

   f)   List comparison characteristic of CB, CC, CE configuration for voltage gain, input impedance, output impedance.
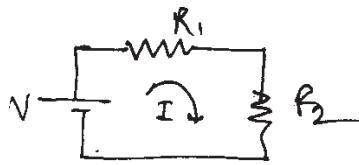

Q5) Attempt <u>any four</u> of the following :   **[16]**

   a)   The arms of π network has Ra = 60Ω, Rb = 40Ω Rc = 20Ω convert it into equivalent T network.

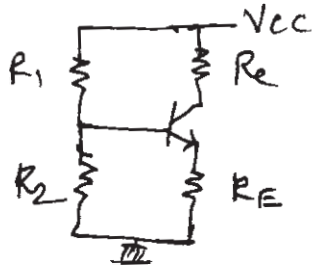   b)   State thevenins theorem. Draw thevenin equivalent of the following circuit.
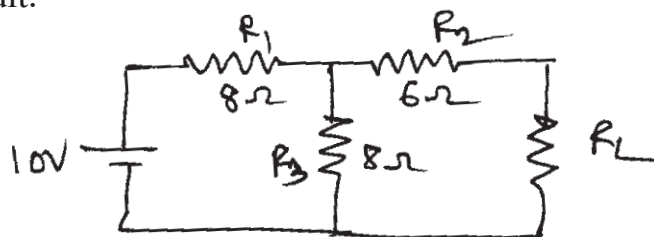
c) i) Calculate the resistance of 60 W bulb if a current of 500 mA results from an applied voltage of 220V.

ii) Determine voltage across R_1 & R_2.

$R_1 = 2k\Omega, \quad R_2 = 5k\Omega \quad V = 35V.$

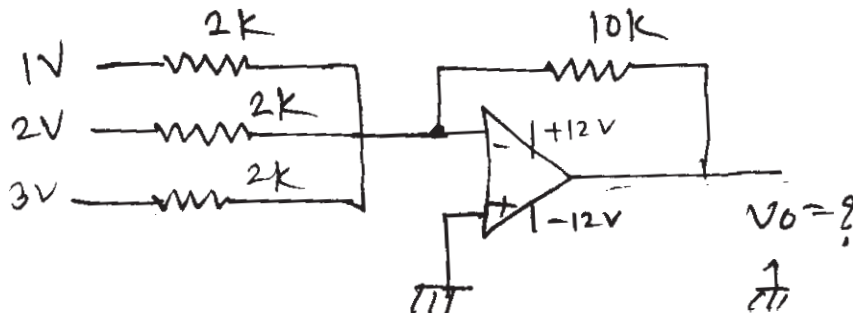d) For the voltage divider biasing circuit if $\beta = 100$ calculate V_{CE} & I_c.

$R_1 = 10k, \quad R_c = 1k$

$R_2 = 5k \quad R_E = 500\Omega$

$V_{cc} = 10V$

e) Calculate output frequency of UJT relaxation oscillator if $R_1 = 100K$, $C = 100 \mu f$. $\eta = 0.65$.

f) Find the output voltage of the following circuit.

$V_0 = ?$

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[3917] - 22

F.Y. B.Sc.

ELECTRONICS

EL1T2 - Principles of Digital Electronics

(Paper - II) (New Course) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks :80*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Neat labelled diagram must be drawn wherever necessary.*

    3)   *Use of calculator and log tables is allowed.*

    4)   *Figures to the right indicates full mark.*

Q1) Answer the following questions in brief: **[16]**

    a)   State the basic principle of operation of static RAM cell and Dynamic RAM cell.

    b)   What is shift register? List applications of shift register.

    c)   "TTL logic family is more popular than ECL logic Family", Comment.

    d)   What is Kmap? Write its use.

    e)   Write 1's complement of $(10010)_2$ and $(101110)_2$.

    f)   Draw the logic symbol of NOT gate. Write its truth table.

    g)   Convert the following decimal number into BCD.

        i)   35,   ii)   174.

    h)   What is combinational logic circuit? List examples of combinational logic circuits.

Q2) Answer any four of the following: **[16]**

    a)   With the help of neat logic diagram explain the working of 3-bit parallel adder.

    b)   Explain 2:1 multiplexer. with proper circuit. Write its truth table.

    c)   Draw the logic circuit of JKFF. Write its truth table with proper logic symbol.

    d)   Write a short note on memory organization of 16 cell memory.

    e)   Explain 2 input TTL NAND gate with the help of basic circuit.

    f)   Convert the following:

        i) $(10110)_2 = (.....)_{GRAY}$ ii) $(110011)_{Gray} = (....)_2$.

Q3) Answer any FOUR of the following: **[16]**

   a) Draw the logic circuit of two input AND gate using diodes. Explain its working.

   b) Draw EXOR gate using basic gates. Write its symbol, boolean equation and write the truth table.

   c) Simplify the following boolean equation and draw the logic circuit of simplified output: $Y=(A\overline{B}C+A\overline{B}BD+\overline{A}\,\overline{B})C$.

   d) Differentiate between RAM and ROM. List the different types of ROM available.

   e) Describe 3-bit up-down counter with neat diagram.

   f) Explain 4-bit subtractor.

Q4) Answer any FOUR of the following: **[16]**

   a) What is asynchronous counter? List its advantages and disadvantages over synchronous counter.

   b) Explain PISO shift register with neat diagram.

   c) With the help of neat diagram explain BCD to 7-segment decoder.

   d) Explain Decimal to BCD encoder with neat circuit.

   e) Convert the following:

      i) $(BAD)_{16} = (...)_{10}$

      ii) $(539)_{10} = (...)$ Excess-3code.

   f) State and prove Demorgon's theorems.

Q5) Answer any FOUR of the following: **[16]**

   a) Explain 1:4 demultiplexer with proper circuit diagram.

   b) Do the following subtraction using 1's complement method and 2's complement method:

      i) 25-13,   ii) 78-65.

   c) Simplify the following expression using Kmap and draw its simplified diagram:

$$Y=\overline{A}\,\overline{B}\,\overline{C}+\overline{A}B\overline{C}+AB\overline{C}+A\overline{B}C+\overline{A}BC+ABC .$$

   d) Draw the logic circuit of 4-bit asynchronous counter. Draw its timing diagram.

   e) Draw the circuit of mod-10 counter using flip-flops. Write its truth table.

   f) List the performance characteristics of digital integrated circuits. Explain noise immunity.

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[3917] - 23

F.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS - 1: War and Warfare

(2008 Pattern) (New Course)

Time : 3 Hours]   *[Max. Marks :80*

Instructions to the candidates:

  1)   *All questions are compulsory.*

  2)   *Figures to the right indicate full marks.*

Q1) Answer in 20 words each (any ten):   **[20]**

  a)   Define 'War'.

  b)   Define 'Airpower'.

  c)   What is 'Amphibious Force'?

  d)   What is meant by 'Coldwar'?

  e)   Define 'Counter Insurgency'.

  f)   What is meant by 'D-Day'?

  g)   What is 'Economic Mobilization'?

  h)   What is meant by 'First Strike'?

  i)   Define 'Military Operation'.

  j)   What is 'Strategy'?

  k)   What is 'Nuclear Radiation'?

  l)   Define 'Passive Defence'.

  m)   Define 'Radar'.

Q2) Answer in 50 words (any two):   **[10]**

  a)   Write the functions of war.

  b)   Write about Total War.

  c)   Write the nature of Modern War.

  d)   Introduce Information Warfare.

                                                                        P.T.O.

Q3) Answer in 150 words (any two):   [20]

    a)   Explain about the basic characteristics of LIC.

    b)   What are the phases of Guerilla Warfare?

    c)   What are the subjects of propagation in Psy War?

    d)   Explain about the advantages and disadvantages of Chemical and Biological Warfare.

Q4) Answer in 300 words (any two):   [30]

    a)   Discuss theory of Nuclear Deterrence.

    b)   Discuss the Principles of War.

    c)   Discuss the application of Information Warfare.

    d)   Discuss changing perspectives of National Security and Warfare.

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[3917] - 24

F.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS - 2: Defence Mechanism and Military Career in India

(2008 Pattern)

Time : 3 Hours]   *[Max. Marks :80*

Instructions:

　　1) *All questions are compulsory.*

　　2) *Figures to the right indicate full marks.*

Q1) **Answer in twenty words each (Any Ten):**   **[20]**

　　a)　State the meaning of integrated perspective plan in Defence.

　　b)　State any two secondary role of Indian army.

　　c)　Explain the meaning of changing nature of warfare.

　　d)　Where the Northern command of Indian army is located?

　　e)　Write the meaning of combat preparedness.

　　f)　State objectives of Indian Navy?

　　g)　State the meaning of second line Defence.

　　h)　Write the objectives of the Coast Guard.

　　i)　Write the meaning of Counter Intelligence.

　　j)　State the meaning of career options in Para-Military Forces.

　　k)　State functions of Civil Defence.

　　l)　Write the objectives of Territorial Army.

　　m)　State principle of Defence Organization.

Q2) **Answer in 50 words (Any Two):** [10]

    a)   Write the functions of Defence Committee of the Cabinet.

    b)   Explain the role of Signal Corps of the army.

    c)   Describe functions of Army medical corps.

    d)   Write characteristics of Indian Navy.

Q3) **Answer in 150 words (Any Two):** [20]

    a)   Explain career options in Indian Army.

    b)   Discuss career options in Intelligence Organizations in India.

    c)   Write a note on Indian Home guards.

    d)   Explain higher Defence organization in India.

Q4) **Answer in 300 words (Any Two):** [30]

    a)   Discuss organization of Indian Air-Force.

    b)   Explain role of administrative services in Peace and War.

    c)   Discuss the status of National Security Council and its role in India.

    d)   Write about the characteristics, role and limitations of armored corps.

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[3917] - 25

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F.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS.No -III: Evolution of Defence Science and Technology

(2008 Pattern)

Time : 3 Hours]   *[Max. Marks :80*

Instructions:

   1)   *All questions are compulsory.*

   2)   *Figures to the right indicate full marks.*

Q1) <u>Answer in 20 words each</u>: [Any Ten].   **[20]**

   a)   How you would like to define Science?

   b)   What do you mean by 'CATAPULT'?

   c)   Write the year & place of Industrial Revolution.

   d)   Who invented the submarine Firstly?

   e)   State any two non-conventional energy resources.

   f)   What do you know about Gustavas Adolphus?

   g)   State any two emerging Military Technology.

   h)   "When & where the gas warfare it was introduced?

   i)   State the meaning of Duel Technology.

   j)   Write the long form of L.I.C.

   k)   What do you understand by Nuclear Doctrine?

   l)   State the duration of World War first.

   m)   Define "Modern War".

Q2) <u>Answer in 50 words</u>: [Any Two].   **[10]**

   a)   Write in brief "Nuclear Dawn".

   b)   Explain in short the concept of "Total War".

   c)   Write in brief the causes of emergence of General Staff'.

   d)   Discuss in brief the function & significance of Radar.

Q3) <u>Answer in 150 words</u> [Any Two]: **[20]**

    a)   Explain the impact of Science & Technology on contemporary warfare.

    b)   Highlight on "L.I.C. in Indias North East Region".

    c)   Explain in brief the Naval warfare during World War - I.

    d)   Discuss in brief the missile inventory of India at present.

Q4) <u>Answer in 300 words</u> [Any Two]: **[30]**

    a)   Describe the role of "Gustavas Adolphus" as a father of Professional Armies.

    b)   Evaluate the role of Air power during World War - I.

    c)   During world war first how the virtual statemate it was broken out on the Western front of Germany?

    d)   Highlight on the linkages between the energy security and National security.

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[3917] - 29
F.Y. B.Sc. (Vocational)
INDUSTRIAL CHEMISTRY - I
(Paper - I) (Theory) (2008 Pattern) (New)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates:
1) *Answers to the two sections should be written in separate books.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *All questions carry equal marks.*
5) *Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and   steam tables is allowed.*
6) *Assume suitable data, if necessary.*
7) *All questions are compulsory.*

SECTION - I

Q1) Answer the following :   **[8]**
    a)   Write one characteristic of physical adsorption.
    b)   Define Emulsions.
    c)   Give one difference between adsorption and absorption.
    d)   Define catalyst.

Q2) Answer <u>any two</u> of the following :   **[8]**
    a)   Describe two factors affecting catalysis.
    b)   Differentiate between homogeneous and heterogeneous catalysis.
    c)   Where are the following catalysts used. Iron, Pt-gauze, Nickel, $HgSO_4$ and Enzyme.

Q3) Answer <u>any two</u> of the following :   **[8]**
    a)   Explain phenomenon of Electrophoresis.
    b)   Give limitations of Freundlich adsorption isotherm.
    c)   Give brief account of ion exchange adsorption.

P.T.O.

Q4) Answer <u>any one</u> of the following : **[8]**

    a)   What are gels? Give types of gels and explain properties of gels.

    b)   Describe mechanism of acid-base catalysis using suitable example.

Q5) Write short notes on <u>any two</u> : **[8]**

    a)   Surfactants.

    b)   Colloidal solutions.

    c)   Inhibitors.

SECTION - II

Q6) Define and explain the following terms : **[8]**

    a)   Stoichiometric coefficient.

    b)   Molarity.

    c)   Kilocalorie.

    d)   Pressure.

Q7) Answer <u>any two</u> of the following : **[8]**

    a)   Write short note on material balance in evaporation.

    b)   Explain the terms yield and selectivity.

    c)   What is recycling operation? What is the use of carrying out recycling?

Q8) Write short notes on <u>any two</u> of the following : **[8]**

    a)   Triple point of water.

    b)   Percent excess.

    c)   Heat capacity.

Q9) Answer <u>any one</u> of the following : **[8]**

    a)   Describe adiabatic process and explain the factors which govern the feasibility of adiabatic reactions.

    b)   State and explain Raoult's Law and Henry's Law.

Q10) Solve <u>any two</u> of the following : [8]

a) The black ash with following composition (42% Na_2CO_3 + 6% water soluble material + 52% insoluble material) is treated with water. The solid residue has following composition (4% Na_2CO_3 + 0.5% water soluble salts + 85% insoluble material + 10.5% water). Calculate the weight of residue remaining from the treatment of 1.0 metric ton of black ash.

b) Flue gases leaving the stack of boiler at 250°C having following molar composition

CO_2 = 11.31% H_2O = 13.4% O_2 = 2.1% N_2 = 73.48%

Calculate the heat lost in 1 kg mole of the gas mixture above 25°C.

C°pm (kcal / kgmole °K between 250 - 25°C)

CO_2	9.94
H_2O	8.2
O_2	7.2
N_2	7.0

c) 9.8 gms of H_2SO_4 is dissolved to make 100 ml of solution. Find normality and molarity of the solution.

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[3917]-32
F.Y. B.Sc. (Vocational)
ELECTRONIC EQUIPMENT MAINTENANCE
Test and Measuring Instruments and Consumer Products
(Paper - I) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates:
1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Draw neat diagrams wherever necessary.*

Q1) Attempt the following :   **[8 × 2 = 16]**

     a)   What is loading effect?

     b)   State at least two advantages of digital meter over analog instruments.

     c)   What is function of delay line in CRO?

     d)   How current through resistor is measured with CRO?

     e)   What are different waveforms obtained from function generator?

     f)   What are different parts of electric iron?

     g)   What are different parts of electric geyser?

     h)   What is ON Line and OFF Line UPS?

Q2) Answer <u>any four</u> :   **[4 × 4 = 16]**

     a)   Explain the working of Wein Bridge and derive formula for frequency.

     b)   Explain the working of Cathod Ray Tube.

     c)   Explain the working of digital voltmeter.

     d)   With the help of block diagram explain the working of pulse generator.

     e)   Explain object counter system with circuit diagram.

Q3) Attempt <u>any four</u> :   **[4 × 4 = 16]**

     a)   Explain various applications of frequency counter.

     b)   Write a short note on "automatic ranging".

     c)   Give importance of service manual.

     d)   Explain any one type of circuit breaker.

     e)   Draw block diagram of single trace oscilloscope and explain in brief.

Q4) Answer <u>any two</u> of the following :   **[2 × 8 = 16]**

    a)   What is signal generator? Explain RF and AF signal generator in detail.

    b)   Describe CRO probes and explain function of each probe.

    c)   What are precautions and remedial measures to eliminate HF noise pick up.

Q5) Answer <u>any two</u> of the following :   **[2 × 8 = 16]**

    a)   Write a short note on : Microwave Oven.

    b)   What are different measurement techniques?

    c)   What are different applications of CRO?

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[3917]-33

F.Y. B.Sc.
INDUSTRIAL MICROBIOLOGY
Instrumentation and Design & Manufacture of a Fermenter
(Vocational Course) (Theory) (Paper - I) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates:

1) *Answers to the two sections should be written in separate answer books.*
2) *All questions are compulsory.*
3) *All questions carry equal marks.*
4) *Figures to the right indicate full marks.*
5) *Neat diagrams must be drawn wherever necessary.*
6) *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
7) *Assume suitable data, if necessary.*

SECTION - I
Instrumentation

Q1) Attempt the following :   **[8]**

   a) Define : "Sensitivity" of an instrument, weighing balance as an example.

   b) Define : "Detection limit" of an instrument with spectrophotometer as an example.

   c) Define : "Precision" of an instrument, weighing balance as an example.

   d) Define : "Accuracy" of an instrument, weighing balance as an example.

Q2) Answer <u>any two</u> of the following :   **[8]**

   a) $V_g = d^2 (\Phi_p - \Phi_1) / 18\mu \times G$

   What is the above equation? Name the instrument for which it is applicable.

   b) Explain what a "Standard Operating Procedure" is with relevance to an instrument.

   c) Explain the term "chromatography", as it was understood by Tswett.

Q3) Answer <u>any two</u> of the following : **[8]**

a) Draw a block diagram of a visible range spectrophotometer. Explain its working.

b) State the equation that explains the process of filtration.

c) Draw a diagram of disc bowl centrifuge. Explain its working.

Q4) Answer <u>any two</u> of the following : **[8]**

a) What is pH? How is it measured?

b) What are the factors that affect the conductivity of a solution?

c) Explain the principle of working of a flame photometer.

Q5) Answer <u>any one</u> of the following : **[8]**

a) Write the Standard Operating Procedure for the operation of a pH meter.

b) Write the Standard Operating procedure for the operation of a colorimeter.

SECTION - II
Materials and Design of a Fermenter

Q6) Answer <u>any four</u> of the following : **[8]**

a) What is a thermoplastic? Name any two thermoplastics.

b) Define corrosion.

c) Define biofouling.

d) Define oligodynamic action of metals.

e) State the following ratios of dimensions in a laboratory fermenter :

Height to diameter of the vessel :

Diameter of the impeller to diameter of the vessel :

Q7) Answer <u>any two</u> of the following : **[8]**

a) What is oligodynamic action of metals? Explain its implications in bioprocesses.

b) Explain the limitations of borosilicate glass for use in bioprocesses.

c) Explain the properties of polypropylene make it compatible for use in bioprocesses.

Q8) Answer any two of the following : [8]

   a) Explain the properties of stainless steel that make it compatible for bioprocesses.

   b) Draw any one type of projection of a cube.

   c) Explain the properties of Teflon that make it compatible for use in bioprocesses.

Q9) Answer <u>any two</u> of the following : [8]

   a) What is a "mold"? Explain its use in construction of articles.

   b) Draw any 3-dimensional object and mark the lines that show the cutting plane and breaks in it.

   c) What is an orthographic projection? Draw an object to show this projection.

Q10) Answer the following : [8]

Draw the object (side view) given below in either its parallel perspective view OR in its angular perspective view.

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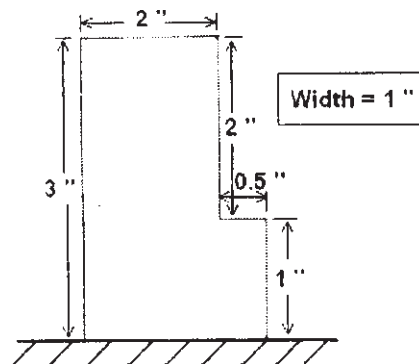
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[3917] - 34

F.Y. B.Sc.

COMPUTER HARDWARE AND NETWORK ADMINISTRATION

Essentials of Computers

(Vocational) (New -2008 Pattern) (Paper - I) (48710)

Time : 3 Hours]   *[Max. Marks :80*

Instructions to the candidates:

   1)   *All questions are compulsory.*

   2)   *Figures to the right indicate full marks.*

   3)   *Draw neat diagrams wherever necessary.*

Q1) Attempt the following: **[16]**

   a)   What is USB?

   b)   Write full forms of : IBM, CAD, ASCII, MBR.

   c)   Distinguish between Primary and Secondary Memory.

   d)   What is NMI? Give example.

   e)   What is BIOS?

   f)   What is the difference between CD ROM and CD R/W?

   g)   What is the meaning of Hardware and Software?

   h)   What is SIMM/DIMM?

Q2) Attempt the following (Any Four):   **[16]**

   a)   Explain in brief: keyboard.

   b)   Write a short note on 'Computer generations'.

   c)   Differentiate between Dot Matrix and Inkjet printers.

   d)   Write a short note on MICR cheques and handling.

   e)   What is Flash RAM?

   f)   Explain how microprocessor works as CPU.

Q3) Attempt any FOUR: **[16]**

    a)   Write a short note on 'Cables and Connectors'.

    b)   Explain sound handling in Computers.

    c)   What are different input, output techniques?

    d)   Write a short note on Plotter.

    e)   What is clock? How it is obtained in computers?

    f)   What are the different packaging types of microprocessors?

Q4) Attempt any Two: **[16]**

    a)   Write a note on 'Memory devices in computer. Explain each type of auxillary memory.

    b)   Write a note on 'Displays'. Explain VDU in detail.

    c)   i)   Comment on 'Address bus is unidirectional'.

           ii)   Write a short note on 'Joystick & light pen'.

Q5) Attempt any Two: **[16]**

    a)   Write a note on 'Intel microprocessors'.

    b)   Draw and explain block diagram of SMPS. How it is different from linear power supply?

    c)   i)   Write a short note on Timing and Control unit.

           ii)   What is Digitizer?

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[3917] - 35

F.Y. B.Sc.

SEED TECHNOLOGY

Morphology, Seed Development and Testing for Cultivar Genuineness (Vocational) (Paper - I)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) *All questions are compulsory.*

2) *Figures to the right indicate full marks.*

3) *Draw neat labelled diagrams wherever necessary.*

Q1) Attempt the following: **[8 x 2 = 16]**

a) Define a Flower.

b) What is Microsporogenesis?

c) What is autogamy?

d) Define poly embryony.

e) Give any two objectives of plant breeding.

f) What do you mean by sexual reproduction?

g) State the law of segregation.

h) Describe any one method of breeding for disease resistance.

Q2) Attempt any Four of the following: **[4 x 4 = 16]**

a) Sketch and label T.S of typical anther.

b) Define Allogamy. Give its advantages and disadvantages.

c) Describe the criterias for harvesting of fruits.

d) Explain natural vegetative mode of reproduction in plants.

e) Give the objectives of introduction.

f) Comment on tissue culture.

Q3) Write notes on any Four of the following: **[4 x 4 = 16]**

   a)   Structure of ovule.

   b)   Classification of fruits.

   c)   Dus system.

   d)   Independant assortment.

   e)   Pure line selection.

   f)   Somaclonal variation.

Q4) Attempt any Two of the following: **[2 x 8 = 16]**

   a)   What is Fertilization? Describe in detail the process of double Fertilization in angiosperms with neat labelled diagrams.

   b)   Explain in detail how morphological characters and chemical tests are employed in examination of seeds.

   c)   Comment on clonal selection.

   d)   Write in detail the process of mass selection.

Q5) Give the distinguishing characters, floral formula and floral diagram of family Malvaceae and Solanaceae. **[16]**

OR

What is hybridization? Explain its technique in self pollinated crops.

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[3917] - 36
F.Y. B.Sc. (Vocational)
Industrial Chemistry - II
(Paper - II) (New 2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates:
   1)   Answers to the two sections should be written in separate books.
   2)   Neat diagrams must be drawn wherever necessary.
   3)   Figures to the right indicate full marks.
   4)   All questions carry equal marks.
   5)   Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and   steam tables is allowed.
   6)   All questions are compulsory.

SECTION - I

Q1) Answer the following :   **[8]**
   a)   Give any two properties of coal-tar.
   b)   Define octane number.
   c)   Name a few petrochemicals derived from alkanes.
   d)   What is aviation gasoline.

Q2) Attempt <u>any two</u> of the following :   **[8]**
   a)   Write a short note on thermal cracking.
   b)   Give a brief account of classification of fuels.
   c)   Give any one theory of origin of petroleum.

Q3) Attempt <u>any two</u> of the following :   **[8]**
   a)   What is natural gas? Give its uses.
   b)   What is coal-tar? Enlist fractions obtained from it.
   c)   Write a short note on calorific value of coals.

Q4) Answer <u>any one</u> of the following :   **[8]**
   a)   Write a short note on analysis of fuel gases.
   b)   Give a descriptive account on processing of industrial fuels.

Q5) Answer <u>any one</u> of the following : **[8]**

    a)   Write a comparative account of coal-gas and coke-oven gas.

    b)   Enlist different methods by which coal can be analysed.

SECTION - II

Q6) Answer the following : **[8]**

    a)   What are metasilicates?

    b)   Define felspars.

    c)   Give two uses of activated charcoal.

    d)   What is liquefaction? Give examples.

Q7) Attempt <u>any two</u> of the following : **[8]**

    a)   Write a short note on occurrence of metals.

    b)   Explain the principles of Hydrometallurgy with suitable examples.

    c)   Differentiate between diamond and graphite.

Q8) Attempt <u>any two</u> of the following : **[8]**

    a)   Write a short note on mica.

    b)   What is alumina? Differentiate between α-Al_2O_3 and γ-Al_2O_3.

    c)   Define slag and give different types of slags and their composition.

Q9) Answer <u>any one</u> of the following : **[8]**

    a)   How is refining of metals carried out? Explain in detail.

    b)   What is a furnace? Enlist different types of furnaces used in metallurgy. Describe one in detail.

Q10) Answer <u>any one</u> of the following : **[8]**

    a)   What is meant by ore-dressing? Describe a suitable method of ore-dressing for a sulphide ore.

    b)   Describe in detail the steps involved in the extraction of a metal from its ore.

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F.Y. B.Sc.

ELECTRONIC EQUIPMENT MAINTENANCE

Maintenance Concepts and Assembly Methods

(Vocational) (Paper - II) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks :80*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

    3)   *Draw neat diagrams wherever necessary.*

Q1) Attempt the following: **[16]**

    a)   Inductor is a wattless component comment.

    b)   Explain the factors on which capacitance of a capacitor depends.

    c)   Explain the significance of tolerance of resistors.

    d)   Explain different losses in a transformer.

    e)   Explain the importance of data sheets.

    f)   Explain the importance of earthing.

    g)   Explain the importance of flux.

    h)   Explain the importance of rating of component.

Q2) Attempt any four: **[16]**

    a)   Write a note on tools used for soldering.

    b)   Explain internal connections of breadboard.

    c)   Explain the use of IF transformers.

    d)   Explain the importance of information printed on body of devices.

    e)   Write a note on precautions to be taken during desoldering.

Q3) Attempt any four: [16]

    a) Write a note on mean time between failures (MTBF).

    b) Write a note on application of AF transformers.

    c) Write a note on causes & indications of failure.

    d) Write a note on soldermaterial.

    e) Write a note on ultrasonic soldering station.

Q4) Attempt any two: [16]

    a) Write a note on Electric Shock & Precautions.

    b) With the help of a neat diagram explain wiring of a fan and regulator.

    c) Write a note on different types of wires used in Electrical Instruments.

Q5) Attempt any two: [16]

    a) Write a note on soldering techniques.

    b) Write a note on good & bad solder joints.

    c) Explain the importance of service manual.

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[3917]-40

F.Y. B.Sc.

INDUSTRIAL MICROBIOLOGY

Microbial Diversity & Cultural Methods and Mathematics and Statistics for Biologists

(Vocational Course) (Theory Paper - II) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates:

1) *Answers to the two sections should be written in separate answer books.*
2) *All questions are compulsory.*
3) *All questions carry equal marks.*
4) *Figures to the right indicate full marks.*
5) *Neat diagrams must be drawn wherever necessary.*
6) *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
7) *Assume suitable data, if necessary.*

SECTION - I

Microbial Diversity and Cultural Methods

Q1) Attempt the following :   **[8]**

a) Define Phototrophs and give two examples.

b) Name any two enrichment media for Fungi.

c) Give two microbial applications of ATCC.

d) List any two algal cultivation methods.

Q2) Answer <u>any two</u> of the following :   **[8]**

a) Describe method use for selectively culturing enteric bacteria.

b) What are extremozymes? Give their importance in basic research.

c) Describe specific method for long term storage of Phages.

Q3) Answer <u>any two</u> of the following :   **[8]**

a) Explain physiological adaptation of halophiles.

b) What is SCP? Give its industrial importance.

c) Enlist methods to cultivate anaerobic bacteria and explain any one culturing device.

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Q4) Answer <u>any two</u> of the following : **[8]**

a) Describe enrichment of Actinomycetes.

b) What is biological nitrogen fixation? Explain cultivation of *Rhizobium* from root nodules.

c) List important culture collections and describe any one.

Q5) Answer <u>any one</u> of the following : **[8]**

a) Describe basic types of culture media and explain the utility of dehydrated media with examples.

b) Describe different methods of preservation of bacteria and diagrammatically explain the process of lyophilization.

SECTION - II
Mathematics and Statistics for Biologists

Q6) Answer <u>any four</u> of the following : **[8]**

a) Define median and variance.

b) The traffic police recorded an average of 3 accidents per week. The number of accidents are distributed according to Poisson distribution. Calculate the probability of exactly 2 accidents per week.

c) Explain skewness of frequency distribution.

d) Choose the correct option and complete the sentence ——————— is an example of Non-random sampling.

    i) Purposive
    ii) Systemic
    iii) Simple random
    iv) Stratified

e) If a coin is tossed 10 times what is the probability of getting combination of 6 Heads and 4 Tails.

Q7) Answer <u>any two</u> of the following : **[8]**

a) Write a note on measurements of central tendencies giving examples.

b) Explain the difference between the two (A and B) distributions represented below :

(A)

(B)
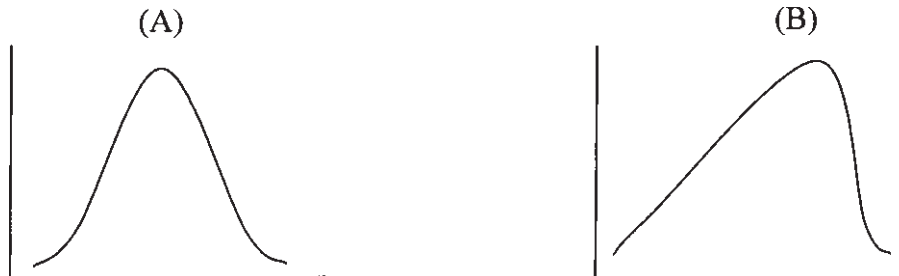
c) Using suitable examples elaborate on addition and multiplication rules of probability.

Q8) Answer <u>any two</u> of the following : **[8]**

a) Measurements of heights (inches) of brother and sister were made in each of 15 two child families, with the following results. Calculate the correlation coefficient between the two heights.

Family	1	2	3	4	5	6
Brother, x	73	70	74	68	70	67
Sister, y	69	67	63	66	67	64

b) Explain the Chi-square test and degree of freedom.

c) Write a note on regression line and its uses.

Q9) Answer <u>any two</u> of the following : **[8]**

a) Explain the importance and limitations of Hardy-Weinberg equilibrium in population genetics studies.

b) Write a note on probability distribution.

c) Explain the following terms :

i) Population and universe.
ii) Parameter and statistic.

Q10) Answer <u>any two</u> of the following :   **[8]**

    a) Give detailed concepts of Hypothesis, Null Hypothesis, Type I error and type II error in statistics.

    b) If the birth rate is half times more that the death rate of a population, will the population attain equilibrium? Justify your answer.

    c) Explain the use and assumptions applied in ANOVA.

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[3917] - 41

F.Y. B. Sc.

COMPUTER HARDWARE AND NETWORK ADMINISTRATION

Computer Organisation

(Vocational) (New) (Paper - II) (2008 Pattern) (48720)

Time : 3 Hours]   *[Max. Marks :80*

Instructions to the candidates:

   1)   *All questions are compulsory.*

   2)   *Figures to the right indicates full marks.*

   3)   *Draw neat diagrams wherever necessary.*

Q1) Attempt the following: **[16]**

   a)   Define - Assembler, Debugger.

   b)   What is Firmware?

   c)   State important features of 8086 Microprocessor.

   d)   List any four internal DOS commands.

   e)   What is Interrupt?

   f)   What is Device Driver?

   g)   State versions of Windows Operating System.

   h)   Define POST.

Q2) Attempt any FOUR: **[16]**

   a)   Explain Evolution of Microprocessor.

   b)   What is algorithm? Explain with example.

   c)   List the segment registers of 8086. How the segment register is combined with offset to form 20 bit address?

   d)   Distinguish between software package and programming language.

   e)   What is Internet? Explain it's Utilities.

   f)   Explain the terms - Software, Hardware.

Q3) Attempt any FOUR: [16]

    a)   What is Multimedia?

    b)   Explain the role of DOS.

    c)   Define - UART.

    d)   Write short note on Network Interface Card.

    e)   What is control panel in Windows? Explain various utilities in it.

    f)   Explain Buffer and Tri State buffer.

Q4) Attempt any TWO: [16]

    a)   What is flowchart? Explain different symbols used in flowchart with example.

    b)   Explain system software and application software.

    c)   Explain 8086 Instruction Set.

Q5) Attempt any TWO: [16]

    a)   What is Window Operating System? State its advantages.

    b)   Explain LAN, MAN & WAN.

    c)   Write short note on:

        i)   Math Co - processor.

        ii)   Protocols.

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F.Y. B.Sc. (Vocational)

SEED TECHNOLOGY

Seed Physiology and Seed Production

(Paper - II) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks :80*

Instructions:

   1)   *All questions are compulsory.*

   2)   *Figures to the right indicate full marks.*

   3)   *Draw neat and labelled diagrams wherever necessary.*

Q1) Attempt the following: **[16]**

   a)   What are Synthetic Seeds?

   b)   Define Seed germination.

   c)   What are Orthodox Seeds?

   d)   Define Seed Vigour.

   e)   Give any two quality concepts in Seed Production.

   f)   What is land preparation?

   g)   Give any two measures to maintain and enrich soil fertility.

   h)   Enlist various factors responsible for seed deterioration.

Q2) Attempt any <u>FOUR</u> of the following: **[16]**

   a)   Comment on seed deterioration during storage.

   b)   Give an account of physiology of seed development.

   c)   Give brief account of invigoration treatment to improve seedling establishment.

   d)   Describe any two methods of irrigation.

   e)   Comment on water and nutrient management in nursery.

   f)   Explain in brief seed village concept.

Q3) Write notes on any <u>FOUR</u> of the following: **[16]**

    a)   Synthesis of Food reserves.

    b)   Physiology of Seed storage.

    c)   Seed ageing.

    d)   Previous crop effect.

    e)   General system of seed multiplication.

    f)   Preparation of land for transplanting of Tomato Seedlings.

Q4) Attempt any <u>TWO</u> of the following: **[16]**

    a)   Explain various factors affecting seed vigour.

    b)   Give an account of production of synthetic seeds.

    c)   What is transplanting? Comment on preparation of land for transplanting in general.

    d)   Explain cropwise critical stages of irrigation.

Q5) What is seed dormancy? Explain various methods to break seed dormancy.
[16]

<div align="center">OR</div>

Explain various methods of sowing for straight varieties. Add a note on calculation of seed rate.

<div align="center">❀ ❀ ❀</div>

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[3917]-108

S.Y. B.Sc.

BOTANY

BO-212 : Fundamentals of Plant Physiology

(New Course) (Paper - II) (Sem. - I) (2008 Pattern) (51421)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

   1) All questions are compulsory.

   2) Figures to the right indicate full marks.

   3) Draw neat labelled diagrams wherever necessary.

Q1) Attempt the following :   **[10]**

   a) Define pH.

   b) What are growth regulators?

   c) Define growth.

   d) What is ion-antagonism?

   e) Define plasmolysis.

   f) Give any two examples of S.D.P.

   g) What is DPD?

   h) Define plant physiology.

   i) Mention different types of salt absorption.

   j) What is photoperiodism?

Q2) Answer <u>any two</u> of the following :   **[10]**

   a) Give practical applications of cytokinins.

   b) Write briefly on Imbibition and Imbibition pressure.

   c) Explain Lundegardh's theory of salt absorption.

Q3) Write notes on <u>any two</u> of the following :   **[10]**

   a) Osmosis.

   b) Path of Ascent of sap.

   c) Role and deficiency symptoms of Nitrogen.

Q4) What is water absorption? Explain the mechanism of water absorption. **[10]**

<div align="center">OR</div>

What is transpiration? Give its significance and add a note on factors affecting transpiration.

<div align="center">✸ ✸ ✸</div>

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[3917]-109

S.Y. B.Sc.

ZOOLOGY

ZY-211 : General Zoology and Biological Techniques - I
(New Course) (Paper - I) (2008 Pattern) (Semester - I)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

   1) *All questions are compulsory.*
   2) *Figures to the right indicate full marks.*
   3) *Neat diagrams must be drawn wherever necessary.*

Q1) Attempt the following : **[10]**

   a) Define centrolecithal egg.

   b) Name any one organism showing amoeboid movement.

   c) State Beer's law.

   d) Mention the name of mollusc with coiled shell.

   e) Name any one group of organism showing periblastula.

   f) What is In Vitro Fertilization?

   g) Write the name of blood pressure measuring instrument.

   h) Enlist the names of pedicellariae.

   i) What is Polyspermy?

   j) What is Sterilization?

Q2) Write short notes on (Any Two) : **[10]**

   a) Significance of coelom.

   b) Ion exchange chromatography.

   c) What is clearing? Mention the use of clearing agents.

Q3) Attempt the following (Any Two) : **[10]**

    a) Describe siphoning type of mouth parts.

    b) Explain harmful Protista.

    c) Sketch & label vertical paper electrophoresis.

Q4) Describe the water vascular system of star fish. **[10]**

<div align="center">OR</div>

What is gametogenesis? Describe the process of spermatogenesis in detail.

<div align="center">✳ ✳ ✳</div>

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[3917]-110

S.Y. B.Sc.

ZOOLOGY

ZY-212 : Applied Zoology - I

(Fisheries and Agricultural Pests and their control)

(New Course) (Paper - II) (2008 Pattern) (Semester - I)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Neat labelled diagrams must be drawn wherever necessary.*

Q1) Attempt the following : **[10]**

a) Mention the habit & habitat of <u>Labeo rohita</u>.

b) Write the biological name of Jowar stem borer.

c) Define fisheries.

d) Mention the biological name of pearl oyster.

e) Enlist any two antidotes

f) What is craft?

g) Write any one damage caused by aphids.

h) What is inland fishery?

i) Write full form of IPM.

j) Mention any two veterinary pests.

Q2) Write short notes on (Any Two) : **[10]**

a) Any two fish preservation methods.

b) Eustuarine fisheries.

c) Rat and Bandicoots as non insect pests.

Q3) Attempt the following (Any Two) :   **[10]**

   a) Describe in brief Knapsack sprayer.

   b) Explain in brief stomach poison with suitable example.

   c) Describe any two fishery by products.

Q4) What is gear? Describe any three types of gears used in Indian fisheries.**[10]**

<div align="center">OR</div>

Describe marks of identification, life cycle, nature of damage and control measures of Lemon butterfly and Mango stem borer.

<div align="center">✸ ✸ ✸</div>

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[3917]-111

S.Y. B.Sc.

GEOLOGY

GL-211 : Mineralogy

(New Course) (2008 Pattern) (Semester - I)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

    3)   *Neat diagrams must be drawn wherever necessary.*

Q1)   Answer the following questions in two or three lines :   **[10]**

    a)   What is foreign overgrowth?

    b)   Define extraordinary ray of light.

    c)   What are the endmembers of olivine group?

    d)   What is Manebach twinning?

    e)   Define the term Isotropism.

    f)   What is mean by Idiochromatic?

    g)   Define Twin plane.

    h)   What is phyllosilicate structure?

    i)   Name two types of felspars.

    j)   What is the silicate structure of silica group?

Q2)   Write notes on (Any Two) :   **[10]**

    a)   Phenomenon of Interference colours.

    b)   Silicate structure and chemical composition of mica minerals.

    c)   Distinction between optical properties and structure of pyroxenes and amphiboles.

Q3) Explain the following (Any Two) :   **[10]**

    a) Main attributes of a gemstone.

    b) Types of extinction positions.

    c) Crystalline and non-crystalline minerals.

Q4) Describe the structure, mineral composition, physical and optical properties and paragenesis of chlorite group of minerals.   **[10]**

<div align="center">OR</div>

Give the crystallographic axes, elements of symmetry and forms present with indices of Cubic System Type pyrite and Type Tetrahedrite.

<div align="center">✳ ✳ ✳</div>

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S.Y. B.Sc.
GEOLOGY
GL-212 : Structural Geology
(New Course) (2008 Pattern) (Semester - I)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:
   1) *All questions are compulsory.*
   2) *Figures to the right indicate full marks.*
   3) *Neat diagrams must be drawn wherever necessary.*

Q1) Answer the following in 2 or 3 lines :   **[10]**

   a)   What are primary lineations?

   b)   What are inliers?

   c)   Define strike & dip of bedding.

   d)   Draw diagram of Chevron fold.

   e)   What is overturned fold?

   f)   Define 'footwall' of a fault.

   g)   Define strike-slip along a fault.

   h)   Define 'throw' along a fault.

   i)   What are dip joints?

   j)   What is disconformity?

Q2) Write notes on (Any Two) :   **[10]**

   a)   Plunging and Non-plunging folds.

   b)   Translational & Rotational movements along fault.

   c)   Columnar joints.

Q3) Explain the following (Any Two) :   **[10]**

   a)   Determination of the top of the beds with the help of cross bedding.

   b)   Angular unconformity.

   c)   Thrust faults and Reverse faults.

Q4) What are faults? Explain the terms associated with faults. Add a note on nature of movement along fault. **[10]**

<div align="center">OR</div>

Describe recognition of folds in the field by direct observation & by plotting attitude of beds on map.

<div align="center">✳ ✳ ✳</div>

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[3917]-115

S.Y. B.Sc.

GEOGRAPHY

Gg-211 : Fundamentals of Geography of Resources

(Paper - I) (2008 Pattern) (Semester - I) (51811)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

　　1)　*All questions are compulsory.*

　　2)　*Figures to the right indicate full marks.*

　　3)　*Draw neat diagrams wherever necessary.*

　　4)　*Use of map-stencil is allowed.*

Q1) Answer the following questions in two to three sentences each :   **[10]**

　　a)　Give any two examples of biotic renewable resources.

　　b)　Give any two examples of non-renewable resources.

　　c)　Define abiotic resources.

　　d)　State any two sources of water.

　　e)　Give any two examples of cultural resources.

　　f)　State any two characteristics of rainwater.

　　g)　State any two bad effects of mining on land resources.

　　h)　What do you mean by deforestation?

　　i)　Name the types of wells.

　　j)　State any two methods of conservation of resources.

Q2) Write notes on the following (Any Two) :   **[10]**

　　a)　Meaning and definition of resources.

　　b)　Measures to conserve forest resources.

　　c)　Importance of forest resources.

Q3) Answer the following (Any Two) :   **[10]**

   a) Explain how land degradation occurs due to agriculture.

   b) Describe the human components of resources.

   c) Explain the importance of abiotic renewable resources.

Q4) Describe the various uses of water resources.   **[10]**

                              OR

Explain the indirect uses of forest resources.

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[3917]-116

S.Y. B.Sc.

GEOGRAPHY

Gg-212 : Introduction to Hydrology

(Paper - II) (New 2008 Pattern) (Semester - I)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

   1)   *All questions are compulsory.*
   2)   *Figures to the right indicate full marks.*
   3)   *Draw neat diagrams and sketches wherever necessary.*
   4)   *Use of map stencil is allowed.*

Q1) Answer the following questions in two or three sentences each :   **[10]**

   a)   What is palaeohydrology?

   b)   What is interception?

   c)   Which are three states of water?

   d)   What percentage of water is stored in the oceans?

   e)   What is the unit of runoff measurement?

   f)   What is fog?

   g)   Where the highest amount of average annual rainfall is recorded in the world?

   h)   What is full form of PMP?

   i)   Define relative humidity?

   j)   What are types of rainfall?

Q2) Write short notes (Any Two) :   **[10]**

   a)   Measurement of rainfall.

   b)   Throughfall.

   c)   Meaning and definition of Hydrology.

Q3) Answer the following (Any Two) :   [10]

   a) What are sources of hydrological data?

   b) What are applications of Hydrology?

   c) How precipitation is distributed on the surface of the Earth.

Q4) Describe hydrological cycle with diagram.   [10]

<div align="center">OR</div>

What is precipitation frequency analysis? Explain gross and net precipitation.

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[3917]-117

S.Y. B.Sc.

MICROBIOLOGY

MB-211 : Microbial Physiology

(Paper - I) (2008 Pattern) (Semester - I) (Theory)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

    1)   ***All questions are compulsory.***

    2)   ***Figures to the right indicate full marks.***

    3)   ***Draw neat labeled diagram wherever necessary.***

Q1)   Answer in one or two lines (All questions are compulsory) :   **[10]**

    a)   Define Beer Lambert Law.

    b)   Give one example of reaction catalysed by hydrolase.

        State <u>True</u> or <u>False</u>

    c)   For a substrate to bind at the active site of an enzyme, there must be two binding sites and one catalytic site.

    d)   Two matrices used in adsorption chromatography are _____ and _____.

    e)   Two radioisotopes used for labelling DNA molecules are _____ and _____.

    f)   The isomerization of citrate to isocitrate in the TCA cycle is catalyzed by _____.

        State <u>True</u> or <u>False</u>

    g)   Glucokinase shows absolute specificity for its substrate.

    h)   The systematic name of lactate dehydrogenase is _____.

    i) NAD^+ is an example of

        1)   Apoenzyme.

        2)   Holoenzyme.

        3)   Coenzyme.

        4)   Metal ion.

    j)   Mention one irreversible reaction of glycolysis.

Q2) Explain <u>any two</u> of the following : [10]

a) Autoradiography.

b) Pasteur effect.

c) Warburg's respirometer.

Q3) Attempt <u>any two</u> of the following : [10]

a) Effect of temperature on enzyme activity.

b) Molecular sieve chromatography can be used to purify proteins.

c) Anaplerotic reactions are essential for the Kreb's cycle.

Q4) Attempt <u>any one</u> of the following : [10]

a) Describe with structures the reactions of EMP pathway. Briefly mention its significance.

b) Elaborate on the salient features of enzymes and describe the three models of enzyme catalysis.

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[3917]-118

S.Y. B.Sc.

MICROBIOLOGY

MB-212 : Microbial Genetics

(Paper - II) (2008 Pattern) (Theory) (Semester - I)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Draw neat labeled diagrams wherever necessary.*

Q1) Answer the following (All questions are compulsory) :   **[10]**

a) Which of the sequence is more prone to damage by uv radiation?

   i)   ATGCAAGC
   ii) TTCTTATG
   iii) CGATGACA

b) What are transversions?

c) Name any two nonsense codons.

d) Define linking number.

e) What is wobble hypothesis?

f) _____ nucleotides are present in each turn of A form of DNA.

   i)   10
   ii) 10.4
   iii) 11
   iv) 12

g) What is leading strand in DNA synthesis?

h) Define : Periodic selection.

i) _____ amino acid is encoded by only one codon.

   i)   Phenyl alanine
   ii) Tyrosine
   iii) Serine
   iv) Methionine

j) Write any two examples of base analogues.

Q2) Attempt <u>any two</u> of the following : **[10]**

   a) Describe the Griffith's experiment to prove that DNA is genetic material.

   b) Explain D loop model for DNA replication.

   c) Diagrammatically illustrate B form of DNA.

Q3) Attempt <u>any two</u> of the following : **[10]**

   a) Explain in brief the process of transcription.

   b) Comment on supercoiling of DNA.

   c) Describe an experiment to isolate an auxotrophic mutant from prototrophic population.

Q4) Attempt <u>any one</u> of the following : **[10]**

   a) Define mutations. Explain in detail mutagenic action of

      i)   Intercalating agent
      ii)   4-nitrosoguanidine

<div align="center">OR</div>

   b) What are different modes of DNA replication? Explain the Messelson and stahl experiment.

<div align="center">✳ ✳ ✳</div>

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[3917]-119

S.Y. B.Sc.

PSYCHOLOGY

Psychology of Adjustment

(Paper - I) (New Course) (Semester - I) (2008 Pattern)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

   1) *Attempt all questions.*

   2) *Draw the figures and diagrams wherever necessary.*

   3) *Figures to the right indicate full marks.*

Q1) Answer in two or four sentences : **[16]**

   a) What is codependency?

   b) What is case study?

   c) What is Marriage?

   d) What is endogamy?

   e) Define Stress.

   f) What is unemployment?

   g) What is obsessive-compulsive disorder?

   h) Define Phobia.

Q2) Attempt any two of the following in eight to ten sentences : **[8]**

   a) Explain in brief psychoanalytical approach to adjustment.

   b) Explain in brief types of leisure activities.

   c) Describe any two types of anxiety disorders.

Q3) Write short notes on any two of the following : [8]

a) Discuss how men and women adjust to divorce.

b) Describe family influences on job choice.

c) Describe three types of somatoform disorders.

Q4) Explain the actions organizations are taking to reduce job stress. [8]

OR

Describe three common problems that are seen in popular self-help books.

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S.Y. B.Sc.

PSYCHOLOGY

Experimental Psychology

(Paper - II) (Sem. - I) (New Course)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

    1)   *Attempt all questions.*

    2)   *Draw the figures and diagrams wherever necessary.*

    3)   *Figures to the right indicate full marks.*

Q1) Answer in two or four sentences: **[16]**

    a)   What is adaptation?

    b)   Define perception.

    c)   What is conditioning?

    d)   What is problem solving?

    e)   What is partial colour blindness?

    f)   State any two monocular cues of depth perception.

    g)   Define reinforcement.

    h)   State the stages of problem solving.

Q2) Attempt <u>any two</u> of the following in eight or ten sentences: **[8]**

    a)   Explain the concept of light and dark adaptation.

    b)   Explain the basic concepts of conditioning.

    c)   Explain the concept of size constancy.

Q3) Write short notes on <u>any two</u> of the following: **[8]**

    a)   Rod and cone vision.

    b)   Binocular cues of depth perception.

    c)   Ineight in problem solving.

Q4) Explain in detail an experiment on classical conditioning.   **[8]**

<div align="center">OR</div>

What is concept learning? Explain generalization and abstraction as conceptual processes in thinking?

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S.Y. B.Sc.

ELECTRONIC SCIENCE

EL-211: Analog Circuits and Systems - I

(Sem. - I) (Paper - I) (New Course) (2008 Pattern) (22211)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicates full marks.*
4) *Use of non - programmable calculator is allowed.*

Q1) Answer all of the following:

a) Classify amplifier on the basis of coupling methods. **[1]**

b) Why power amplifier is used at the final stage of multistage amplifier?
[1]

c) List disadvantages of negative feedback. **[1]**

d) State applications of differential amplifier. **[1]**

e) "Complementary symmetry push-pull amplifier is advantageous over normal transformer used pushpull amplifier". Comment. **[2]**

f) "Negative feedback is desirable in amplifier applications". Comment.
[2]

g) Design Wein Bridge oscillator which generate frequency 2kHz. Use $C_1 = C_2 = 0.01 \mu F$; $R_1 = R_2 = R$. **[2]**

h) Design op amp in inverting mode for the voltage gain of 25. **[2]**

Q2) Attempt any two of the following:

a) What is cross over distortion? How it can be minimized? **[4]**

b) Draw circuit diagram of two stage Rc coupled amplifier. Explain function of each component used. **[4]**

c) Draw block diagram of differential amplifier and explain it in brief. **[4]**

Q3) Attempt any two of the following:

a) Draw the circuit of class A amplifier with transformer coupled load. Show that its efficiency is 50%. **[4]**

b) With the help of dc equivalent circuit of a transistor amplifier explain the method to draw dc load line. **[4]**

c) Explain op amp integrator with proper waveforms. **[4]**

Q4) Attempt all of the following:

a) Explain current to voltage convert using op amp. Derive the expression for its output voltage. **[6]**

b) Explain concept of negative feedback using block diagram. Derive the necessary formula. **[6]**

OR

Attempt all of the following:

a) A power transistor dissipate 5W energy. If the maximum junction temperature is $80°C$, Find the maximum ambient temperature at which it can be operated with the thermal resistance $\theta = 10°C/W$. **[4]**

b) Design high pass active filter of cutoff frequency of 5 kHz with pass band gain of 10. **[4]**

c) In the transistor amplifier using potential divider biasing, draw the dc load line for given $R_c = 4k\Omega$, $R_E = 5k\Omega$, $V_{cc} = 20V$. **[4]**

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[3917] - 124

S.Y. B.Sc.

ELECTRONIC SCIENCE

EL-212: Electronic Instrumentation - II

(Sem. - I) (Paper - II) (New Course) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:
1) *All questions are compulsory.*
2) *Draw the neat diagrams wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Use of non programmable calculator is allowed.*

Q1) Answer <u>all</u> of the following:

    a) Draw the block diagram of Measurement System? **[1]**

    b) List any two specifications of D.C. Voltmeter. **[1]**

    c) What is signal generator? **[1]**

    d) Define line regulation of Power Supply. **[1]**

    e) A moving coil voltmeter has a linear scale with 100 divisions. The full scale reading is 100 Volt and 1/10 of a scale division can be readout. Determine the resolution of it in volts? **[2]**

    f) "Input resistance of electronic voltmeter should be very high" Comment. **[2]**

    g) "A diode is connected between emitter and ground in SMPS" Comment. **[2]**

    h) " Initial zero setting for pH measurement is at pH = 7" Comment. **[2]**

Q2) Attempt any two of the following:

    a) Draw the ckt diagram of Electronic Voltmeter and explain the working. **[4]**

    b) What do you mean by Analog Multimeter and give the operating procedure? **[4]**

    c) With the help of Block diagram explain working of signal generator. **[4]**

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Q3) Attempt any two of the following:

a) With a neat block diagram explain the working of Basic DFM. **[4]**

b) State difference between signal generator and function generator. **[4]**

c) What is ON-LINE UPS and OFF-LINE UPS and draw the block diagram of each? **[4]**

Q4) Attempt all of the following:

a) Draw the block diagram of digital thermometer and explain it in detail. State the specifications of digital thermometer. **[6]**

b) Draw the block diagram of digital tachometer and explain it in detail. State the specifications of tachometer. **[6]**

OR

Attempt all of the following:

a) Design multirange voltmeter for 0 to 10 volt and 0 to 50 volt. If D'Arsonval Movement has internal resistance of $50\,\Omega$ & full scale deflection current of 1 MA. **[4]**

b) A 250 Volt Voltmeter is specified to be accurate within $\pm\,2\%$ at full scale. Find out the magnitude of limiting error and limiting error when it is used to measure voltage of 100 Volt. **[4]**

c) Calculate: **[4]**

1) Percentage load regulation for power supply if O/P voltage with no load is 10 Volt and with full load 9.8 Volt.

2) Percentage line regulation for power supply if the O/P voltage changes by 0.1 Volt for the change in I/P voltage by 10 Volt.

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S.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS-101: International Relations and Foreign Policy

(Sem. - I) (2008 Pattern)

Time : 2 Hours] *[Max. Marks : 40*

Instructions:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*

Q1) Answer in 2 to 4 sentences each: [16]

    a) Define "International Relations".

    b) What is 'Foreign Policy'.

    c) Write the concept of Power.

    d) Define National Interest.

    e) Name any four subjects of International Relations.

    f) Differentiate between Nation and State.

    g) Write the methods of exercising power.

    h) Who was Margenthou?

Q2) Answer in 8 to 10 sentences (any two): [8]

    a) Explain the role of national power in making of foreign policy.

    b) What are the basic tenets of India's foreign policy?

    c) Explain the type of National Interest.

Q3) Write short notes on (any two): [8]

    a) Idealist theory.

    b) Realist theory.

    c) Function and purpose of National Interest.

Q4) Answer in 16 to 20 sentences (any one): [8]

    a) Explain the determinants of Foreign Policy.

    b) Explain the elements of national power.

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S.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS-102: Elements of National Security

(Sem. - I) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:
1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*

Q1) Answer in 2 to 4 sentences each: **[16]**
   a) Define 'Military Power'.
   b) State any two elements of National Security.
   c) Explain the meaning of traditional approach to National Security.
   d) What do you mean by development of Economic Power?
   e) What do you mean by strategic threats?
   f) State the meaning of perspectives in Defence Planning.
   g) Define scientific research.
   h) Define Terrorism.

Q2) Answer in 8 to 10 sentences (any two):   **[8]**
   a) Explain internal security threat to India.
   b) Discuss security planning in India.
   c) Explain new perspective on security.

Q3) Write short notes on (any two):   **[8]**
   a) Concept of Nation.
   b) External threats to India's National Security.
   c) Economic sustainability.

Q4) Write in 16 to 20 sentences (any one):   **[8]**
   a) Discuss how threat perception and military power influence Security Planning.
   b) Write a note on Instruments of National Security.

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S.Y. B.Sc. (Sem. - I)
DEFENCE AND STRATEGIC STUDIES
DS-103: Geopolitics
(2008 Pattern)

Time : 2 Hours] *[Max. Marks : 40*

Instructions:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*

Q1) Answer in 2 to 4 sentences each: [16]
   a) Define 'Geopolitics'.
   b) What is meant by 'Strategic Minerals'?
   c) Define the term 'Resources'.
   d) Write the location of Andaman Nicobar.
   e) Introduce 'Exclusive Economic Zone'.
   f) Define 'Boundary'.
   g) What is 'Buffer State'?
   h) Introduce 'Kuwait'.

Q2) Answer in 8 to 10 sentences (any two): [8]
   a) Write the strategic importance of Diego-Garcia.
   b) Explain the Geo-strategic importance of Jammu & Kashmir.
   c) What is the application and utility of Strategic Minerals?

Q3) Write short notes on (any two): [8]
   a) Maritime Boundaries.
   b) Territorial Sea.
   c) India's land Border.

Q4) Answer in 16 to 20 sentences (any one): [8]
   a) What are the basic elements for creation of state? Explain.
   b) Do you think that Siachin Glacier is strategically important to India? Give your opinions.

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[3917] - 128

S.Y. B.Sc.

ENVIRONMENTAL SCIENCE

ENV - 201: Ecology & Ecosystem

(Paper - I) (Sem. - I) (Revised 2008 New)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:
   1) *All questions are compulsory.*
   2) *Draw neat & labelled diagrams wherever necessary.*
   3) *Figures to the right indicate full marks.*

Q1) Attempt the following in 1-2 lines each: **[10]**

   a)   Define the term: Biome.

   b)   What are biotic & abiotic components of environment?

   c)   What is community ecology?

   d)   Define the term: Evolution.

   e)   What is meant by oxidising atmosphere?

   f)   Define Ecotone.

   g)   State the difference between Intra & Interspecies relationship.

   h)   Name any 2 energy flow models.

   i)   What is meant by carrying capacity of environment.

   j)   What is Ammonification?

Q2) Write notes on <u>any two</u> of the following: **[10]**

   a)   Ecological spectrum.

   b)   Nitrogen cycle with diagram.

   c)   Hydrosere with diagram.

Q3) Answer <u>any two</u> of the following: [10]

a) Explain with example population dynamics along with space & time.

b) Discuss the interdisciplinary nature of ecology & hence its scope.

c) Explain prey-predator relationship with examples.

Q4) Answer <u>any one</u> of the following: [10]

a) Explain ecosystem characteristics with respect to structural & functional attributes.

b) Explain the various types of forest ecosystem with reference to flora & fauna.

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[3917]-129

S.Y. B.Sc.

ENVIRONMENTAL SCIENCE

ENV-202 : Hydrology

(Paper - II) (Revised 2008 New) (Semester - I)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Neat diagrams must be drawn wherever necessary.*

    3)   *Figures to the right indicate full marks.*

Q1) Attempt the following in 1-2 lines each :   **[10]**

    a)   Define catchment area.

    b)   Mention the Indian Province suffering from fluoride pollution.

    c)   What is primary acquifer?

    d)   Mention any 2 problems associated with salt water intrusion.

    e)   Define infiltration.

    f)   Write any 2 biological properties of groundwater.

    g)   Define meteoric origin of water.

    h)   Write any 2 effects of groundwater pollution on human being.

    i)   Differentiate between canals & tunnels.

    j)   Write any 2 natural sources of groundwater pollution.

Q2) Attempt any two of the following each in 8-10 lines. :   **[10]**

    a)   Discuss the methods of estimation of groundwater.

    b)   Mention the role of evaporation & transpiration in hydrological cycle.

    c)   Explain the problems of over exploitation.

Q3) Write notes on any two of the following each in 8-10 lines : **[10]**

a) Storage of harvested rainwater.

b) Renewable groundwater resources.

c) Characters of catchment area.

Q4) Answer any one of the following in 20-22 lines. **[10]**

a) What is water pollution? Mention any 3 types & sources & consequences of water pollution.

b) What is rainwater harvesting? Write in detail its methods & issues.

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P207

[3917]-136

S.Y. B.Sc. (Vocational)
INDUSTRIAL CHEMISTRY
VOC-211: Utilities & Unit Operations of Process Instrumentation
(Paper - I) (New) (2008 Pattern) (Semester - I)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

   1)   *All questions are compulsory.*
   2)   *Figures to the right indicate full marks.*
   3)   *Draw neat diagrams wherever necessary.*

Q1)   Answer the following :   **[16]**

   a)   Convert 15 kg m^{-2} into torr.

   b)   What is the principle of an alphatron pressure gauge?

   c)   Give four industrial uses of steam.

   d)   State the principle used in a magnetic flow meter.

   e)   Convert 140ºF into ºC.

   f)   Define : Temporary hardness of water.

   g)   Give the differences between evaporation and distillations.

   h)   Why is rankine scale called an absolute scale?

Q2)   Attempt <u>any two</u> of the following :   **[8]**

   a)   Describe the tray drier system.

   b)   Describe the working of an ionization gauge with a neat sketch.

   c)   Write a short note on venturi tubes.

Q3)   Attempt <u>any two</u> of the following :   **[8]**

   a)   Discuss the working of a pirani gauge with a neat sketch.

   b)   Discuss the principle of fractional distillation with a neat diagram.

   c)   How are thermocouples used in temperature measurements?

Q4) Explain the types of electronic pressure sensors. **[8]**

OR

Describe the methods used to remove the hardness of water.

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P208

[3917]-137

S.Y. B.Sc. (Vocational)
BIOTECHNOLOGY
VOC-Biotech-211: Cell and Molecular Biology
(Paper - I) (2008 Pattern)) (Semester - I)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:
1) *All questions are compulsory.*
2) *All questions carry equal marks.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right indicate full marks.*

Q1) Answer each of the following in 1-2 lines :   **[10]**

   a) Define gene.

   b) What is promoter?

   c) Define uniport.

   d) What are carrier proteins?

   e) Define active transport.

   f) Enlist chemical substances that compose plasma membrane.

   g) Where in the cell can ribosomes be found?

   h) What is transcription?

   i) Give any two functions of cytoskeleton.

   j) Give function of plant cell wall.

Q2) Write short notes on any two of the following :   **[10]**

   a) Types of DNA damages.

   b) Cell signalling.

   c) Cell differentiation.

Q3) Attempt any two of the following :   **[10]**

    a) Describe the structure of chloroplast.

    b) Give a brief account of cell adhesion molecules (CAMs).

    c) DNA replication is semiconservative! Explain.

Q4) What is transcription? Describe the process of transcription in prokaryotes.

                                                                                                  [10]

<div align="center">OR</div>

What is cell fractionation? Describe techniques of cell fractionation.

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P209

[3917]-139

S.Y. B.Sc. (Vocational)
ELECTRONIC EQUIPMENT MAINTENANCE
VOC-EEM-211: Audio, Video & Office Equipments - A
(Paper - I) (2008 Pattern) (New Course) (Semester - I)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:
1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Use of log tables and calculators is allowed.*

Q1) Answer the following :

    a) In AM signal the frequency remains constant. Comment. **[1]**

    b) The detector for AM and FM is same. Comment. **[1]**

    c) Why aspect ratio of 4:3 is selected? **[1]**

    d) The image is scanned from left to right and top to bottom. Comment. **[1]**

    e) The b.w. of AM signal is dependent upon the amplitude and frequency. Comment. **[2]**

    f) Draw a neat labelled diagram of composite video signal. **[2]**

    g) Explain the terms frame odd and even field, trace and retrace. **[2]**

    h) What is the significance of recording bias? **[2]**

Q2) Answer <u>any two</u> of the following :

    a) Differentiate between AM and FM transmission. Describe the detection principles of them in receiver. **[4]**

    b) Are audio tape recorders obsolute in todays world? Compare it with digital recording. Give proper examples. **[4]**

    c) What is PA system? State its applications. Explain its two important characteristics. **[4]**

Q3) Answer <u>any two</u> of the following :

    a)   Write a note on Video monitor.   **[4]**

    b)   What is MP3? Explain working of MP3 player.   **[4]**

    c)   What is interlaced scanning? Why is it necessary?   **[4]**

Q4) Answer the following :

    a)   Explain record electronics in VCR.   **[6]**

    b)   Describe the CATV system in details.   **[6]**

<div align="center">OR</div>

Answer the following :

    a)   Explain in details the recording and playback in ACD player.   **[6]**

    b)   Draw a neat labelled diagram of colour TV.   **[6]**

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P210　　　　　　　　　　　**[3917]-142**

S.Y. B.Sc. (Vocational)
INDUSTRIAL MICROBIOLOGY
VOC-IND-MIC-211 : Bioreactors - Design and Operation
(Paper - I) (Sem. - I) (2008 Pattern)

Time : 2 Hours]　　　　　　　　　　　　　　　　　*[Max. Marks : 40*

Instructions to the candidates:
　　1)　All questions are compulsory.
　　2)　Figures to the right indicate full marks.
　　3)　All questions carry equal marks.
　　4)　Draw neat labeled diagrams wherever necessary.
　　5)　Use of scientific calculators is allowed.

Q1) Answer each sub-question in one or two lines; Fill in the blanks; State whether the statement is true or false. **[10]**

　　a)　State whether the following statement is TRUE or FALSE "Absolute filters are also known as fibrous filters".

　　b)　State whether the following statement is TRUE or FALSE "Solid substrate fermentation is generally used for fungal enzymes".

　　c)　The DO sensor is a based on ———— (principle of measurement).

　　d)　When the H/D ratio of a fermenter vessel is 2.0, the number of impeller sets needed ideally is ————.

　　e)　Name any two antifoam agents, other than castor oil.

　　f)　How are heat-labile acid solutions sterilized for use fermentation media?

　　g)　List two factors that are important when designing a fermenter.

　　h)　Name two types of valves used in fermenter assemblies.

　　i)　State any two consequences of contamination of fermentation medium during the process.

　　j)　Define 'in-line' monitoring of a process variable.

Q2) Answer <u>any two</u> of the following : **[10]**

　　a)　Draw a diagram to illustrate the construction of a Hollow-Fibre reactor. List the limitations of a hollow-fibre reactor.

　　b)　Explain the principle of operation of a sensor used for monitoring cell mass. State the importance of monitoring cell mass.

　　c)　Draw and explain the working of the inoculation port in a fermenter.

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Q3) Answer <u>any two</u> of the following :   **[10]**

   a)   With suitable examples, explain why exit-gas analysis is important in monitoring of a fermentation process.

   b)   Draw a diagram to show the equipment used for agitation of a fermentation broth. Describe how shearing of microbial cells is avoided by proper designing of impellers.

   c)   Compare the profiles of continuous and batch fermentation processes for biomass production. Draw the profiles for both types of processes.

Q4) Answer <u>any one</u> of the following :   **[10]**

   a)   Describe the construction, working and limitations of a fermenter used for solid-substrate fermentation.

   b)   Enlist the methods of immobilization of cells and enzymes. Describe the process of gel entrapment in detail. State applications where gel entrapment is used.

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P211

[3917]-143

S.Y. B.Sc. (Vocational)
INDUSTRIAL CHEMISTRY
VOC - 212 : Inorganic Process Industries
(Paper - IV) (Sem. - I) (New) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:
1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Draw neat diagrams wherever necessary.*

Q1) Answer the following :   **[16]**

   a)   What is fibre glass?

   b)   Define cullet.

   c)   Name two methods to prevent corrosion.

   d)   Give the composition of two types of bronzes.

   e)   What is stray current corrosion.

   f)   Define : Super alloys.

   g)   Define : Glazing.

   h)   Give uses of Nickel alloy.

Q2) Attempt <u>any two</u> of the following :   **[8]**

   a)   What are white wares? Give their uses.

   b)   Describe the properties of the glass.

   c)   Write a note on special cement products.

Q3) Attempt <u>any two</u> of the following :   **[8]**

   a)   Discuss underground corrosion.

   b)   Write a note on high alumina cement.

   c)   Explain the properties of refractory materials.

Q4) Classify and describe composite materials.

OR

Describe the manufacture of glass by tank furnace method.

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P212

[3917]-144

S.Y. B.Sc. (Vocational)
BIOTECHNOLOGY
VOC. Biotech - 212 : Recombinant DNA Technology
(Paper - II) (Sem. - I) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks : 40*
Instructions to the candidates:
  1) All questions are compulsory.
  2) All questions carry equal marks.
  3) Neat diagrams must be drawn wherever necessary.
  4) Figures to the right indicate full marks.

Q1) Answer each of the following in 1-2 lines :   **[10]**

  a) Define : Proteomics.

  b) What is Northern blotting?

  c) Enlist any two examples of restriction endonucleases.

  d) Give different properties of plasmids.

  e) What is chemiluminescence? How it is useful in hybridization?

  f) Which radio isotopes will you use for N and H in probes?

  g) What is the capacity of YAC vector to carry foreign DNA?

  h) Give two examples of animal viruses used as cloning vectors.

  i) What is Ti plasmid?

  j) Enlist any two applications of PCR technique.

Q2) Write short notes on any two of the following in 8 - 10 lines each :   **[10]**

  a) Site directed mutagenesis.

  b) α-complementation.

  c) Type II restriction endonucleases.

Q3) Attempt <u>any two</u> of the following in 8 - 10 lines each :   **[10]**

  a) What is electroporation? Explain the method in detail.

  b) Give the applications of proteomics.

  c) Explain with suitable diagram the action of ligase enzyme on given DNA molecule.

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Q4) What is gene cloning? Explain in detail the steps in gene cloning method.**[10]**

OR

What are gene cloning vectors? Comment on the different vectors based on λ bacteriophage.

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S.Y. B.Sc. (Vocational)

ELECTRONIC EQUIPMENT MAINTENANCE (EEM)

VOC. - EEM-212: Maintenance Concepts and Repairs - II-A

(Paper - II) (Sem. - I) (New Course) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

    3)   *Neat diagrams <u>must</u> be drawn wherever necessary.*

    4)   *Use of log tables and/or calculators is allowed.*

Q1) Answer <u>all</u> of the following:

    a)   ——————— can work as heat sink while soldering.   **[1]**

    b)   Solvents, adhesives, lubricants, freeze sprays are together as ——— tools.   **[1]**

    c)   What is maintainability?   **[1]**

    d)   Impedance of a folded dipole type Yagi antenna is ———— Ω.   **[1]**

    e)   In what way does MTBF depend on power supply.   **[2]**

    f)   Which instruments will you use for the following functions?

        i)   Leakage testing of ac voltage on neutral wire.

        ii)   Display of characteristic curve of an active device.   **[2]**

    g)   Determine the reliability of the system if i) $\lambda = 0$. ii) $\lambda = \infty$. Which system would be preferred?   **[2]**

    h)   Define availability and state equation for it.   **[2]**

Q2) Attempt <u>any two</u> of the following:

a) What does redundancy mean? Describe 'active redundancy' along with block diagram for the same. **[4]**

b) Write a note on preventive maintenance of Lead Acid battery, clearly indicating the periodicity of actions. **[4]**

c) How can one estimate the power requirement of a typical installation of computer and also the desired rating of safety fuse/mc B&, What should be done to protect the equipment from transients? **[4]**

Q3) Attempt <u>any two</u> of the following:

a) Describe the different types of failure in electronic equipment and the causes behind the same. **[4]**

b) Describe the typical contents and importance of service manual. **[4]**

c) What kind of fire extinguishers are suited for different types of fires such as fires of materials like cloth and paper, fires of liquids, fires due to electric short circuit? **[4]**

Q4) Answer the following:

a) Write a note on preventive maintenance of a computer mentioning the activities involved, tools used etc. **[6]**

b) Write a note on maintenance logbook and explain its importance. **[6]**

OR

a) What are the typical potential problems, which may be faced by a service engineer in repair of modern electronic equipment?

b) What are typical safety measures? On what does prevention of accidents depend?

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S.Y. B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY

VOC - IND-MIC-212: Screening and Process Optimization

(Paper - II) (Sem. - I) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks : 40*

Instructionsto the candates:

1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) All questions carry equal marks.

4) Draw neat labelled diagrams wherever necessary.

Q1) Answer each sub-question in one or two lines; Fill in the blanks; State whether the statement is true or false. **[10]**

a) State whether the following statement is TRUE or FALSE "Fermenter design is the most important operational parameter that needs to be scaled up during a fermentation process".

b) State whether the following statement is TRUE or FALSE "Stock cultures of fermentation production strains are normally in lyophilized state".

c) Fill in the blank.

Glutamic acid is generally produced during _____ phase of growth.

d) Fill in the blank.

Crowded plate technique is _____ screening method.

e) Define "analogue resistant mutant".

f) Define the term "feedback inhibition".

g) Name any two medium ingredients which serve as source of nitrogen in a fermentation medium.

h) Name any one compound which can affect broth rheology at the beginning of fermentation.

i) State two advantages of using lard oil in fermentation medium.

j) Name any one method of monitoring cell mass during a fermentation process.

Q2) Answer **any two** of the following: [10]

   a) Explain the mechanism of achieving overproduction of glutamic acid.

   b) Explain the role of the pilot-plant fermenter in scale up process.

   c) Explain the term "microbial diversity". How is the total number of species estimated in an ecosystem?

Q3) Answer **any two** of the following: [10]

   a) Define "Screening". Explain the process and objectives of secondary screening.

   b) Explain the role of precursors in a fermentation process.

   c) Enlist the process parameters which need to be controlled during fermentation. Give the importance of foam control.

Q4) Answer **any one** of the following: [10]

   a) Explain the role of Del Factor in the design of a batch sterilization process.

   b) Describe various buffering and antifoam agents used in medium formulation.

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[3917] - 19

F.Y. B.Sc.

PSYCHOLOGY

General Psychology

(Paper - I) (New) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks :80*

Instructions to the candidates:

1)   All questions are compulsory.

2)   Draw the figures and diagrams wherever necessary.

3)   All questions carry equal marks.

Q1) Attempt all 8 questions in one or two sentences: **[16]**

a)   What is synapse?

b)   What is PET scan?

c)   Define sensory threshold.

d)   What is perception?

e)   Define personality.

f)   What is self concept?

g)   What is forgetting?

h)   Mention the fulform of STM & LTM.

Q2) Answer the following questions in 6/8 sentences any four: **[16]**

a)   Discuss the role of master gland.

b)   Explain physiological elements of emotion.

c)   Describe the mechanism of hunger motive.

d)   What is reinforcement?

e)   What is insight learning?

f)   Explain retroactive inhibition.

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Q3) Attempt the following questions in 6/8 sentences any four: **[16]**

    a)   Explain any two defense mechanisms.

    b)   Describe any two social motives.

    c)   What is instrumental conditioning?

    d)   Illustrate any two types of conflict.

    e)   Explain the concept 'latent learning'.

    f)   What is illusion? Give two types.

Q4) Answer any two of the following questions: **[16]**

    a)   Illustrate the structure and function of neuron.

    b)   Describe 'Gestalt' principles.

    c)   Explain psychoanalytic approach of personality.

    d)   Describe memory model of Atkinson and Shiffrin.

Q5) Define Psychology. Enumerate its various fields. **[16]**

<div align="center">OR</div>

What is intelligence? Explain Gardner's theory of intelligence.

<div align="center">❀ ❀ ❀</div>

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[3917] - 20

F.Y. B.Sc.

PSYCHOLOGY

Experimental Psychology and Psychological Testing

(Paper - II) (New) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks :80*

Instructions to the candidates:

  1) *All questions are compulsory.*
  2) *Draw the figures and diagrams wherever necessary.*
  3) *All questions carry equal marks.*

Q1) Attempt all 8 questions in one or two sentences: **[16]**

  a) Enlist the basic problems of Psychophysics.

  b) What is PSE?

  c) Define foreperiod.

  d) Define reaction time.

  e) What is psychological test?

  f) What is standardized test?

  g) State any two aptitude tests.

  h) Define intelligence.

Q2) Answer the following questions in 6/8 sentences (ANY FOUR):   **[16]**

  a) Explain Weber's law.

  b) Discuss the term insight in terms of problem solving.

  c) Illustrate the laws of Thorndike in brief.

  d) Describe the factors affecting on reliability.

  e) State the types of validity.

  f) Explain the importance of aptitude tests.

Q3) Answer the following questions in 6/8 sentences (ANY FOUR): **[16]**

    a)   Explain simple reaction time.

    b)   Discuss the stages of problem solving.

    c)   Describe the term 'creativity'.

    d)   Explain Reliability.

    e)   Explain criterion validity.

    f)   Enlist the types of psychological tests.

Q4) Answer ANY TWO of the following questions: **[16]**

    a)   Explain basic concepts of psychophysics.

    b)   Describe the subjective determinants of reaction time.

    c)   Discuss the various uses of psychological tests.

    d)   Illustrate 'Wechsler's Intelligence Scale for children'.

Q5) Define variable. Explain various types of variables. **[16]**

<div align="center">OR</div>

What is projective test? Discuss any two projective tests.

<div align="center">❀ ❀ ❀</div>

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[3917] - 26

F.Y. B.Sc.

ENVIRONMENTAL SCIENCE - I

ENV - 101: Life Sciences: Basic Biology & Natural Resources

(Paper - I) (2008 Pattern)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Draw neat labelled diagram whenever necessary.*

    3)   *Figures to the right indicate full marks.*

Q1) Attempt the following: **[16]**

    a)   What is living fossil?

    b)   Define, subspecies.

    c)   Describe root system of epiphytes.

    d)   What is continental drift?

    e)   What is calorific value of fuel?

    f)   What is plantation farming?

    g)   Discuss concept of "Improved chullahs".

    h)   What are building minerals?

Q2) Attempt any <u>four</u> of the following: **[16]**

    a)   Describe palentological evidences of origin of life.

    b)   What is biology? Mention any three branches of applied biology.

    c)   Classify Micro-organism. Write in detailed three kingdom classification of micro organism.

    d)   Describe resources are dynamic or static concept.

    e)   Describe present position of petroleum resources in India.

    f)   Discuss various freshwater resources of India.

Q3) Write a short note on <u>any four</u> of the following: **[16]**

    a)   Zonation of marine environment.

    b)   Continental drift theory?

    c)   Amphibious plants.

    d)   Atomic energy minerals.

    e)   Non conventional energy resources.

    f)   Flood : Man made disasture.

Q4) Attempt <u>any two</u> of the following: **[16]**

    a)   Give an account of Darwin's theory of Evolution.

    b)   What are fossils? Describe how fossils are formed in nature.

    c)   Define 'sustainable agriculture'. Why there is need of sustainable agriculture.

    d)   Discuss "Resources are environmental gifts".

Q5) Discuss briefly classification of Halophytes. Give an account of distribution of mangroves in India. **[16]**

<div align="center">OR</div>

Discuss various reasons due to which question of resources arise.

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[3917] - 27

F.Y. B.Sc.

ENVIRONMENTAL SCIENCE - II

ENV - 102: Earth Sciences - Environmental Chemistry & Basic Geosciences

(Paper - II) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks :80*

Instructions to the candidates:

   1) All questions are compulsory.

   2) Draw neat labelled diagrams wherever necessary.

   3) Figures to right indicate full marks.

Q1) Attempt the following: **[16]**

   a) Enlist green house gases.

   b) Define carcinogen.

   c) What are surfactant?

   d) Give any two sources of Hydrocarbons.

   e) Define Environmental Lapse Rate.

   f) Enlist factors affecting on wind.

   g) What are igneous rocks?

   h) Give any four micronutrients in soil.

Q2) Attempt <u>any four</u> of the following: **[16]**

   a) Explain chemical potential and chemical equilibria.

   b) Give the toxic effects of Lead on Human body.

   c) Discuss chemistry in ozone depletion.

   d) Explain in brief atmospheric stability.

   e) Describe different types of soil.

   f) Discuss process of condensation and precipitation.

Q3) Write short notes on <u>any four</u> of the following: **[16]**

    a)   Surfactant.

    b)   Aflatoxin.

    c)   Hydrocarbon.

    d)   Types of rocks.

    e)   Soil Profile.

    f)   Internal structure of earth.

Q4) Attempt <u>any two</u> of the following: **[16]**

    a)   Explain unusual behaviour of water. Add a note on 'Hydrogen' bonding in water.

    b)   What are pesticides? Discuss in brief pollution problems associated with DDT.

    c)   Describe physical and chemical properties of soil.

    d)   Explain the process of continental and oceanic crust formation.

Q5) Describe physical and chemical characteristics of mercury. Add a note on effects of mercury on human body. **[16]**

<div align="center">OR</div>

Discuss structure and chemical composition of atmosphere.

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[3917] - 27

F.Y. B.Sc.

ENVIRONMENTAL SCIENCE - II

ENV - 102: Earth Sciences Environmental Chemistry & Basic Geosciences

(Paper - II)

Time : 3 Hours]   *[Max. Marks :80*

Instructions to the candidates:

    1)   All questions are compulsory.

    2)   Draw neat labelled diagrams wherever necessary.

    3)   Figures to right indicate full marks.

Q1) Attempt the following: **[16]**

    a)   Enlist green house gases.

    b)   Define carcinogen.

    c)   What are surfactant?

    d)   Give any two sources of Hydrocarbons.

    e)   Define Environmental Lapse Rate.

    f)   Enlist factors affecting on wind.

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    b)   Aflatoxin.

    c)   Hydrocarbon.

    d)   Types of rocks.

    e)   Soil Profile.

    f)   Internal structure of earth.

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    a)   Explain unusual behaviour of water. Add a note on 'Hydrogen' bonding in water.

    b)   What are pesticides? Discuss in brief pollution problems associated with DDT.

    c)   Describe physical and chemical properties of soil.

    d)   Explain the process of continental and oceanic crust formation.

Q5) Describe physical and chemical characteristics of mercury. Add a note on effects of mercury on human body.   **[16]**

<div align="center">OR</div>

Discuss structure and chemical composition of atmosphere.

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[3917]-101

S.Y. B.Sc.

MATHEMATICS

Calculus of Several Variables

(Paper - I) (2008 Pattern) (Semester - I) (51111)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

Q1)   Answer any Five from the following :   **[10]**

    a)   Examine whether, $\lim\limits_{(x,y)\to(0,0)}\left(\dfrac{x^2-y^2}{x^2+y^2}\right)$ exists or not.

    b)   State Young's theorem for the equality of mixed partial derivatives of $f(x,y)$ of second order.

    c)   If $u = \log(x^2+y^2)$, show that $\dfrac{\partial^2 u}{\partial x^2}+\dfrac{\partial^2 u}{\partial y^2}=0$

    d)   Find the stationary points of $x^3 + y^3 - 24xy$.

    e)   If $u = y - x$ and $v = x + y$, then find $\mathbf{J}=\dfrac{\partial(x,y)}{\partial(u,v)}$

    f)   Evaluate $\int\limits_0^4\int\limits_0^2\int\limits_0^1 (x+y+z)\,dz\,dx\,dy$

    g)   Change the order of integration in $\int\limits_0^1\int\limits_x^1 e^{x/y}\,dy\,dx$

Q2)   Answer any Two of the following :   **[10]**

    a)   If u is a differentiable function of x, y and x, y are differentiable function of t then prove that u is a differentiable function of t and

$$\frac{du}{dt}=\frac{\partial u}{\partial x}\frac{dx}{dt}+\frac{\partial u}{\partial y}\frac{dy}{dt}$$

b) Using differentials, find the approximate value of $(2.01)(3.02)^2$

c) If $u = \tan^{-1}\left(\dfrac{x^3 + y^3}{x - y}\right)$, show that

$$x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = (1 - 4\sin^2 u)\sin 2u.$$

Q3) Answer any Two of the following : **[10]**

a) Explain Lagrange's method of undetermined multipliers.

b) Expand $f(x, y) = e^{xy}$ about the point $(2, 3)$ upto second degree terms by Taylor's theorem.

c) If $f(x, y) = \dfrac{x^3 y}{x^2 + y^2}$, if $x^2 + y^2 \neq 0$

$\qquad = 0 \qquad$, if $(x, y) = (0, 0)$

Show that $fxy\,(0,0) \neq fyx(0,0)$

Q4) Answer any One of the following : **[10]**

a) i) Evaluate $\displaystyle\int\limits_{0}^{1}\int\limits_{0}^{1} \frac{dxdy}{\sqrt{(1 - x^2)(1 - y^2)}}$

ii) Find the volume of the tetrahedron bounded by coordinate planes and the plane $x + y + z = 1$

b) i) Evaluate $\displaystyle\iint xy(x^2 + y^2)^{3/2}\,dxdy$ over the first quadrant of the circle $x^2 + y^2 = 1$.

ii) Show that $\displaystyle\int\limits_{0}^{a} dx \int\limits_{0}^{a} dy \int\limits_{0}^{a-x} xy\,dz = \frac{a^5}{12}$

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S.Y. B.Sc.

MATHEMATICS

(A) : Differential Equations

(Paper - II (A)) (Sem. - I) (New Course) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

   1)   *All questions are compulsory.*

   2)   *Figures to the right indicate full marks.*

Q1) Attempt <u>any five</u> of the following :   **[10]**

   a)   State the order and degree of the equation $\left(\dfrac{d^3y}{dx^3}\right)^2 - x\left(\dfrac{dy}{dx}\right)^4 = 3x + 2$.

   b)   Solve the differential equation.

        $\dfrac{d^2y}{dx^2} + 2\dfrac{dy}{dx} - 3y = 0$

   c)   Test the exactness of the differential equation.

        $(a^2 - xy - y^2)\ dx - (x + y)^2\ dy = 0$

   d)   Find the integrating factor for the differential equation $x\ dy - y\ dx = 0$.

   e)   Define the term orthogonal trajectories.

   f)   Find the particular solution of the differential equation.

        $(D^2 + 4D + 3)\ y = e^{2x}$

   g)   Solve the differential equation $\dfrac{dy}{dx} = \dfrac{1 + y^2}{1 + x^2}$.

Q2) Attempt <u>any two</u> of the following :   **[10]**

   a)   Explain the method of solving the differential equation,

        $\dfrac{dy}{dx} + Py = Q.\ y^n$

        where P and Q are functions of x alone.

   b)   Solve the differential equation $(2x^3 + 3y)\ dx + (3x + y - 1)\ dy = 0$.

   c)   Solve the differential equation.

        $\dfrac{dy}{dx} = \dfrac{2x + y - 1}{2\ (2x + y) - 1}$

Q3) Attempt <u>any two</u> of the following :   **[10]**

   a)   If $f(D) = (D - a)^r \phi (D)$, then prove that

   $$\frac{1}{f(D)}e^{ax} = \frac{1}{\phi(a)} \frac{x^r}{r!}e^{ax}, \quad \phi(a) \neq 0$$

   b)   Find orthogonal trajectories of the hyperbola $xy = c$.

   c)   Solve the differential equation, $\dfrac{d^3 y}{dx^3} + a^2 \dfrac{dy}{dx} = \sin ax$.

Q4) Attempt <u>any one</u> of the folloiwng :   **[10]**

   a)   i)   Describe the method of reduction of order. $\dfrac{d^2 y}{dx^2} + P\dfrac{dy}{dx} + Qy = R$

            where P & Q & R are functions of x alone.

        ii) Solve the differential equation $(D^2 - 5D + 6)y = 2e^x$

   b)   i)   Explain the method of solving non-homogeneous linear differential equation by variation of parameter.

        ii) Solve the differential equation $(D^2 - 2D + 3) = x^3 + \sin x$.

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[3917]-102

S.Y. B.Sc.
MATHEMATICS
(B) : Numerical Analysis
(Paper - II (B)) (2008 Pattern) (Sem. - I)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:
   1)   *All questions are compulsory.*
   2)   *Figures to the right indicate full marks.*
   3)   *Use of non-programmable calculator is permitted.*

Q1) Attempt <u>any five</u> of the following :   **[10]**

   a)   Three approximate values of the number $\dfrac{1}{3}$ are given as 0.30, 0.33 and 0.34. Which of these three is the best approximation?

   b)   Two numbers 4.536 and 1.32, both of which being correct to the significant figures given. Find the absolute error in the product of the numbers.

   c)   Show that the equation $2x^7 - x^4 + 4x^3 - 5 = 0$ has at least four imaginary roots.

   d)   State Lagrange's interpolation formula for unequal intervals.

   e)   Find the function in factorial notation whose first forward difference is $6x^2 + 16x + 9$.

   f)   Using the Trapezoidal rule, evaluate $\displaystyle\int_0^4 \sqrt{x}\, dx$ from the following table :

x :	0	1	2	3	4
$\sqrt{x}$:	0	1	1.4142	1.7321	2

   g)   Evaluate $\Delta^2\,(e^{2x})$ (Take $h = 1$).

Q2) Attempt <u>any two</u> of the following :   **[10]**

   a)   Find a root of the equation $x^5 + 5x + 1 = 0$ between -1 and 0 by Newton- Raphson method. (Take two iterations).

   b)   Find the real root of the equation $f(x) = x^3 - 2x - 5 = 0$ lying between 2 and 3 by Regula-Falsi method. (Take two iterations).

c) Find the number and position of the real roots of the equation $f(x) = 8x^3 - 12x^2 - 2x + 3 = 0$.

Q3) Attempt <u>any two</u> of the following : **[10]**

a) Derive Newton-Gregory formula for backward interpolation for equally spaced arguments.

b) Fit a polynomial of the second degree to the following data :

x :	0	1	2
$f(x)$:	1	6	17

c) Find a polynomial $f(x)$ from the following data; using Newton's divided difference formula.

x :	0	2	3	4	7	9
$f(x)$:	4	26	58	112	466	922

Q4) Attempt <u>any one</u> of the following : **[10]**

a) Derive Simpson's $\dfrac{1}{3}^{rd}$ rule for numerical integration and hence find the velocity of a Rocket which is launched from the ground. It's acceleration is registered during the first 80 seconds and is given in the table below :

Time : (in seconds)	0	10	20	30	40	50	60	70	80
Acceleration : (m/sec².)	30.00	31.63	33.34	35.47	37.35	40.33	43.25	46.69	50.67

b) Determine the value of y when $x = 0.1$ by Euler's modified method.

Given $y(0) = 1$ and $\dfrac{dy}{dx} = x^2 + y$. (Take $h = 0.05$).

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[3917]-113

S.Y. B.Sc.

STATISTICS

ST-211: Discrete Probability Distributions and Time Series
(2008 Pattern) (Semester - I)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

1)   All questions are compulsory.
2)   Figures to the right indicate full marks.
3)   Use of calculator and statistical tables is allowed.
4)   Symbols and abbreviations have their usual meaning.

Q1)   Attempt each of the following :

    a)   Choose the correct alternative in <u>each</u> of the following :   **[1 each]**

        i)   If $E(XY) = E(X) \cdot E(Y)$, then

            A) $P[X = x, Y = y] = P[X = x] \cdot P[Y = y] \ \forall (x, y)$.

            B) $E(XY) = 0$.

            C)   X and Y are independent random variables.

            D)   X and Y are uncorrelated.

        ii)   Which of the following is countably infinite sample space?

            A) $\{x \mid x \in N \text{ and } 1 \le x \le 10\}$

            B) $\{x \mid x \in R \text{ and } -5 \le x \le 5\}$

            C) $\{x \mid x \in R \text{ and } x \ge 4\}$

            D) $\{x \mid x \in N \text{ and } x \text{ is a multiple of } 5\}$

        iii)   B(n,p) distribution tends to Poisson (m) distribution if

            A) $n \to \infty, p \to \frac{1}{2}$

            B) $n \to 0, p \to \infty$

            C) $n \to 100, p \to 0$

            D) $n \to \infty, p \to 0, np = m < \infty$.

b) State whether the given statement is true or false in each of the following: **[1 each]**

   i) Poisson distribution is symmetric.

   ii) In case of negative binomial distribution variance is always greater than mean.

   iii) Moving averages can give estimate of trend for future.

c) Fill in the blanks and complete the following statements. **[1 each]**

   i) If independent Bernoulli trials are conducted till getting the first success, then the probability distribution of number of trials is .....

   ii) $X \rightarrow$ Poisson(m) is bimodal if ......

d) State the various components of time series. **[1]**

e) State uniqueness property of moment generating function (M.G.F.) **[1]**

Q2) Attempt any Two of the following : **[5 each]**

a) If $\mu'_r = p(r = 1,2,3,.....)$ then find the M.G.F. of a random variable X. Comment on it.

b) If $X \rightarrow$ Poisson(m) then show that for a positive integer K,

$$P[X > k] < \frac{m^k}{k!}.$$

c) Workers come to a tool store room to enquire about the special tools for a particular job. Customers arrive at the store according to Poisson distribution with average rate of 30 customers per hour. The average service time is one and a half minute per customer.

   Find i) Average queue length,

   ii) Expected number of workers in the system,

   iii) Average waiting time of worker in the queue.

Q3) Attempt any Two of the following : **[5 each]**

a) If a random variable (X, Y) has p.m.f.

$$p(x, y) = \frac{e^{-1} p^y q^{x-y}}{y!x-y!} \quad \begin{matrix} x = 0,1,2, ... \\ y = 0,1,2, ...x \\ 0 < p < 1 \ q = 1 - p \end{matrix}$$

Find :

i) Marginal distribution of X,

ii) Marginal distribution of Y,

iii) Whether X and Y are independent.

b) State and prove lack of memory property of a geometric distribution.

c) State additive and multiplicative models used in the analysis of time series. Also compare their utility.

Q4) Attempt <u>any One</u> of the following :

a) State M.G.F. of N.B. (k, p) distribution. Hence find C.G.F. further obtain first four cumulants of it. **[10]**

b) i) A bivariate random variable (X, Y) has p.m.f

$$P(x, y) = \begin{cases} \dfrac{5!}{x!\, y!\,(5-x-y)!}(1/3)^5 & \begin{array}{l} x=0,1,2,....5 \\ y=0,1,.....5-x \end{array} \\ 0 & \text{otherwise} \end{cases}$$

Find M.G.F. of (X, Y). Hence find E(X) and E(Y).

ii) State merits and demerits of ratio to moving average method.

   . **[7 + 3]**

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[3917]-114

S.Y. B.Sc.

STATISTICS

ST - 212 : Continuous Probability Distributions - I

(2008 Pattern) (Sem. - I)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

  1)   All questions are compulsory.
  2)   Figures to the right indicate full marks.
  3)   Use of calculator and statistical tables is allowed.
  4)   Symbols and abbreviations have their usual meaning.

Q1) Attempt <u>each</u> of the following :   **[1 each]**

  a)   Choose the correct alternative in <u>each</u> of the following.

  i)   If $X \to$ Exp (mean 4) then the variance of X is

       (A) 4   (B) 16

       (C) 2   (D) $\dfrac{1}{4}$

  ii) If a two dimensional random variable (r.v.) (X, Y) has m.g.f.
       $M_{X,Y}(t_1, t_2)$ then which of the following statements is not correct?
       (A) $M_{X,Y}(t_1, 0) = M_X(t_1)$
       (B) $M_{X,Y}(0, t_1) = M_Y(t_2)$
       (C) $M_{X,Y}(0, 0) = 0$
       (D) $M_{X,Y}(0, 0) = 1$

  iii) If X is a standard normal variate then the distribution of $Y = X^2$ is

       (A) N (0, 1)   (B) Exp (1)

       (C) $G\left(\dfrac{1}{2}, \dfrac{1}{2}\right)$ (D) N (2, 1)

  b)   State whether the given statement is true or false :   **[1 each]**

  i)   If $X \to$ N (0, 1) then the distribution of aX is N $(a\mu, a)$.

  ii) If $X_1, X_2, ..., X_n$ are i.i.d. exponential variates with mean θ then

       $$\sum_{i=1}^{n} X_i \longrightarrow G\left(\dfrac{1}{\theta}, n\right).$$

  iii) Uniform distribution is a symmetric distribution.

c) For a two dimensional continuous r.v. (X, Y), define expectation of a function g (X, Y). **[1]**

d) If $X \rightarrow N (\mu, \sigma^2)$ then state the coefficient of Kurtosis (β_2) of the distribution of X. **[1]**

e) Let p.d.f. of a r.v. X be

$$f(x) = \frac{x^3}{3}, \quad -1 \le x < 2$$

$$= 0 \quad \text{otherwise.}$$

If $A = \{x / 0 < x < 1\}$ then find P (A). **[1]**

f) State any two properties of distribution function of a continuous r.v. **[1]**

Q2) Attempt <u>any two</u> of the following : **[5 each]**

a) State m.g.f. of gamma distribution. Find c.g.f. and hence find its mean and variance.

b) Let a r.v. X have p.d.f. given by

$$f(x) = \frac{1}{\pi}, \quad \frac{-\pi}{2} \le x \le \frac{\pi}{2}$$

$$= 0 \quad \text{otherwise}$$

Find : i) p.d.f. of $Y = \tan X$.

ii) $P(-1 \le Y \le 1)$.

c) i) Let $X \rightarrow \text{Exp (mean 5)}$

find $P(X > 10 \mid X > 7)$.

ii) Let $X \rightarrow N(100, 3^2)$,

$Y \rightarrow N(100, 4^2)$.

If X and Y are independent then find $P(X + Y \ge 200)$.

Q3) Attempt <u>any two</u> of the following : **[5 each]**

a) The joint p.d.f. of random variables X and Y is

$$f(x, y) = \frac{1}{8}(4 - x - y) \quad ; \quad 0 \le x \le 2$$

$$0 \le y \le 2$$

$$= 0 \quad \text{otherwise.}$$

Find E (X), E (XY).

b) State and prove the additive property of gamma distribution.

c) Obtain the mean deviation about mean for normal distribution.

Q4) Attempt <u>any one</u> of the following :

a) i) The joint p.d.f. of (X, Y) is

$$f(x, y) = 2 \quad ; \quad 0 < x < y < 1$$
$$= 0 \qquad \text{otherwise}$$

Find conditional mean of Y given X = x. **[6]**

ii) Let X → U (– a, a). Find the quartiles of X. **[4]**

b) i) Let X be a continuous r.v. with p.d.f.

$$f(x) = \frac{1}{4} \quad , \quad -2 \leq x \leq 2$$
$$= 0 \qquad \text{otherwise}$$

Find : (I) $P\left(1 < X < \frac{3}{2} \mid X > \frac{1}{2}\right)$

(II) Mean of X. **[5]**

ii) Prove that : 'If X follows binomial distribution with parameters n and p then the probability distribution of $Y = \dfrac{X - np}{\sqrt{npq}}$ tends to N (0,1) as $n \to \infty$. **[5]**

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S.Y. B.Sc.

STATISTICAL TECHNIQUES

STT - 211 : Statistical Techniques - I

(2008 Pattern) (Sem. - I)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

1)   All questions are compulsory.

2)   Figures to the right indicate full marks.

3)   Use of calculator and statistical tables is allowed.

4)   Symbols and abbreviations have their usual meaning.

Q1) Attempt <u>each</u> of the following :   **[1 each]**

   a)   Choose the correct alternative in <u>each</u> of the following :

      i)   If probability mass function of random variable X is

        $P[X = x] = 0.25 (0.75)^x$, $x = 0, 1, 2, 3, ...$

        then var (X) is equal to

        (A) 3   (B) 4   (C) 12   (D) 16

      ii)   For exponential distribution with mean 2, first quartile $Q_\perp$ is

        (A) $2 \log_e 3$ (B) $2 \log_e \left(\dfrac{4}{3}\right)$ (C) $\dfrac{1}{2}\log_e \left(\dfrac{4}{3}\right)$ (D) $2 \log_e 4$

      iii)   The corr $(x_{1.2}, x_{3.2})$ is

        (A) r_{13} (B) $r_{12.3}$ (C) $r_{13.2}$ (D) $r_{23.1}$

   b)   State whether <u>each</u> of the following statements is true or false.

                                                                        [1 each]

      i)   Normal distribution is symmetric and mesokurtic.

      ii)   The multiple correlation coefficient always lies between –1 and +1.

      iii)   Geometric distribution possesses additive property.

   c)   Define partial regression coefficient $b_{12.3}$.   **[1]**

   d)   It all total correlation coefficients in a set of three variables are equal to K, then find $r_{23.1}$ **[1]**

   e)   If $X \rightarrow N (\mu, \sigma^2)$, obtain $P [\mu - \sigma < X < \mu + \sigma]$.   **[1]**

   f)   State the relationship between geometric and negative binomial distributions.   **[1]**

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Q2) Attempt <u>any two</u> of the following : **[5 each]**

a) Define negative binomial distribution. State its mean and variance. Give two real life situations where negative binomial distribution is applicable.

b) The time (in years) that a satellite remains in space is a random variable X whose probability density function is

$$f(x) = 0.5e^{-0.5x}, \quad x \geq 0$$
$$= 0 \quad , \quad \text{o.w.}$$

State the distribution function of X and hence find the probability that a satellite remains in space between one and three years. Also state the expected life time of the satellite.

c) Let $X \to N(4, 16)$. Find the first and third quartile of the distribution.

Q3) Attempt <u>any two</u> of the following : **[5 each]**

a) Define multiple correlation coefficient $R_{i \cdot jk}$. State its formula interms of cofactors of correlation matrix. Interpret the values

i) $R_{i.jk} = 1$

ii) $R_{i.jk} = 0$

b) A continuous random variable X has density function as follows :

$$f(x) = \frac{1}{4\sqrt{2\pi}} \; e^{\frac{1}{32}\left(x^2 - 2x + 1\right)}, \quad -\infty < x < \infty$$
$$= \qquad 0 \qquad , \quad \text{o.w.}$$

i)   Identify the distribution of X.

ii) State mean and variance of X.

iii) Find $P(2X + 3 < 7)$

c) i)   State the distribution function of geometric distribution. State its lack of memory property.

ii) If a boy is throwing stones at a target. The probability of hitting the target at any throw is 0.4. Find the probability that he will hit the target at 4th attempt for the first time. Also find expected number of throws required to hit the target for the first time.

Q4) Attempt <u>any one</u> of the following :

    a)   i)   Explain the concept of multiple regression. Give any two real life situations where multiple regression is applicable. **[5]**

          ii)   In a locality, the proportion of literate persons is 0.30. If the persons are interviewed one by one, find the probability that 4 or less persons will be interviewed to get second literate person. **[5]**

    b)   i)   Define standard normal distribution. State the nature of its probability curve. State the normal approximation to binomial distribution. **[4]**

          ii)   A machinist keeps a large number of washers in a drawer. Of these 50% are of type X, 30% are of type Y and remaining are of type Z. If 12 washers are chosen at random. Find the probability that there are exactly seven of type X, three are of type Y and two of type Z. **[6]**

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[3917]-122

S.Y. B.Sc.

STATISTICAL TECHNIQUES

STT - 212 : Statistical Techniques - II

(2008 Pattern) (Sem. - I)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

   1)   All questions are compulsory.
   2)   Figures to the right indicate full marks.
   3)   Use of calculator and statistical tables is allowed.
   4)   Symbols and abbreviations have their usual meaning.

Q1) Attempt **each** of the following :   **[1 each]**

   a)   Choose the correct alternative in each of the following :

   i)   The total number of possible samples of size 3 from a population
         of size 10 using SRSWR is

         (A) $^{10}c_3$ (B) $^{10}p_3$ (C) 10^3 (D) 3^{10}

   ii)   Producer's risk is the probability of

         (A) accepting a lot of quality AQL

         (B) accepting a lot of quality LTPD

         (C) rejecting a lot of quality AQL

         (D) rejecting a lot of quality LTPD

   iii) For a single sampling plan with N = 1000, n = 50, c = 0 : probability
         of accepting a lot of quality p = 0.02 is

         (A) $e^{0.02}$ (B) e^{-1} (C) $1 - e^{-1}$ (D) $1 - e^{-2}$

   b)   State whether the given statement is true or false in each of the following :

                                                                    [1 each]

   i)   The greater is the slope of the OC curve, the greater is the power of
         the sampling plan to discriminate between good and bad lots.

   ii)   ATI is always a decreasing function of lot fraction defective p.

   iii) In simple random sampling, each unit in the population has the
         same probability of being included in the sample.

   c)   State the expression for standard error of an estimator of population
        proportion under SRSWR.   **[1]**

   d)   Explain the term : Lot Tolerance Percent Defective (LTPD).   **[1]**

e) State the expression for the variance of estimator of population mean under stratified random sampling using proportional allocation. **[1]**

f) State the probability distribution used while deriving the formula for standard error of an estimator of population mean in case of SRSWOR.
[1]

Q2) Attempt <u>any two</u> of the following : **[5 each]**

a) Consider a population of 4 units with values 3, 4, 6 and 9. Write down all possible samples of size 2 using SRSWOR and verify that the mean of all sample means is equal to the population mean.

b) In a survey, a sample of 50 households selected from the population of 900 households using SRSWOR showed that 29 of these households possessed LPG connection. Estimate the total number of households possessing LPG connection in the population. Obtain the estimate of the standard error of your estimator.

c) What do you mean by stratification? Give two real life situations where stratification is needed.

Q3) Attempt <u>any two</u> of the following : **[5 each]**

a) Describe the working of a single sampling plan. Explain the term AOQL in connection with a single sampling plan.

b) Explain the concept of OC curve for a single sampling plan. How will you obtain LTFD for consumer's risk of 5% with the help of an OC curve for a single sampling plan.

c) For a double sampling plan with $N = 1000$, $n_1 = 50$, $c_1 = 0$, $n_2 = 50$, $c_2 = 2$; compute the probability that a lot having exactly 1% defectives will be accepted.

Q4) Attempt <u>any one</u> of the following :

a) i) A population of size 1200 is divided into 4 strata. Their sizes and standard deviations are given below :

Stratum No.	Size	S.D.
1	300	4
2	400	7
3	300	10
4	200	6

A stratified random sample of size 100 is to be drawn from the population. Determine the sizes of the samples from the four strata in case of

(A)   proportional allocation and

(B)   optimum allocation.   **[5]**

ii)   Explain the terms AOQ and ATI in connection with a double sampling plan. State the expression for ATI of a double sampling plan.   **[5]**

b) i)   A sample of size n is to be drawn from the population of size N using SRSWOR. Show that the probability that the ith unit in the population is selected at the jth draw is equal to $\dfrac{1}{N}$. Hence find the probability that the ith unit in the population is included in the sample.   **[5]**

ii)   For a single sampling plan with N = 10000, n = 100 and c = 3 : compute AOQ and ATI if the lots submitted are 2% defective. **[5]**

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[3917] - 201
S.Y. B.Sc. (Sem. - II)
MATHEMATICS
Linear Algebra
(Paper - I) (2008 Pattern)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:
   1) *All questions are compulsory.*
   2) *Figures to the right indicate full marks.*

Q1) Attempt <u>any five</u> of the following : **[10]**

   a) Let W = {(x, y, z) : x = 0 or y = 0}. Is W a subspace of R^3?

   b) Let T : $R^2 \to R^2$ be a linear transformation defined by T(x, y) = (x + y, x – y). Find the matrix of T with respect to the standard basis of R^2.

   c) Let u = (1, –3) and v = (2, 2). Find the orthogonal projection of u along v.

   d) Find the angle between the vectors (1, –1) and (1, 0).

   e) Justify whether true or false : The set {(1, –1, 2), (2, 1, 0), (0, 1, 2), (–1, 3, 1)} is a linearly independent subset of R^3.

   f) If a linear transformation T : V $\to$ W is one-one, then show that Ker T = {θ}.

   g) Find the solution set of the equation x + y –z = 0.

Q2) Attempt <u>any two</u> of the following : **[10]**

   a) Let V be a vector space. Prove that the set S = {v_1, ...,v_n} is linearly dependent if and only if one of the vectors in S can be expressed as a linear combination of other vectors in S.

   b) Find a basis of R^3 which contains the vectors {(–1, 3, 0)}.

   c) Let T : $R^3 \to R^3$ be defined by T(x, y, z) = (4x + 2y + 2z, 2x + 3y – z, – x + y – 2z). Find a basis and the dimension of Kernel of T.

Q3) Attempt <u>any two</u> of the following :　　　　　　　　　　　　　　　**[10]**

　　a)　State and prove Cauchy-Schwarz inequality.

　　b)　Given that the set {(1, 1, 0), (0, 1, 1), (1, 0, 1)} is a basis of R^3. If T : $R^3 \rightarrow R^3$ is a linear transformation such that T(1, 1, 0) = (0, 0, 1), T(0, 1, 1) = (1, 0, 0) and T(1, 0, 1) = (0, 1, 0). Find T(2, –3, 4).

　　c)　Apply Gram-Schmidt process to the set {(1, 1, 1), (–1, 1, 0), (1, 2, 1)} to obtain an orthogonal basis of R^3.

Q4) Attempt <u>any one</u> of the following :

　　a)　Let $A = \begin{pmatrix} 2 & 1 & 1 \\ 2 & 3 & 2 \\ 3 & 3 & 4 \end{pmatrix}$. Find eigenvalues of A. Also find basis and

　　　　dimension of the eigenspace corresponding to each eigenvalue.　**[10]**

　　b)　i)　Let T : V → W be a linear transformation. Prove that dim Ker T + dim Rank T = dim V.　　　　　　　　　　　**[7]**

　　　　ii)　Let T : $R^2 \rightarrow R^2$ be defined by T(x, y) = (2x – y, x + 2y). Is T onto?　　　　　　　　　　　　　　　　**[3]**

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[3917] - 202A
S.Y. B.Sc. (Sem. - II)
MATHEMATICS
Vector Calculus
(Paper - II(A)) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

Q1) Attempt <u>any five</u> of the following :   **[10]**

    a)   Test the continuity of the function

$$\bar{f}(t) = (1 + 3t)^t \, i + \left(\frac{\sin 3t}{t} \right) j + 0k, \, t + 0$$

$$= e^3 i + 3j + 0k, \, t = 0$$

    b)   A space curve is given by $x = t$, $y = t^2$, $z = \dfrac{2}{3}t^3$, find the unit tangent vector $\overline{T}$ at $t = 1$.

    c)   If $\bar{r} = xi + yj + zk$, $r = |\bar{r}|$, find grad r.

    d)   Find the values of a,b,c if the vector

        $\bar{f} = (x + 2y + az) \, i + (bx - 3y - z)j + (4x + cy + 2z)k$ is irrotational.

    e)   If $\bar{f} = \cos xy \, i + (3xy - 2x^2)j - (3x + 2y)k$,

        find $\dfrac{\partial^2 \bar{f}}{\partial x \partial y}$ at the point $(1, 0)$.

    f)   State 'Gauss Divergence Theorem'.

    g)   Evaluate the integral of $\bar{f} = x^2 i - xyj$ from O(0, 0) to P(1, 1) along the parabola $y^2 = x$.

Q2) Attempt <u>any two</u> of the following : **[10]**

    a)   Show that the differentiable function $\bar{u}\,(t)$ defined on $[a,\,b]$ is of constant magnitude iff $\bar{u}\cdot\dfrac{d\bar{u}}{dt}=0$, $t \in [a,\,b]$.

    b)   Find the directional derivative of $\phi=\dfrac{y}{x^2+y^2}$ at $(0,1)$ in the direction making an angle of $30°$ with the positive x-axis.

    c)   If $\bar{u} = 2xz^2\,i - yzj + 3xz^3k$, $\phi = x^2yz$. Verify that div(Curl $\phi\,\bar{u}\,) = 0$.

Q3) Attempt <u>any two</u> of the following : **[10]**

    a)   If $\bar{u}$, ϕ are respectively vector and scalar functions of x,y,z possessing first order partial derivatives, then prove that

$$\text{div}(\phi\bar{u}\,) = \text{grad } \phi,\ \bar{u}\ +\ \phi\ \text{div }\bar{u}\,.$$

    b)   Find the scalar potential ϕ if

$$\nabla\phi = (x + 2y + 4z)i + (2x - 3y - z)j + (4x - y + 2z)k \text{ if } \phi\,(2, -2, 0) = 4.$$

    c)   If $\bar{r} = \bar{a}\cos wt + \bar{b}\sin wt$; $\bar{a}\,\bar{b}$ are constant non-collinear vectors and w is a constant scalar, prove that

$$\bar{r}\times\dfrac{d\bar{r}}{dt} = w\big(\bar{a}\times\bar{b}\big) \text{ and } \dfrac{d^2\bar{r}}{dt^2} + w^2\bar{r} = \bar{0}\,.$$

Q4) Attempt <u>any one</u> of the following :

    a)   State and prove Green's theorem in a plane. **[10]**

<p align="center">OR</p>

    b) i)   Evaluate $\iint\limits_{S} \bar{F}.\bar{u}\ ds$ using divergence theorem for

          $\bar{F} = 4xzi - y^2j + yzk$ over a cube bounded by $x = 0$, $x = 1$, $y = 0$, $y = 1$, $z = 0$, $z = 1$. **[5]**

      ii)   Evaluate $\oint\limits_{C} \bar{F}.d\bar{r}$ by using stoke's theorem where $\bar{F} = xyi + xy^2j$ taken round the square C with vertices $(1, 0)$, $(-1, 0)$, $(0, 1)$, $(0, -1)$ in positive direction. **[5]**

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[3917] - 202B

S.Y. B.Sc. (Sem. - II)
MATHEMATICS
MT - 222 (B) : Discrete Mathematics
(Paper - II(B)) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

1)   All questions are compulsory.
2)   Figures to the right indicate full marks.
3)   Use of single memory, non-programmable scientific calculator is allowed.

Q1) Attempt <u>any five</u> of the following :   **[10]**

a)   Prove the statement $5 + 10 + 15 +.......+5n = \dfrac{5n(n+1)}{2}$ is true by using mathematical induction.

b)   Find the number of distinguishable permutations of the letters in 'MISSISSIPPI'.

c)   Show that if seven integers from 1 to 12 are chosen, then two of them will add upto 13.

d)   Define a linear homogeneous recurrence relation of degree K. Also, find the degree of relation $c_n = (-2)c_{n-1}$.

e)   Give an example of regular, connected graph on six vertices that is not complete.

f)   Define the terms : (i) Euler path (ii) Hamiltonian circuit.

g)   Find the chromatic number and the chromatic polynomial for the linear graph L_4 : •——•——•——•.

Q2) Attempt <u>any two</u> of the following :   **[10]**

a)   State the principle of mathematical induction and using it to prove that $3/(n^3-n)$ for every positive integer n.

b)   Suppose that a valid computer password consists of seven characters, the first of which is a letter chosen from the set {A, B, C, D, E, F, G} and the remaining six characters are letters chosen from the English alphabet or a digit. How many different passwords are possible?

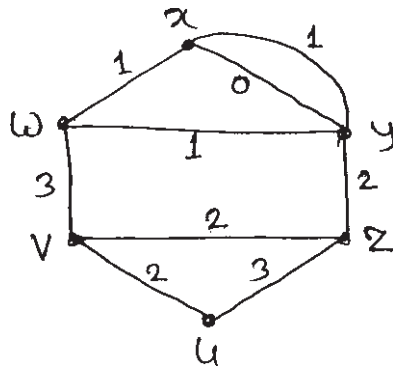c)   Solve the recurrence relation.
$a_n - 7a_{n-2} + 6a_{n-3} = 0$ where
$a_0 = 8$, $a_1 = 6$, $a_2 = 22$.

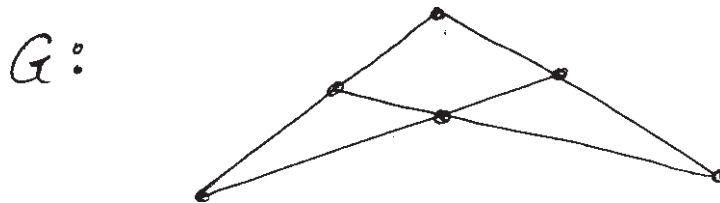*P.T.O.*

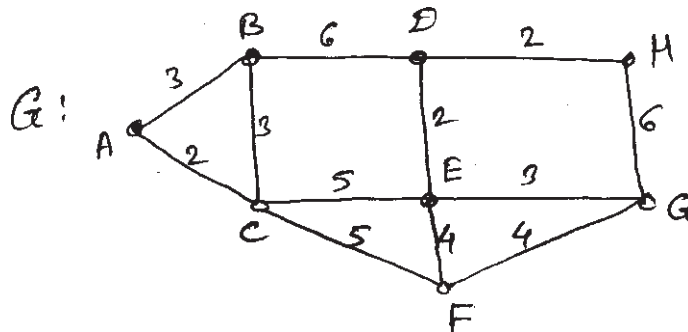*Q3)* Attempt <u>any two</u> of the following : **[10]**

    a)   Use Kruskal's algorithm to find a minimal spanning tree for the following graph.

   b)   Use Fleury's algorithm to produce an Euler circuit for the graph.

    c)   Find the Hamiltonian circuit of minimal weight for the graph G if you must begin and end at F.

Q4) Attempt <u>any one</u> of the following : **[10]**

    a)   i)   If G is a connected graph and every vertex has even degree, then prove that there is an Euler circuit in G.

        ii)   Find the cromatic polynomial P_G for the following graph and use P_G to find X(G).
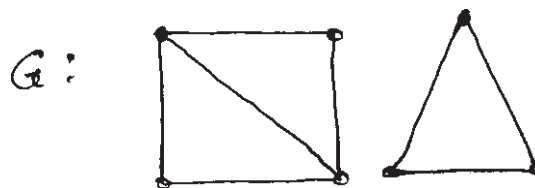
b) i) Prove that, if n pigeons are assigned to m pigeonholes, then one of the pigeonholes must contain at least $\left[\dfrac{n-1}{m}\right]+1$ pigeons.

ii) Define the quotient graph G^R of graph $G = (V, E, \upsilon)$ with respect to equivalence relation R on the set V. Also, if R is the equivalence relation defined by the partition $\{\{a, f\}, \{e, b, d\}, \{c\}\}$, find the quotient graph G^R.

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[3917] - 203

S.Y. B.Sc. (Sem. - II)
PHYSICS
PH - 221 : Oscillations, Waves and Sound
(New Course) (Paper - I) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:
1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Use of calculator and log table is allowed.*
4) *Neat diagrams must be drawn wherever necessary.*

Q1) Attempt all of the following :
- a) Explain stable equillibrium. **[1]**
- b) What is meant by critically damped motion? **[1]**
- c) Distinguish between forced oscillations and damped oscillations. **[1]**
- d) What are P-waves? **[1]**
- e) Explain the term 'Radar Speed Trap'. **[1]**
- f) What is reverberation? **[1]**
- g) A 5.0 kg block oscillates due to spring of spring constant 196 N/m. Find the period of oscillations. **[1]**
- h) The equation for critically damped motion is given in the form **[1]**

$$\left(\frac{d^2x}{dt^2} \right) + R\left(\frac{dx}{dt} \right) + x = 0$$

Determine the value of R.
- i) What is meant by coupled oscillations? **[1]**
- j) The velocity of transverse waves over a stretched string is 300 cm/s. If its mass per unit length is 5 g/cm, find the tension in the string. **[1]**

Q2) Attempt <u>any two</u> of the following :
- a) Define simple harmonic motion. Give the differential equation of S.H.M. and obtain solution of it. **[5]**
- b) Derive the condition for velocity resonance and obtain amplitude of velocity at resonance. **[5]**
- c) Obtain an expression of apparent frequency of sound heard by the listener when both are in relative motion with respect to each other. **[5]**

Q3) Attempt <u>any two</u> of the following :

a) The amplitude of a pendulum of period 0.5 sec. falls to half of its initial value in 230.3 seconds. Determine the quality factor. **[5]**

b) An alternating e.m.f of peak value 230 volt is applied across the series combination of an inductor of Inductance 20 mH a capacitor of capacitance 2 µf and resistance of 100 Ω. Determine resonant frequency, quality factor and band width. **[5]**

c) In the experiment for measuring the intensity of just audible sound from the source of sound having frequency 2730 Hz at a distance 820 m, the calculated intensity was 4.26×10^{-6} watt/cm² in still air. Determine the amplitude of vibration of air particles assuming all the energy from the source is radiated as sound. **[5]**

Q4) Attempt the following :

a) i) What are Lissajous figures? Explain electrical method for obtaining Lissajous figures. **[4]**

ii) Prove that the velocity of transverse waves over a string of linear density µ is $c = \sqrt{T/\mu}$, where T is tension. **[4]**

OR

i) Set up differential equation for damped oscillations. Obtain its solution. **[4]**

ii) What do you mean by wave velocity and particle velocity? Show that wave velocity, $c = \dfrac{w}{k}$. **[4]**

b) Attempt <u>any one</u> of the following :

i) A spectral line of wavelength 6000A° in the spectrum of a star is found to be displaced from its normal position towards red end by 1 A°. Calculate the velocity of the star and sense of motion. **[2]**

ii) A stroboscope disc has 16 dots in the ring. When seen through strips window, the dots appeared stationary for 256 revolutions in 16 seconds. Determine the frequency of tuning fork. **[2]**

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[3917] - 204
S.Y. B.Sc.
PHYSICS
PH - 222 : Optics
(New) (Paper - II) (2008 Pattern) (Sem. - II) (51222)

Time : 2 Hours] [*Max. Marks : 40*
Instructions to the candidates:
  1) *All questions are compulsory.*
  2) *Figures to the right indicate full marks.*
  3) *Use of calculator and log table is allowed.*
  4) *Neat diagrams must be drawn wherever necessary.*

Q1) Attempt all of the following :
   a) What do you mean by cardinal points? **[1]**
   b) State the cause of monochromatic aberration. **[1]**
   c) Define angular magnification of a telescope. **[1]**
   d) What do you mean by fringes of equal thickness. **[1]**
   e) State Malu's law. **[1]**
   f) A convex lens has radii of curvatures 1m and 2m. If the refractive index of material of the lens is 2.33, what will be its focal length? **[1]**
   g) What is distortion? **[1]**
   h) A converging lens of focal length 4 cm. Calculate the magnifying power, if the distance of distinct vision is 16 cm. **[1]**
   i) What is diffraction of light? **[1]**
   j) The polarizing angle for air and transparent material is 60°. Calculate refractive index of material. **[1]**

Q2) Attempt <u>any two</u> of the following :
   a) Explain construction and working of Ramsden's eye-piece. **[5]**
   b) Obtain the condition $2 \mu t \cos r = m\lambda$ for destructive interference in the reflected system of rays from a thin film. **[5]**
   c) Prove that for a combination of two thin lenses of focal lengths f_1 and f_2 separated by a distance x, the focal length of the combination is given by

$$\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2} - \frac{x}{f_1 f_2}.$$
   [5]

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Q3) Attempt <u>any two</u> of the following :

   a)   Find the polarizing angle for light incident from water to glass and glass to water if refractive index of glass and water is 1.54 and 1.33 respectively. **[5]**

   b)   The focal length of an achromatic combination of two lenses in contact is 100 cm. The magnitude of the dispersive powers of the two lenses are 0.02 and 0.03. Calculate the focal length of the two lenses. **[5]**

   c)   Monochromatic light of wavelength 6000A° is incident normally on a diffraction grating. The first order maximum is observed in the direction of 15'. Calculate the grating element. **[5]**

Q4) Attempt the following :

   a)   i)   Explain principal foci and focal planes. Draw necessary ray diagram. **[4]**

        ii)   Show that longitudinal chromatic aberration is equal to the product of dispersive power and mean focal length. **[4]**

<div align="center">OR</div>

        i)   Show that the distance of the second principal plane from the second lens of an optical system is $\beta = -\dfrac{xf}{f_1}$. **[4]**

        ii)   What do you mean by achromatism? Derive the condition for the achromatism of two lenses in contact. **[4]**

   b)   Attempt <u>any one</u> of the following :

        i)   Distinguish between Fresnel's and Fraunhoffer's diffraction. **[2]**

        ii)   When a movable mirror of Michelson's interferometer is moved through a distance of 0.0589 mm, a shift of 200 fringes is observed. What is the wavelength of the light used. **[2]**

<div align="center">❖ ❖ ❖ ❖</div>

P365

[3917]-208

S.Y. B.Sc. (Semester - II)
BOTANY
BO-222 : Fundamentals of Plant Biotechnology
(Paper - II) (New Course) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:
  1) *All questions are compulsory.*
  2) *Figures to the right indicate full marks.*
  3) *Draw neat labeled diagrams wherever necessary.*

Q1) Attempt the following :   **[10]**

   a) Define biotechnology.

   b) Give names of different types of genomes.

   c) What is Genetic Engineering?

   d) What is bioprocess technology?

   e) What are enzymes?

   f) Define biofuels.

   g) What are SCPs?

   h) Define micropropogation.

   i) Enlist the types of waste.

   j) What is hardening?

Q2) Attempt any two of the following :   **[10]**

   a) Economic implications of SCP.

   b) Describe structure and organization of chloroplast genome.

   c) Explain interdisciplinary nature of biotechnology.

Q3) Write short notes on (Any Two) :   **[10]**

   a) Advantages of GMO's.

   b) Biodiesel.

   c) Enzyme immobilization.

Q4) Define organogenesis? Explain the mechanism of organogenesis and give its advantages.   **[10]**

<div align="center">OR</div>

What is bioreactor? Describe the structure and operation of Tubular Tower Bioreactor.

<div align="center">✳ ✳ ✳</div>

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[3917]-209

S.Y. B.Sc.

ZOOLOGY - I

ZY-221 : General Zoology and Biological Techniques - II
(Paper - I) (New Course) (2008 Pattern) (Semester - II)

Time : 2 Hours]　　　　　　　　　　　　　　　　　　　　　　　*[Max. Marks : 40*

Instructions to the candidates:
　　1)　*All questions are compulsory.*
　　2)　*Figures to the right indicate full marks.*
　　3)　*Neat labelled diagrams must be drawn wherever necessary.*

Q1)　Attempt the following :　　　　　　　　　　　　　　　　　　**[10]**

　　a)　Mention the function of scroll valve in Scoliodon.

　　b)　Write any two examples of birds with raptorial feet.

　　c)　Enlist any two desert adaptations in vertebrates.

　　d)　What is the function of holobranch in Scoliodon.

　　e)　What is casts?

　　f)　Enlist any two arteries of Scoliodon.

　　g)　Mention the example of fish with placoid scale.

　　h)　Define homocercal tail.

　　i)　What is altitudinal migration?

　　j)　Enlist any two safety measures for personal protection in laboratory.

Q2)　Write short notes on (any two) :　　　　　　　　　　　　　　**[10]**

　　a)　Simple microscope.

　　b)　Fruit eating and wood chiselling beak.

　　c)　Ampullae of Lorenzini.

Q3) Attempt the following (any two) :   [10]

   a) Describe the method of preparation of normal solution.

   b) Sketch and label male urinogenital system of Scoliodon.

   c) Describe parental care in Alytes.

Q4) Describe habit, habitat and external characters of Scoliodon.   [10]

                                    OR

Describe the method of total leucocyte (WBC) count by haemocytometer.
Add a note on its clinical significance.

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[3917]-210

S.Y. B.Sc.

ZOOLOGY

ZY-222 : Applied Zoology - II (Apiculture and Sericulture)

(Paper - II) (New Course) (2008 Pattern) (Semester - II)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

    1)   All questions are compulsory.

    2)   Figures to the right indicate full marks.

    3)   Neat labelled diagrams must be drawn wherever necessary.

Q1) Attempt the following :   **[10]**

    a)   Enlist any two bacterial diseases of honey bees.

    b)   Define Sericulture.

    c)   What is Swarming?

    d)   Define the term multivoltine.

    e)   What is the use of bee-veil?

    f)   What is brushing?

    g)   What is bee bread?

    h)   Define stifling.

    i)   Enlist any two species of honey bees.

    j)   Define manuring.

Q2) Write short notes on (any two) :   **[10]**

    a)   Uzi-fly.

    b)   Round dance.

    c)   Wax moth as bee pest.

Q3) Attempt the following (any two) :   **[10]**

   a) Describe bees as efficient pollinators.

   b) Describe any two harvesting methods of mulbery leaves.

   c) Sketch and label smoker.

Q4) Give a detail account of economic importance of honey and bee-wax. **[10]**

<div align="center">OR</div>

With neat, labelled diagram describe the life cycle of <u>Bombyx</u> <u>mori</u>.

<div align="center">✳ ✳ ✳</div>

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[3917]-211

S.Y. B.Sc.

GEOLOGY

GL-221 : Petrology

(Paper - I) (New Course) (2008 Pattern) (Semester - II)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Neat diagrams must be drawn wherever necessary.*

    3)   *Figures to the right indicate full marks.*

Q1) Answer the following questions :   **[10]**

    a)   What is dunite?

    b)   What is slaty cleavage?

    c)   Define optalic metamorphism.

    d)   What is idiomorphic texture?

    e)   Define roundness.

    f)   What are mud cracks?

    g)   What is mafic?

    h)   What is anthracite?

    i)   Define anti-stress minerals.

    j)   What is primary magma?

Q2) Write notes on (Any two) :   **[10]**

    a)   Competence, capacity and load of transporting medium.

    b)   Crush breccia and crush conglomerate.

    c)   Factors controlling grain size of Igneous rocks.

Q3) Explain the following (Any two) : **[10]**

   a) Regional metamorphism of basic Igneous rocks.

   b) Orbicular and spherulitic structure.

   c) Thermal metamorphism of pume limestone.

Q4) Describe the crystallisation of a bi-component magma with the help of 'solid solution series'. **[10]**

<p align="center">OR</p>

Define primary sedimentary structures. Explain the origin & environmental significance of cross bedding and graded bedding.

<p align="center">✳ ✳ ✳</p>

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[3917]-212

S.Y. B.Sc.

GEOLOGY

GL-222 : Palaeontology & Stratigraphy

(New Course) (2008 Pattern) (Semester - II)

Time : 2 Hours]　　　　　　　　　　　　　　　　　*[Max. Marks : 40*

Instructions to the candidates:

　　1)　All questions are compulsory.

　　2)　Draw neat diagrams wherever necessary.

　　3)　Figures to the right indicate full marks.

Q1) Answer the following questions :　　　　　　　　　　　　**[10]**

　　a)　State the principles of stratigraphy.

　　b)　Define a Formation.

　　c)　What are alternations?

　　d)　Define symmetrical cycles.

　　e)　What is marine regression?

　　f)　Define correlation?

　　g)　Define Nanopalaeontology.

　　h)　Define microevolution.

　　i)　What are conodonts?

　　j)　State the different types of hinges in Ostracods.

Q2) Write notes on (any two) :　　　　　　　　　　　　　**[10]**

　　a)　Principle of uniformitarianism.

　　b)　Lithostratigraphic units.

　　c)　Cycles as patterned succession.

Q3) Write notes on (any two) : **[10]**

    a) Laboratory study of outcrop samples.

    b) Evidence of erosion in recognition of unconformities.

    c) Evolutionary trends in ammonoids?

Q4) Define correlation. Describe lateral continuity and lithological similarity for correlation. **[10]**

<div align="center">OR</div>

Describe the morphology of the test of foraminifers.

<div align="center">✳ ✳ ✳</div>

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[3917]-213

S.Y. B.Sc.

STATISTICS

ST-221: Statistical Methods and National Income

(2008 Pattern) (Semester - II)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

    3)   *Use of calculator and statistical tables is allowed.*

    4)   *Symbols and abbreviations have their usual meaning.*

Q1)   Attempt each of the following :

    a)   Choose the correct alternative in <u>each</u> of the following :   **[1 each]**

        i)   The three regression planes coincide if

            A) $|R| = 1$

            B) $|R| > 0$

            C) $|R| = 0$

            D) $|R| < 0$

        ii)   A statistical hypothesis is

            A)   a statement about the test.

            B)   an imaginary abstract concept.

            C)   an ideal value of the parameter.

            D)   a statement about the parameter of distribution.

        iii)   We need to change the base year of index number if

            A)   it is abnormal year.

            B)   it is too old or too distant.

            C)   new commodities are introduced.

            D)   old commodities are out of use.

    b)   State whether the given statement is true or false in <u>each</u> of the following:

                                                             [1 each]

        i)   Test statistic is independent of unknown parameter on parent distribution.

        ii)   Index numbers always lies between 0 and 100.

        iii)   According to Pigou's definition of national income the services rendered by mother to her child are included in national income.

c) Define type I error. **[1]**

d) State various methods of estimation of national income. **[1]**

e) State the purpose of Fisher's z-transformation. **[1]**

f) If $\sigma_1 = 3$, $R_{11} = 0.578$, $|R| = 0.758$ then find Var $(X_{1.23})$. **[1]**

Q2) Attempt any <u>two</u> of the following : **[5 each]**

a) Show that the correlation coefficient between the residuals $X_{1.23}$ and $X_{2.13}$ is equal in magnitude and opposite in sign to that between $X_{1.3}$ and $X_{2.3}$.

b) In a college there are two faculties Arts and Science. The average weight of students in a sample of 250 in Art faculty was found to be 120 pounds with standard deviation of 12 pounds. While the corresponding figures in a sample of 400 students from science faculty were 124 pounds and 14 pounds. Test the hypothesis that the mean weight of two faculties are equal. Use 1% level of significance.

c) Convert the following series of fixed base index number to chain base index number.

Year	2003	2004	2005	2006	2007	2008	2009
Fixed base Index Number	100	105	115	128	140	157	210

Q3) Attempt any <u>two</u> of the following : **[5 each]**

a) Describe the test procedure to test H_0: $P_1 = P_2$ against the alternative hypothesis.

i) $H_1 : P_1 \neq P_2$
ii) $H_1 : P_1 > P_2$
iii) $H_1 : P_1 < P_2$

where P_1 and P_2 are population proportions.

b) With usual notations, show that $b_{12.3} = \dfrac{b_{12} - b_{13}\, b_{32}}{1 - b_{23}\, b_{32}}$

c) Determine NNP at factor cost for the following :
   i)   GNP at market price = 100000 crores Rs.
   ii) Indirect taxes = 7000 crores Rs.
   iii) Subsidies = 2000 crores Rs.
   iv) Depreciation = 9000 crores Rs.

Further find NDP if net income from abroad is 2000 crores Rs. Also verify that value of NNP at factor cost is less than GNP at factor cost.

Q4) Attempt any <u>one</u> of the following :

a) i)   Explain how to construct $100(1-\alpha)\%$ confidence interval for population mean of normal distribution when σ^2 is known. **[4]**

   ii) Show that $R^2_{1.23} = b_{12.3} \, r_{12} \dfrac{\sigma_2}{\sigma_1} + b_{13.2} \, r_{13} \dfrac{\sigma_3}{\sigma_1}$. **[3]**

   iii) Explain how logistic regression differs from usual regression. **[3]**

b) i)   Derive the equation of least square regression plane of X_1 on X_2, X_3. **[7]**

   ii) Splice the following series of index numbers with base year 1990.

Year	1990	1991	1992	1993	1994	1995	1996
Series A	107	115	140	150	–	–	–
Series B	–	–	–	100	120	150	200

. **[3]**

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P393

[3917]-246

S.Y. B.Sc. (Vocational)
ELECTRONIC EQUIPMENT MAINTENANCE
VOC - EEM - 222 : Maintenance and Repair of Audio, Video, Office and Communication Equipment
(Paper - II) (2008 Pattern) (Sem. - II) (New)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:
   1)   *All questions are compulsory.*
   2)   *Figures to the right indicate full marks.*
   3)   *Use of log table and/or calculator is allowed.*

Q1) Answer <u>all</u> of the following :

   a)   Output of the receiver is normal with signal generator input, but the broadcast signal is not received. What is the likely fault?   **[1]**

   b)   What are the probable causes if erase function of a magnetic tape recorder becomes non functional?   **[1]**

   c)   How many photodiodes are present in the detector block of a CD player?

                                                                          [1]

   d)   What is the cause behind noisy picture on playback of properly recorded video cassette?   **[1]**

   e)   What is the probable cause if output of receiver seen on screen of a CRO appears fuzzy?   **[2]**

   f)   Why are line drivers of I/O devices most prove to faults?   **[2]**

   g)   If in a TV receiver (BW) sound is normal but raster is missing, what is the probable cause?   **[2]**

   h)   If a laser printer print quality is uneven in density what would be the reason?   **[2]**

Q2) Answer <u>any two</u> of the following :

    a)   How will you locate the faulty section of a TV receiver if following symptoms are seen.

        - No raster, no sound (set dead)

        - Horizontal bright line on screen   **[4]**

    b)   Explain the following faults & cause/s behind the faults in a public address system.

        - Excessive hum

        - No sound in one loudspeaker but normal in other.   **[4]**

    c)   Explain different causes of irregular movement of tape in a tape recorder.

                                        [4]

Q3) Answer <u>any two</u> of the following :

    a)   Explain the common categories of faults in a CD player. Which of these faults can be repaired without a service manual?   **[4]**

    b)   Explain typical faults and their causes in a mixer circuit of a superhet receiver.   **[4]**

    c)   Explain the probable faults in the sound and picture of a TV receiver.**[4]**

Q4) Answer the following :

    a)   Explain the typical trouble shooting process in a PA (Public Address) system.   **[6]**

    b)   Explain the faults, which are present in FM receivers only and the remedies of these faults.   **[6]**

<div align="center">OR</div>

    a)   Explain any four faults and their causes in a cassette tape recorder. **[6]**

    b)   State the cause/s behind the following faults in a colour TV * No colour, *distorted colours, *loss of colour synchronization.   **[6]**

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[3917]-248

S.Y. B.Sc. (Vocational)
SEED TECHNOLOGY
Seed Quality Control
(Paper - IV) (Sem. - II) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Draw neat and labeled diagrams wherever necessary.*

Q1) Attempt the following :   **[10 × 1 = 10]**

    a)   Define seed quality.

    b)   What is a nucleus seed?

    c)   Give any two objectives of seed certification agency.

    d)   What is field inspection?

    e)   Define roughing.

    f)   Give any two powers of seed inspector.

    g)   Where is central seed testing laboratory located?

    h)   Draw any two walking patterns in field inspection.

    i)   How many members comprise a central seed committee?

    j)   What is seed legislation?

Q2) Attempt <u>any two</u> of the following :   **[2 × 5 = 10]**

    a)   Give the principles of field inspection.

    b)   Describe in brief the classes of seed.

    c)   Give an account of International Organizations for seed certification.

Q3) Write notes on <u>any two</u> :   **[2 × 5 = 10]**

    a)   Appellate authority.

    b)   General seed certification standards.

    c)   State seed testing laboratory.

Q4) Describe in brief technique of field inspection for seed production plots of straight varieties in cotton. **[10]**

OR

Describe in brief technique of field inspection for seed production plots of hybrid varieties in cotton.

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P395

[3917]-249

S.Y. B.Sc. (Vocational)
INDUSTRIAL MICROBIOLOGY
VOC - IND - MIC - 222 : Quality Assurance in Industrial Products
(2008 Pattern) (Sem. - II) (Theory Paper - II)

Time : 2 Hours]　　　　　　　　　　　　　　　　　　　　*[Max. Marks : 40*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *All questions carry equal marks.*
4) *Draw neat labeled diagrams wherever necessary.*
5) *Use of scientific calculators is allowed.*

Q1) Answer each sub-question in one or two lines; Fill in the blanks; State whether the statement is true or false. **[10]**

a) Give the difference between "Quality Control" and "Quality Assurance".

b) Define "Commercially Sterile".

c) Give the full form of 'FPO".

d) Give the full form of 'BIS'.

e) State whether the following statement is TRUE / FALSE.

All injectables should only be pyrogen free.

f) State whether the following statement is TRUE / FALSE.

Gel diffusion microbiological assays are sturdier than turbidimetric microbiological assays for testing antibiotics.

g) State whether the following statement is TRUE / FALSE.

The LAL test was first designed for Gram negative bacterial pathogens.

h) State whether the following statement is TRUE / FALSE.

Mineral water is sterile.

i) State whether the following statement is TRUE / FALSE.

All heat treated products are pyrogen-free.

j) Name the media used for testing the sterility of a product.

Q2) Answer <u>any two</u> of the following :   **[10]**

    a)   Explain the 'Ames Test', and enlist the products for which it needs to be carried out.

    b)   Describe the limitations of the LAL test used for pyrogen testing.

    c)   What is 'undue toxicity', and describe the test by which it is checked.

Q3) Answer <u>any two</u> of the following :   **[10]**

    a)   What are pharmacopeias? Explain their need in quality assurance.

    b)   State the names of two products which need to be tested for sterility. Briefly explain the test.

    c)   What does FDA stand for? Explain its role in Quality Assurance of pharmaceutical products.

Q4) Answer <u>any one</u> of the following :   **[10]**

    a)   What is meant by a standard dose response with reference to the microbiological assay for antibiotics? Explain with the help of a suitable example.

    b)   Enlist the quality assurance tests carried out for 'water for injection'. Explain why these tests are necessary.

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P412

[3917]-130

S.Y. B.Sc.

OPTIONAL ENGLISH

Enriching Oral and Written Communication in English

(New Course) (2008 Pattern) (Sem. - I)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*

Q1) Attempt <u>any two</u> of the following : **[10]**

a) What is upward communication? Explain how you would share your experiences with your authorities working as a sales executive.

b) What is non-verbal communication? Explain how you would take care of your voice while attending an interview.

c) Illustrate some of the features of effective communication when you are a receiver of a message.

Q2) Attempt <u>any five</u> of the following : **[10]**

a) Find out meanings of the underlined words in the given sentences from the list given in the brackets.

   i) The toast got <u>burnt</u>.
   ii) He <u>burnt</u> his fingers in the stock market.
      (got angered, damaged, suffered)

b) Use any one of the following words in separate sentences as noun and verb in order to bring out meaning : cook, play

c) Use the following words in your own sentences :

   author, definition

d) Match the synonymous words.

A	B
destroy	order
sequence	happy
seldom	wreck
joyous	rarely

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e) Choose the correct alternatives and fill in the gaps.

    i) Now a days many students' handwriting is not ------------- (eligible/legible)

    ii) The Minister's visit to Chandigad was a ------------- one. (historic/historical)

f) Make two words each with following suffixes. (any two)

-ing, age, able

Q3) Attempt <u>any five</u> of the following :   **[10]**

a) Find out the correct spellings. (any two)

    i) arrangment, arrangement, arrengement
    ii) weard, weird, wierd
    iii) thesaurus, thessaurus, thesarus

b) Identify the part of speech of the underlined words. (any two)

    i) They came for help at a <u>crucial</u> time.
    ii) The sea is rough <u>today</u>.
    iii) He arrived <u>late</u>.

c) Match the phrasal verbs in **A** with their meanings in **B**.

A : to carry on, to carry over

B : to delay something, to continue, to bear the load.

d) Provide a lexical set of four words each for the following.

refrigerator, hospital

e) Make four words each using the letters in the following words.

celebrate, declaration

f) Rearrange the jumbled letters to form meaningful words with the help of hints given. (any two) :

elrdaec (to announce), ratheg (to come together), barhoru (an area of water on the coast).

Q4) Attempt <u>any two</u> of the following :   **[10]**

    a)   Answer **any five** of the following.

        i)   Say whether the initial sound in the following words is a vowel, a consonant or a diphthong. (any one)
             hard, umbrella

        ii)   Transcribe phonemically any one of the following words.
             beach, play

        iii) Mark stress in the words 'market' and 'quarrel'.

        iv) Underline the stressed words in the following sentence.
             My teacher was reading a new book.

        v)   Say whether the following sentences will be said with falling or rising tone. (any one)
             Is the water cool?
             He is late to the office.

        vi) Underline the weak forms in the following sentence.
             Give the wooden box to the man.

    b)   Write down short responses in the form of an utterance or two according to the situations given below. (**any five**)

        i)   You are at the railway station. Make enquiry about the next train you want to board.

        ii)   You meet your sick friend. Greet him.

        iii) Introduce your uncle to your teacher.

        iv) Your neighbour helped you in solving your problem at bank. Thank him.

        v)   Your mother received an award at a function. Respond to her.

        vi) Request the bank officer to sanction you bank loan for higher studies.

    c)   You are talking to your parents about your future plans. Write a short dialogue of about fifteen utterances on this situation.

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[3917]-1

F.Y. B.Sc.

MATHEMATICS

Algebra and Geometry

(Paper - I) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

Q1) Attempt each of the following :   **[16]**

   a) Define power set of a set. Hence find power set of X = {1, 2, 3, 4}.

   b) If f : R→R defined by $f(x) = 3x - 5$ then find formula for f^{-1}.

   c) Define relation ~ on the set of real numbers R such that for x, y real numbers $x \sim y$ if and only if xy is positive. Determine whether ~ is reflexive and symmetric.

   d) Let A = {–2, –1, 0, 1, 2, 3} and B = {3, 2, 6, 11} and let $f : A \to B$ be a function defined by $f(x) = x^2 + 2$. Check whether f is bijective function.

   e) Show that the equation $9x^2 - 12xy + 4y^2 - 3x + 2y - 1 = 0$ represents a parabola.

   f) The origin is changed to the point $(h, 2)$. Find the value of h so that the transformed equation of $x^2 + 4x + 3y - 5 = 0$ will not contain a first degree term in x.

   g) Find the value of 'λ' if two planes $x + 2y + 2z = 5$ and $2x + 3y + \lambda z + 3 = 0$, are perpendicular to each other.

   h) Show that the following two lines are coplanar.

$$\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4} \text{ and } \frac{x-2}{3} = \frac{y-3}{4} = \frac{z-4}{5}.$$

Q2) Attempt any four of the following :   **[16]**

   a) Let R be the relation defined on the set of integers Z by "x Ry if and only if $5x + 6y$ is divisible by 11" for $x, y \in Z$. Show that R is an equivalence relation on Z.

b) Let the functions $f, g : R \rightarrow R$ be defined by $f(x) = x^2 + 3x + 1$ and $g(x) = 2x - 1$. Find the formula which defines the composite functions fog and gof.

c) If x and y are odd integers then prove that $x^2 + y^2$ is even but not divisible by 4.

d) Show that a constant α is a root of the polynomial equation $f(x) = 0$ if and only if $x - \alpha$ is a factor of $f(x)$.

e) If $|z| = 1$ and $arg z = \theta$ then show that $\dfrac{1+z}{1-z} = i \cot \dfrac{\theta}{2}$.

f) If the sum of the roots of the equation $2x^3 - x^2 - 7x + 6 = 0$ is -1, then find all the roots.

Q3) Attempt any two of the following :   **[16]**

a) i) Prepare composition table for addition in z_8. Also calculate $-\overline{3} + (\overline{6} + \overline{4})$.

   ii) Find integers $x, y, 243x + 198y = 9$ if they exist.

b) Let a, b, x, y are integers and $a \equiv b$ (mod n) and $c \equiv d$ (mod n) then prove that
   i) $a + c \equiv b + d$ (mod n)
   ii) $ac \equiv bd$ (mod n).

c) State and prove De Moivre's theorem.

d) i) Define Euler's ϕ function and find the value of $\dfrac{\phi(16) + \phi(8)}{\phi(6)}$.

   ii) Find real and imaginary parts of $\left(1 - \sqrt{3i}\right)^3$.

Q4) Attempt any four of the following :   **[16]**

a) Remove the xy-term from $x^2 - 4xy + 4y^2 + 2y + 2 = 0$.

b) Show that every equation of first degree in x, y, z viz $Ax + By + Cz + d = 0$ represents a plane.

c) If direction cosines of two lines are connected by the relations, $l + m + n = 0$, $2mn - 6nl - 3lm = 0$, then find the angle between them.

d) Obtain the equation of a sphere whose centre is $(2, -3, -1)$ and radius 4.

e) Find the symmetric form of the equation of the line $x + y + z + 1 = 0 = 4x + y - 2z + 2$.

f) Reduce the matrix A to row-echelon form and hence find rank of A.

$$A = \begin{bmatrix} 0 & 1 & 3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$$

Q5) Attempt any two of the following :   **[16]**

a) Without shifting the origin, if due to rotation of axes, the expression $ax^2 + 2hxy + by^2$ is transformed to $a'x'^2 + 2h'x'y' + b'y'^2$ then prove that $a + b = a' + b'$ and $ab - h^2 = a'b' - h'^2$.

b) i) Find the equation of a plane which passes through the point $(1, 2, 3)$ and parallel to the plane $3x + 4y + 5z + 6 = 0$.

   ii) Obtain the equation of the sphere containing the circle $x^2 + y^2 + z^2 + 10y - 4z - 8 = 0$, $x + y + z - 3 = 0$ and passing through $(1, 1, -1)$.

c) i) Find the cosine of acute angle between two lines whose direction cosines are l_1, m_1, n_1, and l_2, m_2, n_2.

   ii) Find the condition under which the plane $lx + my + nz = p$ is a tangent plane to the sphere $x^2 + y^2 + z^2 = a^2$. Also find co-ordinates of point of contact.

d) i) Test the following equations for consistency and if consistent solve them
$$x + y + z = 9$$
$$2x + 5y + 7z = 52$$
$$2x + y - z = 0.$$

   ii) Solve completely the system of equations.
$$4x_1 + 2x_2 + x_3 + 3x_4 = 0$$
$$6x_1 + 3x_2 + 4x_3 + 7x_4 = 0$$
$$2x_1 + x_2 + x_4 = 0.$$

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P422

[3917]-2

F.Y. B.Sc.

MATHEMATICS

Calculus

(Paper - II) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates:

    1)   All questions are compulsory.

    2)   Figures to the right indicate full marks.

Q1)   Attempt <u>each</u> of the following :   **[16]**

    a)   Find the rational number between $\sqrt{5}$ and $\sqrt{6}$.

    b)   Discuss the convergence of the series $\sum_{n=1}^{\infty} \dfrac{1}{2^n}$.

    c)   Define a Cauchy sequence.

    d)   Find the left hand limit of $\lim\limits_{x\to 0} \dfrac{2x^2+|x|}{x}, x \neq 0$.

    e)   Discuss the continuity of the function
        $f(x)$ at $x = 0$, where

$$f(x) = \frac{x-|x|}{x},\ x \neq 0$$
$$= 2 \qquad , x = 0.$$

    f)   Evaluate $\lim\limits_{x\to 0} \dfrac{e^{ax} - e^{-ax}}{\log(1+bx)},\ b > 0$.

    g)   Test whether Rolle's theorem is applicable for the function
        $f(x) = 2 + (x - 1)^{2/3}$ on $[0, 2]$.

    h)   If $y = \dfrac{1}{3x+2}$, then find y_n.

Q2) Attempt any <u>Four</u> of the following : **[16]**

    a)   If a sequence $<x_n>$ of reals is monotonic increasing and bounded above, then show that it converges to it's least upper bound.

    b)   Find all real numbers x that satisfy the inequality $\left|\dfrac{2-x}{3+x}\right| < 1, \; x \neq -3.$

    c)   Show that the sequence $<x_n>$, where $x_n = \dfrac{1}{1.2} + \dfrac{1}{2.3} + \dfrac{1}{3.4} + \dots + \dfrac{1}{n \cdot (n+1)},$

       $\forall n \in \mathbb{N}$ is monotonic, bounded and convergent.

    d)   Show that every bounded sequence of real numbers has a convergent subsequence.

    e)   Discuss the convergence of the series $\displaystyle\sum_{n=1}^{\infty} \dfrac{3n+1}{n(n+1)(n+2)}.$

    f)   Evaluate, $\displaystyle\lim_{x \to 0} \dfrac{e^{1/x}}{e^{1/x}+1},$ if it exists.

Q3) Attempt any <u>Two</u> of the following : **[16]**

    a) i)   For any two real numbers x, y prove that $|x+y| \leq |x| + |y|.$

       ii)   Show that the sequence $<x_n>$, where $x_n = \left(1 + \dfrac{1}{2n}\right)^{n+1}, \; \forall n \in \mathbb{N}$ is convergent.

    b) i)   Prove that $\displaystyle\sum_{n=1}^{\infty} \dfrac{1}{n^p}$ is convergent, if $P > 1.$

       ii)   Discuss the convergence of the series $\displaystyle\sum_{n=1}^{\infty} \dfrac{n+2}{n+3}.$

    c) i)   If limit of a function $f(x)$ exists then it is unique.

       ii)   If $x_1 > 0$ and $x_{n+1} = \dfrac{1}{2+x_n},$ for $n \geq 1$ then show that $<x_n>$ is contractive sequence.

d) i) State the field axioms for set of real numbers.

ii) Using the $\in - \delta$ definition of limit. Prove that $\lim\limits_{x \to 1} \dfrac{x}{1+x} = \dfrac{1}{2}$.

Q4) Attempt any <u>Four</u> of the following : **[16]**

a) State and prove Lagranges Mean value theorem.

b) Discuss the continuity of the function $f(x)$ at $x = 4$; if the function is defined as follows.

$$f(x) = \dfrac{x^2}{4} - 4, \ \text{if} \ 0 < x < 4$$
$$= 0 \qquad , \ \text{if} \ x = 4.$$
$$= 4 - \dfrac{64}{x^2}, \ \text{if} \ x > 4.$$

c) Verify Rolle's theorem for the function $f(x) = x^3 - 3x^2$ in $[0, 3]$.

d) Evaluate, $\lim\limits_{x \to 0} (\cos x)^{1/x^2}$.

e) State Maclaurin's theorem with Lagrange's form of remainder and expand

$\sin x$ in ascending powers of $\left[x - \dfrac{\pi}{2} \right]$.

f) Verify Cauchy's Mean value theorem for function $f(x) = \sin x$,

$g(x) = \cos x$ on $\left[0, \dfrac{\pi}{2} \right]$ and also find value of c.

Q5) Attempt any <u>Two</u> of the following : **[16]**

a) State and prove Leibnitz theorem. Hence find y_5, if $y = e^x \cdot \log x$.

b) i) Let $f : [a, b] \to R$ be continuous function on $[a, b]$. If a real number k satisfies $f(a) < k < f(b)$ then prove that there exists $c \in (a, b)$, such that $f(c) = k$.

ii) Discuss the continuity of the function $f(x)$, where

$$f(x) = \sqrt{\dfrac{x+1}{x-4}}, \ \forall x \in R; \ x \neq 4.$$

c) i) If $y = \sin(ax + b)$ then prove that $y_n = \sin(ax + b + n\dfrac{\pi}{2})$, $\forall n \in$ N.

ii) Evaluate $\lim\limits_{x \to 0}\left(\dfrac{a}{x} - \cot\dfrac{x}{a}\right)$, $x \neq 0$.

d) i) If $y = \tan^{-1}x$, then prove that

$$(1 + x^2)y_{n+2} + 2(n+1)x \cdot y_{n+1} + n(n+1)y_n = 0$$

ii) Discuss the continuity of the function $f(x)$, at $x = 1$ and $x = 2$, where

$$f(x) = x^2 + 2 \quad\quad 0 \leq x < 1$$
$$= 4x - 1 \quad\quad 1 \leq x \leq 2$$
$$= x^2 - 1 \quad\quad 2 < x \leq 4.$$

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P423

[3917]-30
F.Y. B.Sc. (Vocational)
BIOTECHNOLOGY
Biochemistry, Biophysics and Instrumentation - I
(Paper - I) (New Course) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Draw neat and labelled diagrams whenever necessary.*
3) *Figures to the right indicate full marks.*
4) *Use separate answer books for section-I and II.*

SECTION - I

Q1) Answer the following questions in short :   **[8]**

a) How are hydrogen bonds formed in water molecule?

b) Give two examples of disaccharides.

c) Define coenzymes.

d) What is free energy?

Q2) Answer <u>any four</u> of the following :   **[16]**

a) What are functions of lipids?

b) Describe the structure of aminoacids.

c) Give classification of enzymes.

d) How are enzymes useful in industry?

e) Write a note on Kreb's cycle.

Q3) Answer <u>any two</u> of the following :   **[16]**

a) What are carbohydrates? Classify carbohydrates in detail and give example of each type.

b) How is glycolysis regulated by different enzymes?

c) Describe Watson and Crick model of DNA.

Q4) Answer the following :   **[8]**

    a)   Define resolving power of microscope.

    b)   State Beer's law.

    c)   What is differential centrifugation.

    d)   Define mobile phase.

Q5) Attempt <u>any four</u> questions :   **[16]**

    a)   Describe electrodes of pH meter.

    b)   Explain the technique of tlc and give its applications.

    c)   Give principle involved in nephatometer. Comment on its applications.

    d)   Comment on applications of infrared spectrophotometry.

    e)   Explain principle and working of centrifuge.

Q6) Attempt <u>any two</u> of the following :   **[16]**

    a)   Describe the parts of colorimeter with suitable diagram.

    b)   Describe affinity chromatography with respect to principle, working and applications.

    c)   What is light microscopy? Describe lenses used in compound microscope.

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P424

[3917]-37

F.Y. B.Sc. (Vocational)
BIOTECHNOLOGY

Microbiology and Mathematics, Statistics and Computer for Biologists
(Paper - II) (New Course) (2008 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Draw neat labelled diagrams wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Use separate answer books for section-I and II.*

SECTION - I
Microbiology

Q1) Answer each of the following : **[8]**

a) Name any two N_2 fixing bacteria.

b) What are differential media?

c) What is stain? Give one example of acidic stain.

d) What are extremophiles?

Q2) Attempt <u>any four</u> of the following : **[16]**

a) Enlist salient features of prokaryotic cells.

b) Briefly explain "Germ theory of Koch".

c) Describe various lens of compound microscope.

d) Explain steam heat sterilization technique.

e) Write a note on culture media.

Q3) Attempt <u>any two</u> of the following : **[16]**

a) What are archeobacteria? Give salient features of archeobacteria you have studied.

b) What is pure culture? Explain the technique of pure culture.

c) What is enrichment media? Discuss enrichment culture technique with suitable example.

SECTION - II

Mathematics, Statistics and Computer for Biologist

Q4) Answer each of the following : **[8]**

a) If $y = \log(2x^2 + 3x + 2)$, find $\dfrac{dy}{dx}$.

b) Evaluate $\int \dfrac{x}{1 + x^2}\, dx$.

c) Define mean.

d) Mention components of computer.

Q5) Attempt <u>any four</u> of the following : **[16]**

a) Evaluate $\lim\limits_{x \to 5} \dfrac{\sqrt{x} - \sqrt{5}}{x - \sqrt{5}}$.

b) Give applications of computer in industry.

c) Discuss the convergence of the series $\sum\limits_{n=1}^{\infty} \dfrac{2^n}{5^n + 1}$.

d) Write a note on Poisson distribution.

e) What is regression? Explain linear regression with suitable example.

Q6) Attempt <u>any two</u> of the following : **[16]**

a) i) Evaluate $\int \dfrac{e^x - 1}{e^x + 1}\, dx$

ii) Evaluate, $\lim\limits_{x \to 2} \dfrac{x^2 - 4}{x - 2}$

b) If $y = \dfrac{3x^2 + 5x}{7x + 4}$, find $\dfrac{dy}{dx}$.

c) Explain t-test with suitable example.

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P426

[3917]-140

S.Y. B.Sc. (Vocational)
COMPUTER HARDWARE & NETWORK ADMINISTRATION
Microprocessor & Interfacing Techniques
(Paper - I) (New Course) (2008 Pattern) (Sem. - I)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*

Q1) a)   Attempt the following :   **[4 × 1 = 4]**

      i)   What is full form of PCMCIA?

      ii)   What is the temperature range of LM-35 sensor?

      iii)   How to put 8086 Microprocessor to maximum mode?

      iv)   Why DRAM requires a refresh Circuitry?

  b)   Attempt the following :   **[4 × 2 = 8]**

      i)   What is sensor? List different light sensors you know.

      ii)   List any two features of 8086?

      iii)   What is USB? List any two devices that support USB.

      iv)   What is DMA?

Q2) Attempt <u>any two</u> of the following :   **[2 × 4 = 8]**

  a)   Explain DOS INT 21H with its functions?

  b)   Write a note on simple 4-bit DAC?

  c)   Write a note on computer based design and development tools.

Q3) Attempt <u>any two</u> of the following :   **[2 × 4 = 8]**

    a)   Differentiate between Hardware and Software interrupt.

    b)   Draw schematic diagram to interface matrix keyboard to microprocessor.

    c)   Write a note on DRAM briefing its advantages and disadvantages.

Q4) Attempt <u>any two</u> of the following :   **[2 × 6 = 12]**

    a)   List non Intel processors and explain any two of them.

    b)   State types of ADC. Explain any one in detail.

    c)   Explain DMA Controller operation with a neat diagram.

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P427

[3917]-141

S.Y. B.Sc. (Vocational)
SEED TECHNOLOGY
Hybrid Seed Production
(Paper - III) (New Course) (Sem. - I)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

   1)   All questions are compulsory.
   2)   Figures to the right indicate full marks.
   3)   Draw neat and labelled diagram wherever necessary.

Q1) Attempt the following :   **[10 × 1 = 10]**

   a)   Define heterosis.

   b)   What is apomixis?

   c)   What is meant by male sterility?

   d)   What is heteromorphic self incompatibility?

   e)   Define gametocides.

   f)   What is meant by a variety?

   g)   Give the isolation requirement for cotton.

   h)   Enlist types of pollination.

   i)   Which type of sowing method is employed in sun flower?

   j)   Define a seed rate.

Q2) Attempt <u>any two</u> of the following :   **[2 × 5 = 10]**

   a)   Give the commercial utilization of inbreeding depression.

   b)   Explain the use of genetic male sterility in hybrid seed production.

   c)   Describe the utilization of self incompatibility.

Q3) Write notes on <u>any two</u> of the following : **[2 × 5 = 10]**

a) Emasculation.

b) Compact area approach.

c) Pollen storage.

Q4) Describe in detail, the stepwise procedure for hybrid seed production in maize or sunflower. **[10]**

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P428

[3917] - 147

S.Y. B.Sc. (Vocational)

COMPUTER HARDWARE & NETWORK ADMINISTRATION

Computer System Management - I

(Paper - II) (2008 Pattern) (Sem. - I) (New Course) (Theory)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

   1)   **All questions are compulsory.**

   2)   **Figures to the right indicate full marks.**

Q1) a)   Attempt the following: **[4 x 1 = 4]**

   i)   What is Magnetism problem for a PC?

   ii)   How many Parallel Ports are there in a PC?

   iii)   What does ROM Stand for?

   iv)   Give one example of Logical Access Control.

   b)   Attempt the following: **[4 x 2 = 8]**

   i)   What is a Incident?

   ii)   List any two RUN Problems.

   iii)   Give any Two Electrical Contributors to PC Failures.

   iv)   What is AGP Card?

Q2) Attempt any <u>Two</u> of the following: **[2 x 4 = 8]**

   a)   What Safety Precautions Should one take during PC Trouble Shooting?

   b)   What are various Access Controls?

   c)   Discuss Problems related to:

   1)   Parallel Port.   2)   USB Port.

Q3) Attempt any <u>Two</u> of the following: **[2 x 4 = 8]**

    a)   What are the Problems related to Keyboard and Mouse?

    b)   Explain the importance of Backup Policies.

    c)   What are the different environmental factors that affect the PC?

Q4) Attempt any <u>Two</u> of the following: **[2 x 6 = 12]**

    a)   How will you troubleshoot a Display Problem for a PC?

    b)   Explain the importance of Business Continuity and Disaster Recovery.

    c)   How will you do Preventive Maintenance of

        1)   Hardware.   2)   System Software.

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P429

[3917] - 148

S.Y. B.Sc. (Vocational)
SEED TECHNOLOGY
Seed Testing

(Paper - IV) (2008 Pattern) (Sem. - I) (New Course)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:

   1)   *All questions are compulsory.*

   2)   *Figures to right indicate full marks.*

   3)   *Draw neat and labelled diagram wherever necessary.*

Q1) Attempt the following: **[10 x 1 = 10]**

   a)   Define Seed Testing.

   b)   Give any one objective of central seed testing laboratory.

   c)   Which type of equipment is used for physical purity analysis?

   d)   What is a composite sample?

   e)   Define a pure seed.

   f)   What is a service sample?

   g)   Give any one precaution required for seed sampling.

   h)   Enlist any two objectives of germination testing.

   i)   Which chemical is used in TZ method for testing germination.

   j)   Define a dead seed.

Q2) Attempt any two of the following: **[2 x 5 = 10]**

   a)   Describe the kinds of seed sampling.

   b)   Give in detail the procedure for physical purity analysis.

   c)   Explain the generalized procedure for seed vigour testing.

Q3) Write notes on any two of the following: **[2 x 5 = 10]**

    a)   Storage of guard sample.

    b)   State Seed Testing Laboratory.

    c)   Equipments used in Seed Testing Laboratory.

Q4) Describe the procedure for registration. Comment on the precautions taken during registration of samples. **[10]**

<div align="center">OR</div>

Define seed germination. Give the objectives and methods employed in seed germination testing.

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P431

[3917]-236

S.Y. B.Sc. (Vocational Course)
INDUSTRIAL CHEMISTRY
VOC - 221 : Unit Processes in Organic Industries
(Paper - I) (Sem. - II)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:
  1) *All questions are compulsory.*
  2) *Figures to the right indicate full marks.*
  3) *Draw neat diagrams wherever necessary.*

Q1) Answer the following questions in brief :   **[16]**

  a)   Write the structure of orthonitro phenol.

  b)   Give two examples of a reduction reaction with metal and acid.

  c)   How is acetylene obtained from vinyl ester?

  d)   Write the reaction for the manufacture of acetaldehyde.

  e)   How is aniline converted to chlorobenzene?

  f)   Write the reaction for hydrogenation of oils.

  g)   How is acetic acid obtained from bromomethane?

  h)   How is benzene converted to chlorobenzene?

Q2) Answer <u>any two</u> of the following :   **[8]**

  a)   Discuss types of esterification processes.

  b)   Explain Friedel-Crafts reaction.

  c)   Write a note on ozonolysis.

Q3) Attempt <u>any two</u> of the following :   **[8]**

  a)   What is oxidation? Describe the role of dichromate as an oxidising agent in different reactions.

  b)   Write a note on 'Different Sulphonating Agents'.

  c)   Write a note on 'Catalysts for hydrogenation reactions'.

Q4) Describe the manufacture of aniline from nitrobenzene with help of flow sheet diagram. **[8]**

OR

Describe briefly the manufacture of chloral.

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P432

[3917]-237

S.Y. B.Sc. (Vocational)
BIOTECHNOLOGY
Voc. Biotech - 221 : Plant and Animal Tissue Culture
(Paper - I) (2008 Pattern) (Sem. - II)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:
1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *All questions carry equal marks.*

Q1) Answer each of the following in 1-2 lines :   **[10]**

     a)   What are anchorage dependent cells?

     b)   Give role of cell counter in animal tissue culture.

     c)   What is trypsinisation of tissues?

     d)   Glutamine is added excess in animal tissue culture. Why?

     e)   Give any two applications of primary cell culture.

     f)   What is an explant?

     g)   Name any two chemicals used in surface sterilization.

     h)   Define the term 'cybrid'.

     i)   What is callus?

     j)   What is organogenesis?

Q2) Write short notes on <u>any two</u> of the following :   **[10]**

     a)   Filter sterilization.

     b)   Cell repository.

     c)   Culture media.

Q3) Attempt <u>any two</u> of the following :   **[10]**

     a)   Compare the characteristics of normal diploid cells and transformed cells.

     b)   Give significance of protoplast culture.

     c)   Write a note on finite life span cell line.

Q4) What is organ culture? Discuss various ways for initiation of organ culture. Add a note on application of organ culture in animal tissue culture. **[10]**

OR

What is micropropagation? Describe various steps involved in it.

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P433

[3917]-240

S.Y. B.Sc. (Vocational)
COMPUTER HARDWARE AND NETWORK ADMINISTRATION
Microprocessor and Interfacing Techniques - II
(Paper - I) (New Course) (Sem. - II) (58712) (2008 Pattern)

Time : 2 Hours]　　　　　　　　　　　　　　　　　　　*[Max. Marks : 40*

Instructions to the candidates:

1)　All questions are compulsory.

2)　Figures to the right indicate full marks.

Q1) a)　Attempt the following :　　　　　　　　　　　**[4 × 1 = 4]**

　　i)　Write two broad categories of serial data transmission.

　　ii)　Name two popular storage devices that are commonly used nowadays.

　　iii)　Write the full form of MIDI.

　　iv)　Which add-on card is needed to enhance the audio performance of a PC?

　b)　Attempt the following :　　　　　　　　　　　**[4 × 2 = 8]**

　　i)　Write the storage capacity of commonly used CD-R/W and DVD.

　　ii)　Which media can be used for Wireless Communication?

　　iii)　Classify networks on the basis of geographical area covered.

　　iv)　Describe Multimedia-PC in very brief.

Q2) Attempt any two of the following :　　　　　　　**[2 × 4 = 8]**

　a)　Compare the features of Bluetooth and Zigbee Wireless Communication Standards.

　b)　Explain the principle of a card reader as an input device.

　c)　Explain Thick and Thin concept with reference to a Green PC.

Q3) Attempt any two of the following :　　　　　　　**[2 × 4 = 8]**

　a)　Explain different types of scanners and their typical uses.

　b)　Describe the working of a Device Controller with the help of a block diagram.

　c)　Explain the ways by using which the performance of devices and interfaces can be enhanced.

P.T.O.

Q4) Attempt <u>any two</u> of the following :   **[2 × 6 = 12]**

    a)   Explain the function of a Display Adapter write important features of any two display adapters which are commonly used.

    b)   Explain the important functions of BIOS and the enhancements in flash BIOS.

    c)   Explain the concept of Speech Recognition along with its typical applications.

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[3917]-243

S.Y. B.Sc. (Vocational)
INDUSTRIAL CHEMISTRY
VOC - 222 - Industrial Pollution
(Paper - II) (Sem. - II) (2008 Pattern)

Time : 2 Hours]　　　　　　　　　　　　　　　　　　*[Max. Marks : 40*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Draw neat diagrams wherever necessary.*

Q1) Answer the following questions :　　　　　　　　　　　**[16]**

    a)　Explain the term 'electrodialysis'.

    b)　Define environment.

    c)　Define COD.

    d)　Explain "sullage".

    e)　Define 'lagooning'.

    f)　What are the hazards of pesticide pollution?

    g)　Define herbicide and give one example.

Q2) Attempt <u>any two</u> of the following :　　　　　　　　　　**[8]**

    a)　Explain the hazards of CO pollution.

    b)　Explain the ill effects of the oxides of nitrogen on humans .

    c)　Discuss global warming .

Q3) Write notes on <u>any two</u> of the following :　　　　　　　　**[8]**

    a)　Tannery wastes.

    b)　Reverse osmosis.

    c)　Dairy wastes.

Q4) Explain the working of the Imhoff tank

<div align="center">OR</div>

Discuss green house effect.　　　　　　　　　　　　　　**[8]**

<div align="center">⊠⊠⊠⊠</div>

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[3917]-244

S.Y. B.Sc. (Vocational)
BIOTECHNOLOGY
VOC. Biotech : 222 - Immunology
(Paper - II) (2008 Pattern) (Sem. - II)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:
  1) *All questions are compulsory.*
  2) *Figures to the right indicate full marks.*
  3) *All questions carry equal marks.*

Q1) Answer each of the following in 1-2 lines : **[10]**

  a) Define : Interferons.

  b) Enlist any two immunodiffusion techniques.

  c) Give the role of complement proteins in immunity.

  d) Describe the significance of IgE.

  e) What are primary lymphoid organs?

  f) Give atleast two types of cells involved in specific immune response?

  g) How are killed vaccines prepared?

  h) Describe adjurants with example.

  i) Which cells exhibit first line of defence in body?

  j) What is passive immunisation? Give one example.

Q2) Write short notes on any two of the following 8-10 lines : **[10]**

  a) Antibody structure.

  b) MHC complex.

  c) Primary lymphoid organs.

Q3) Attempt <u>any two</u> of the following 8-10 lines : **[10]**

  a) Comment on different classes of immunoglobulins.

  b) What is ELISA technique? Explain how it is qualitative and quantitative reaction.

  c) Add a note on clonal selection theory.

P.T.O.

Q4) What are vaccines? Write in detail the types of vaccines with example. **[10]**

OR

Describe the classical and alternative pathway of complement cascade in detail.

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S.Y. B.Sc. (Vocational)
COMPUTER HARDWARE AND NETWORK ADMINISTRATION
Computer System Management - II
(Paper - II) (New Course) (Sem. - II) (58722) (2008 Pattern)

Time : 2 Hours]   *[Max. Marks : 40*

Instructions to the candidates:
  1) *All questions are compulsory.*
  2) *Figures to the right indicate full marks.*

Q1) a)   Attempt the following :   **[4 × 1 = 4]**

  i)   What is a software?

  ii)   Define client-server.

  iii) Define Role of a DBA.

  iv)   What does U.S.B. stand for?

  b)   Attempt the following :   **[4 × 2 = 8]**

  i)   List different types of key boards.

  ii)   Explain the use of

  I)   Modem.
  II)   Hub.

  iii) How will you install a laser printer in Windows XP?

  iv)   What is a Black Berry device?

Q2) Attempt <u>any two</u> of the following :   **[2 × 4 = 8]**

  a)   Write a note on portable devices.

  b)   Give any four methods of Access control.

  c)   What are the WAN controls defined in operation management?

Q3) Attempt <u>any two</u> of the following :   **[2 × 4 = 8]**

  a)   List any four types of users. Explain their roles.

  b)   What is segregation of duties?

  c)   What is a change process?

Q4) Attempt <u>any two</u> of the following :   [2 × 6 = 12]

    a)   Explain the importance of operation management.

    b)   Give various steps involved in assembling a desktop P.C.

    c)   Give steps involved in installation of win 2003 server.

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