



[4018] – 404

**T.Y. B.Sc. (Semester – IV) (Computer Science) Examination, 2011**  
**CS – 344 : WEB DEVELOPMENT AND PHP PROGRAMMING – II**  
**(2008 Pattern) (Paper – IV)**

Time : 2 Hours

Total Marks : 40

- Instructions :* 1) *All questions are compulsory.*  
2) *All questions carry equal marks.*  
3) *Black figures to the right indicate full marks.*

1. Attempt **all** of the following : **(10×1=10)**

- a) What are the different place holders used in SQL query ?
- b) What is sequence in php ?
- c) State 24 bit colour representation.
- d) Explain the XML document structure.
- e) State the concept of SOAP.
- f) State differentiate between imagecreate ( ) and imagecreate truecolor ( ).
- g) List the feature of HTTP protocol.
- h) What is an Ajax ?
- i) How variables are declared in javascript ?
- j) How to define elements and attributes in XML ?

2. Attempt **any two** of the following : **(2×5=10)**

- a) Which are the different class methods and object methods available in PEAR DB Library ? Explain.
- b) Write php script to read image file name from user and display half size of the original image.
- c) What is DOM and how does it relate to XML ?

**P.T.O.**



3. Attempt **any two** of the following : **(2×5=10)**

a) Consider the following entities and their relationships.

Customer (cust\_no, name, address, city)

Account (acc\_no, acc\_type, balance)

Cust\_Acc (cust\_no, acc\_no, w\_amt, w\_date)

Write php script to accept customer name from user and print his transaction details in tabular format.

b) Explain how to send email through PHP with example.

c) Explain structure of SOAP XML – RPC Request.

4. Attempt **any one (A or B)** : **(1×10=10)**

A) i) Discuss three kinds of popup boxes in javascript.

ii) Write a php script to read item.xml file (contains itemno, description, Qty, rate) and print the bill in tabular format (apply simple XML)

B) i) Explain advantages of web services. **3**

ii) Explain any two windows object method in java script. **2**

iii) Write an AJAX program to search the book name according the character typed and display same list using array. **5**

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[4018] – 306

**T.Y. B.Sc. (Semester – III) Examination, 2011**  
**COMPUTER SCIENCE (Paper – VI)**  
**CS-336 : Object Oriented Software Engineering**  
**(2008 Pattern)**

Time : 2 Hours

Max. Marks : 40

- Instructions :* 1) *All questions are compulsory.*  
2) *Neat diagrams must be drawn whenever necessary.*  
3) *Black figures to the right indicate full marks.*

1. Attempt **all** of the following : **(10×1=10)**

- a) Define the object 'Bank Account' with possible attributes and operations with visibility.
- b) What is meant by organizing the object ?
- c) State any two kinds of relationship in the UML.
- d) What is purpose of use case view ?
- e) "It is possible to connect a class to itself" state true or false – Justify.
- f) Define Link Attributes.
- g) What is use of package diagram ?
- h) What is purpose of life line in sequence diagram ?
- i) Define Alpha testing.
- j) What are components of deployment diagram ?

2. Attempt **any two** of the following : **(2×5=10)**

- a) Differentiate between Aggregation and Generalization with suitable example.
- b) Explain Elaboration with some key ideas and best practices.
- c) Draw state chart diagram for stack implementation.

**P.T.O.**



3. Attempt **any two** of the following : **(2×5=10)**

- a) What is use of component diagram ? Explain it with suitable example.
- b) What is integration testing ? Explain roles of stub and driver.
- c) Prepare a class diagram for “Newspaper advertisement agency” consisting of at least three classes. Define appropriate relationship, association with multiplicity.

4. A) “Super Market” is well known super market in Pune. It has chain of several super markets in the state.

The Supermarket accepts payments in cash, “supermarkecard” or credit cards from various agencies such as ICICI, City Bank etc, customers using credit cards give the card at the time of purchase and sign the receipt once in week, the billing clerk prepares a statement and forwards it along with signed slips to the respective agencies. The agencies makes payments on statement to statement basis, sometime rejecting some of slips listed for irregularities. Customer having supermarket card have charge slips for certain amount of purchase. Each time purchase is done. The balance on the charge slip is updated and authorised. Some customers make purchase using either of the above mentioned facilities. Consider the above case and draw the following diagrams.

- i) Use case diagram **3**
  - ii) Sequence diagram. **4**
- B) Consider the above case and prepare activity diagram. **3**

OR

- B) Explain behavioral aspects of a collaborations. **3**



[4018] – 301

**T.Y. B.Sc. (Computer Science) (Semester – III) Examination, 2011  
(Paper – I)**

**CS – 331 : SYSTEM PROGRAMMING AND OPERATING SYSTEM – I  
(2008 Pattern) (New Syllabus)**

Time : 2 Hours

Max. Marks : 40

*Instructions :* 1) Figures to the **right** indicate **full** marks.  
2) **All** questions are **compulsory**.

1. Attempt **all** : **(10×1=10)**

- a) What is stream editor ?
- b) 'LTORG' is imperative statement of assembly language. Justify.
- c) Consider the following assembly language program segment.

```
START 200
MOVER AREG , = '5'
MOVEM AREG , A
STOP
A DS 1
END
```

What is the address allocated to literal = '5' ? Why ?

- d) List the expansion time statements of macro.
- e) If a macro call has both positional and keyword parameters, then all positional parameters should appear before keyword parameters. Justify.
- f) What do you mean by dynamic memory allocation ?
- g) What is p-code compiler ?
- h) If a program has translation ORIGIN as 300 and linked origin as 180, then the relocation factor is 180. Justify.
- i) What is an absolute loader ?
- j) Give schematic of pure and impure interpreter.

**P.T.O.**



2. Attempt **any two** :

(2×5=10)

- a) Explain the data structures used in assembler for handling literals with suitable example.
- b) Consider following macro.

```

MACRO
    CALC      &X, &Y, &OP = MULT, & LAB =
&LAB    MOVER  AREG , &X
        &OP    AREG , &Y
        MOVEM  AREG , &X
MEND
    
```

If the macro is called as

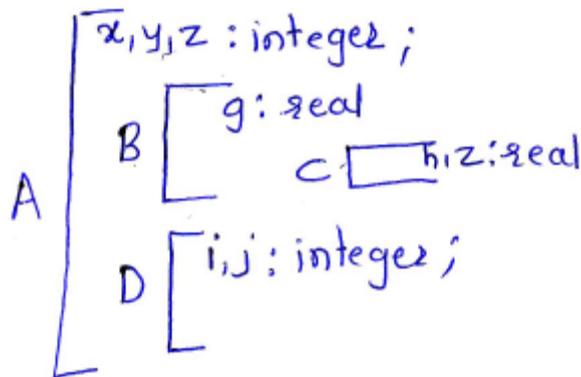
CALC A, B, LAB = LOOP, then show the contents of APTAB, PNTAB, SSNTAB, KPDTAB and MNT.

- c) Which phase of compiler involves scanner ? Explain various functions of scanner.

3. Attempt **any two** :

(2×5=10)

- a) What do you mean by an overlay ? Explain linking of overlays.
- b) Which type of memory allocation is used by a block structured language ? Consider the block structured program.



Construct the local and non-local variable scope for the blocks A, B, C, D.



c) What is code optimization ? Explain elimination of common subexpression and frequency reduction optimizing transformations with example.

4. Attempt either **A** or **B** :

**10**

A) a) Consider the following assembly language program segment.

```

START    100
READ     N
LOOP    MOVER  AREG ,N
        SUB    AREG , = '1'.
        BC    GT,  LOOP
        STOP
A       DS    1
        END

```

Instruction	Opcode	Assembly mnemonic	
00		STOP	<u>Declarative stmt</u>
01		READ	DS 01
02		MOVER	<u>Assembler directive</u>
03		SUB	START 01
04		BC	END 02

Write intermediate code form using variant I.

**4**

b) Speed of execution of program whose source program code contains macro is faster than the program containing subroutine. Justify.

**2**

c) Explain any two examples of system softwares in brief.

**2**



d) Consider the following expression. 2

$$a \uparrow b \uparrow c / f + g * (c + m)$$

Draw expression tree for the above expression.

OR

- B) a) Give the usage of each of the following statement with its syntax AIF, ANOP, LCL, SET. 4
- b) Single pass assembler requires more memory space during assembly than two pass assembler. Justify. 2
- c) What is debugger ? List any two facilities provided by debugger. 2
- d) State any two differences between static and dynamic memory allocation. 2

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[4018] – 302

T.Y. B.Sc. (Semester – III) Examination, 2011

Paper – II: COMPUTER SCIENCE

CS : 332 : Theoretical Computer Science and Compiler Construction – I  
(2008 Pattern)

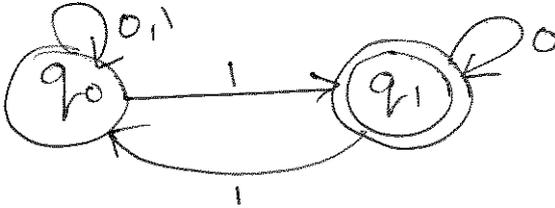
Time : 2 Hours

Max. Marks : 40

- N.B. :** i) All questions are compulsory.  
ii) Black figures to the right indicate full marks.  
iii) All questions carry equal marks.  
iv) Assume suitable data, if necessary.

1. Attempt **all** of the following : (1×10=10)

- a) Give an example of binary relation which is transitive and irreflexive.  
b) Show the output of  $\delta(q_0, 0010101)$  for following F.A.



- c) What will be the smallest possible string generated by regular expression  $(a+\epsilon)^*$ .  
d) List any two functions of FA other than lexical analysis.  
e) Describe the language accepted by R.E.  $((a+b)^*a)$ .  
f) Most of the programming language grammar is regular grammar. State true/false.  
g) Explain the following transition of PDA.  
 $(q_j, B) \in \delta(q_i, a, A)$ .  
h) What is the difference between PDA and FA ?  
i) Define recursively enumerable language.  
j) State the machines used for CSG and CFG.

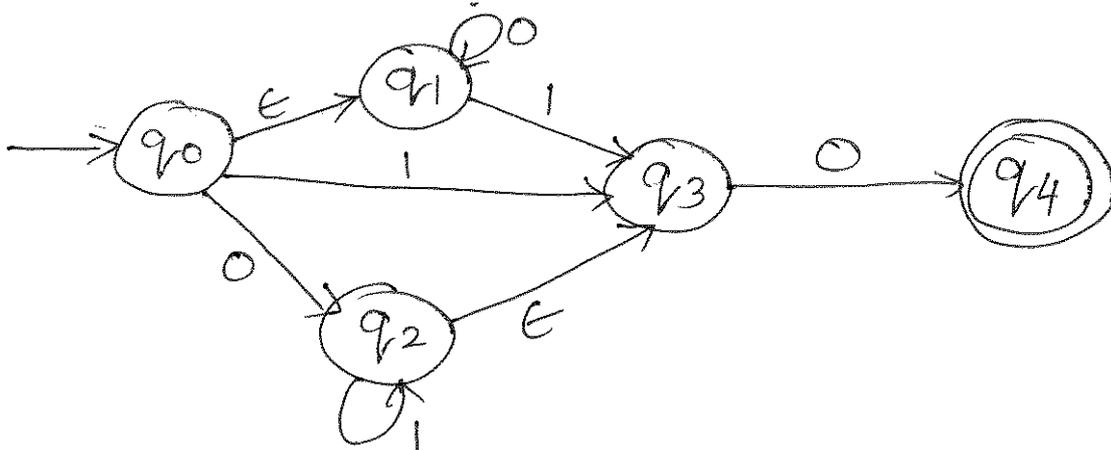
P.T.O.



2. Attempt **any two** :

(2×5=10)

- a) Construct DFA for a language over {0, 1} which accepts all strings that start with (1) and does not contain substring 101 in it.
- b) Construct DFA equivalent to given  $\epsilon$ -NFA.



c) Construct  $\epsilon$ -NFA for the following regular expression.

$$10 + (0 + 11) 01^*$$

3. Attempt **any two** :

(2×5=10)

a) Reconstruct the grammar after eliminating the useless and non-reachable symbols.

$$S \rightarrow ACH \mid BB$$

$$A \rightarrow aA \mid aF$$

$$B \rightarrow CFH \mid b$$

$$C \rightarrow aC \mid DH$$

$$D \rightarrow aD \mid BD \mid Ca$$

$$F \rightarrow bB \mid b$$

$$H \rightarrow dH \mid d$$

b) Construct PDA for the language  $L = \{a^m b^n c^{m-n} / m, n > 0\}$

c) Convert the following grammar to CNF.

$$G : S \rightarrow A \mid ABa \mid AbA$$

$$A \rightarrow Aa \mid \epsilon$$

$$B \rightarrow Bb \mid BC$$

$$C \rightarrow CB \mid CA \mid bB$$



4. A) Attempt **any two** (either A or B)

(2×5=10)

a) Convert the following grammar to GNF.

$$S \rightarrow AB$$

$$A \rightarrow BB \mid CC$$

$$B \rightarrow AD \mid CA$$

$$C \rightarrow a$$

$$D \rightarrow b$$

b) Prove that Halting problem of Turing Machine is unsolvable.

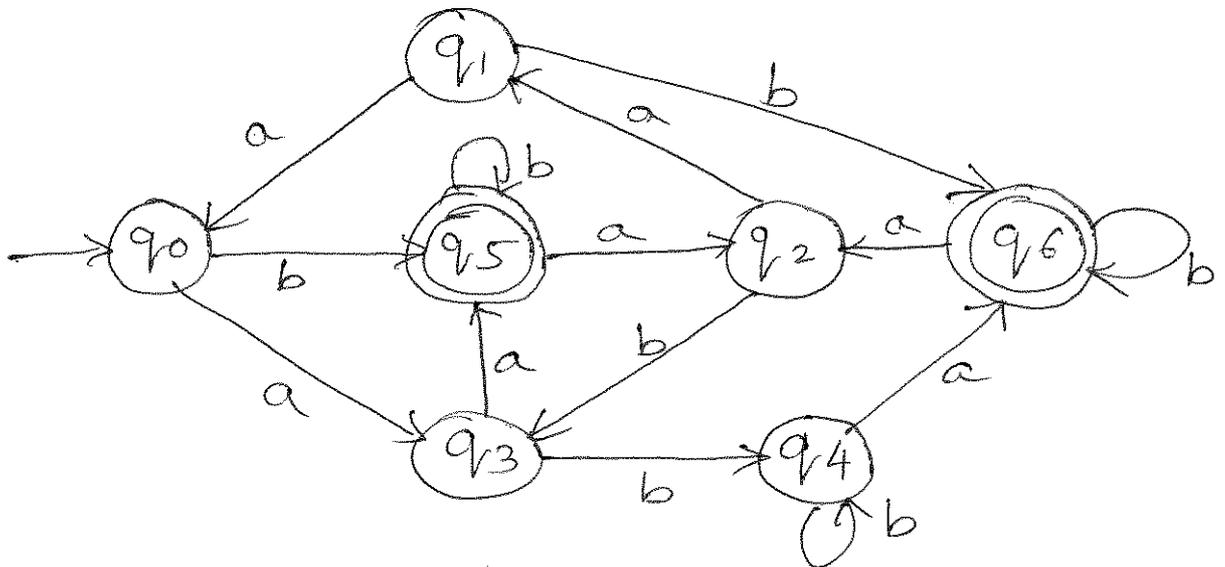
c) Construct a Moore machine to replace 110 by 101.

OR

B) Attempt **any two** :

(2×5=10)

a) Minimize the following F.A.



b) Design a Turing machine to accept

$$L = \{ \omega \mid \omega \in \{0,1\}^* \text{ having equal number of 0's and 1's.} \}$$

c) i) Show that  $L \{ a^P \mid P \text{ is prime} \}$  is not regular.

3

ii) Show that CFL's are closed under concatenation.

2



[4018] – 303

**T.Y. B.Sc. (Semester – III) Examination, 2011**  
**COMPUTER SCIENCE**  
**CS – 333 : Computer Networks – I**  
**(Paper – III) (New) (2008 Pattern)**

Time : 2 Hours

Max. Marks : 40

*N.B. : 1) All questions are compulsory.*  
*2) Figures to the right indicate full marks.*

1. Attempt **all** of the following : **(10×1=10)**

- a) Define Computer Network.
- b) Which topology requires a multipoint connection ?
- c) Which device operates at the network layer of the OSI model ?
- d) Define Line Coding.
- e) What is used in PPP for framing ?
- f) A seven bit even parity Hamming Code is received as 1100110. Find and correct the error if any.
- g) Define contention system.
- h) List any 2 random access methods for MAC.
- i) State the maximum and minimum ethernet frame length.
- j) What is multicasting ?

2. Attempt **any two** of the following : **(2×5=10)**

- a) Compare server based LAN and peer LAN.
- b) Explain the functions of Physical layer and Network layer of TCP/IP model.
- c) Draw the NRZ - Land Manchester encoding for following data stream :

01010101.

**P.T.O.**



3. Attempt **any two** of the following : (2×5=10)

- a) Compare frequency division multiplexing and time division multiplexing.
- b) What is pipe lining ? Explain any one protocol used for pipelining.
- c) Explain the factors affecting protocol efficiency.

4. Attempt **any one** of the following : (1×10=10)

I) a) Consider message 1101011011 and  $G(x) = x^4 + x + 1$  find CRC.

b) Write short note on Gigabit Ethernet.

OR

II) a) Explain CSMA/CD

b) Explain ISDN system architecture for home use.

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[4018] – 303

**T.Y. B.Sc. (Semester – III) Examination, 2011**  
**COMPUTER SCIENCE**  
**CS – 333 : Computer Networks – I**  
**(Paper – III) (New) (2008 Pattern)**

Time : 2 Hours

Max. Marks : 40

*N.B. : 1) All questions are compulsory.*  
*2) Figures to the right indicate full marks.*

1. Attempt **all** of the following : **(10×1=10)**

- a) Define Computer Network.
- b) Which topology requires a multipoint connection ?
- c) Which device operates at the network layer of the OSI model ?
- d) Define Line Coding.
- e) What is used in PPP for framing ?
- f) A seven bit even parity Hamming Code is received as 1100110. Find and correct the error if any.
- g) Define contention system.
- h) List any 2 random access methods for MAC.
- i) State the maximum and minimum ethernet frame length.
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2. Attempt **any two** of the following : **(2×5=10)**

- a) Compare server based LAN and peer LAN.
- b) Explain the functions of Physical layer and Network layer of TCP/IP model.
- c) Draw the NRZ - Land Manchester encoding for following data stream :

01010101.

**P.T.O.**



3. Attempt **any two** of the following : (2×5=10)

- a) Compare frequency division multiplexing and time division multiplexing.
- b) What is pipe lining ? Explain any one protocol used for pipelining.
- c) Explain the factors affecting protocol efficiency.

4. Attempt **any one** of the following : (1×10=10)

I) a) Consider message 1101011011 and  $G(x) = x^4 + x + 1$  find CRC.

b) Write short note on Gigabit Ethernet.

OR

II) a) Explain CSMA/CD

b) Explain ISDN system architecture for home use.

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[4018] – 304

**T.Y. B.Sc. (Semester – III) Examination, 2011**  
**(2008 Pattern)**  
**Paper – IV : COMPUTER SCIENCE**  
**CS-334 : Web Development and PHP Programming – I**

Time : 2 Hours

Max. Marks : 40

*Instructions: 1) All questions are compulsory.*  
*2) Figures to the right indicate full marks.*

1. Attempt **all** of the following : **(10×1=10)**

a) “Whole PHP code (script) is case sensitive”. Justify true or false.

b) Find output

```
<?php
    $a= “9 Lives.” –1;
    var-dump($a);
?>
```

c) Which operator is used to run the shell command ?

d) Which statement is not allowed in anonymous function ?

e) Why var-dump( ) is preferable over print-r( ) ?

f) Find output

```
<?php
    $marks=array (10, 20);
    $padded=array_pad ($marks, –6, 0);
    print_r ($padded);
?>
```

g) Which concept is used to examine an objects characteristics like name, parent class, properties and methods ?

h) Which function is used to separate filename from whole path ?

i) What is Apache ?

j) “HTTP is stateful protocol”. Justify. True/False.

P.T.O.



2. Attempt **any two** of the following : (2×5=10)

- a) What is string decomposition ? List string decomposing functions with their purpose, proper syntax and example.
- b) What is iterator ? List any four iterator functions and purpose.
- c) Write short note on sessions.

3. Attempt **any two** of the following : (2×5=10)

- a) What is inheritance ? Give proper example.
- b) Accept file name and directory name from user. Change the directory and delete given file. If file is not present give proper error message.
- c) What is output of given code and purpose of each line

<? php

    \$shape = “round”;

    \$a = array (“cover” ⇒ “bird”, “shape” ⇒ “rectangular”);

    extract (\$a, EXTR-PREFIX-ALL, “book”);

    echo “cover; \$book-cover, Book shape; \$book-shape, shape: \$shape”;

?>

4. Attempt **any one** (A or B) : 10

- A) i) Write a PHP script to accept user name and password from user. Create a function check ( ) if user name and password is present or not and also assign default value to user as superuser and return those values.
- ii) What is use of soundex( ) and metaphone ( ) ? Explain it with proper example.
- B) i) Write a PHP script to accept personal details of student (rno, name, class) on first page. On second page accept marks of six subjects (out of 100). On third page print marklist (rno, name, class, marks, total, percentage)
- ii) Explain ereg ( ) function. List and explain with example special characters used in regular expressions.

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[4018] – 305

**T.Y. B.Sc. (Computer Science) (Semester – III) Examination, 2011**  
**(Paper – V)**  
**CS-335 : PROGRAMMING IN JAVA – I**  
**(2008 Pattern)**

Time : 2 Hours

Max. Marks : 40

- Instructions :** 1) *Figures to the **right** indicate **full** marks.*  
2) *All questions are **compulsory**.*  
3) *Assume no syntax errors.*

1. Attempt **all** of the following : **(1×10=10)**

- a) How does string class differ from String Buffer Class ?
- b) When is the destroy ( ) method of the Applet class called ?
- c) State the use of javap. tool.
- d) Justify **True/false**  

We can overload the finalize ( ) method defined in a class.
- e) State any 2 methods of the Object Class that are declared as final.
- f) Write Java statement that opens a file for reading, writing and one can “jump around” in the file while accessing the file.
- g) Define-final class.
- h) What type of variables can be defined in an interface ?
- i) Differentiate between JScrollBar and JScrollPane components.
- j) State any 2 access specifiers used in java.

**P.T.O.**



2. Attempt **any two** of the following : **(2×5=10)**

- a) Write a program to design a frame having a text box and a label. As the user types characters in the text box simultaneously display these typed characters in the label. Your program should exit when user presses the 'X' button of the window.
- b) What is an Exception ? How is an exception handled ? Differentiate between throw and throws keywords.
- c) Write a java program that reads a text file and prints every n<sup>th</sup> character from the file. 'n' should be passed as a command line argument.

3. Attempt **any two** of the following : **(2×5=10)**

- a) Write a program that displays three concentric circles where ever the user clicks the mouse on a frame. The program must exit when user clicks 'X' on the frame.
- b) What is cloning ? Explain the method and interface used to create a clone.
- c) Write a program to copy a file to another. Use proper error handlers to handle run time exceptions. File names are passed as arguments form the command prompt.

4. Attempt **any one** of the following (A or B) : **(1×10=10)**

- A) 1) State the advantages that Java's Layout Managers provide over traditional windowing systems. Explain any two layouts provided by Swing. **5**
- 2) Write a program to accept a string and throw exceptions for following cases. **3**
- a) string contains numbers
  - b) string length is less than 5
  - c) string length is greater than 30.



3) Predict the output

2

```
Public class test {  
    Public static void main (string [ ] args) {  
        A a = new A ( );  
    } // end of main  
    {  
        system.out. println (“Z”) ; }  
    } // end of class  
class A extends B {  
    A ( ) { system. out. println (“A”) ; }  
    {system.out. println ( “X”) ; }  
} // end of class A  
class B  
{  
    B ( ) { system .out . print ( “B”) ; }  
    {system.out.print (“Y”); }  
} // B ends  
} // end of Test.
```

B) Explain any 5 methods of the InputStream.

1) Class

5

2) Write a program to copy one file to another by changing the case of each character read. That is, if a character read from the source file is in upper case, convert it to lower case and then write it to the destination file. Use proper error handling logic.

3



3) Predict the output

2

```
i) Public class Test {  
    Public static void main (string[ ] args) {  
        boolean [ ] [ ] x = new boolean [3] [ ];  
        x [0] = new boolean [1];  
        x [1] = new boolean [2];  
        x [2] = new boolean [3];  
        System. out. println (“x[2] [2] is ” + x [2] [2]) ;  
    }  
}
```

```
ii) Class Test {  
    Public static void main (string [ ] args) {  
        int [ ] x = { 1, 2, 3, 4};  
        int [ ] y = x ;  
        x = new int [2];  
        for (int i = 0; i < y.length; i ++)  
            System. out. println (y [i]);  
    }  
}
```



[4018] – 401

**T.Y. B.Sc. (Semester – IV) Examination, 2011**  
**COMPUTER SCIENCE (Paper – I)**  
**CS – 341 : System Programming and Operating System – II**  
**(2008 Pattern) (New)**

Time : 2 Hours

Max. Marks : 40

- Instructions :*
- 1) *All questions carry equal marks.*
  - 2) *All questions are compulsory.*
  - 3) *Neat diagrams must be drawn wherever necessary.*
  - 4) *Assume suitable data, if necessary.*

1. Attempt **all** of the following : **(1×10=10)**

- a) List out any two advantages of multiprocessor systems.
- b) Define : System program and application program.
- c) State the role of thread library.
- d) Define the terms : independent process and cooperating process.
- e) Give the diagrammatic representation for : Swapping of two processes using a disk as a backing store.
- f) Explain any two file operations.
- g) What is the role of “valid” and “invalid” bits in demand paging ?
- h) Define : Turnaround time.
- i) What is the role of Max and Need array used in Banker’s Algorithm ?
- j) Explain the role of wait ( ) and signal ( ) operations used in semaphores.

**P.T.O.**



2. Attempt **any two** of the following : (2×5=10)

- a) Consider the following set of processes, with the length of CPU burst time and arrival time in milliseconds.

Process	Burst time	Arrival time
P <sub>1</sub>	5	1.5
P <sub>2</sub>	1	0
P <sub>3</sub>	2	2
P <sub>4</sub>	4	3

Illustrate the execution of these processes using pre-emptive SJF CPU scheduling algorithm. Calculate average waiting time and average turn around time. Give the contents of Gantt chart.

- b) What is system call ? Explain all the system calls related to file management.
- c) What is the role of process scheduler ? Explain different types of scheduling queues.

3. Attempt **any two** of the following : (2×5=10)

- a) Write a note on segmentation hardware.
- b) Explain in detail, multilevel feedback queue scheduling.
- c) Consider the following sets P, R and E :

$$P = \{P_1, P_2, P_3\}$$

$$R = \{R_1, R_2, R_3, R_4\}$$

$$E = \{P_1 \rightarrow R_1, P_2 \rightarrow R_3, R_1 \rightarrow P_2, R_2 \rightarrow P_2, R_2 \rightarrow P_1\}$$

Also consider the following number of instances per resource type :

- i) One instance of resource type R<sub>1</sub> and R<sub>3</sub>.
- ii) Two instances of resource type R<sub>2</sub>.
- iii) Three instances of resource type R<sub>4</sub>.

Construct the Resource - allocation graph for the above problem. Check whether the system is in the deadlock.



4. Attempt **A** or **B** of the following :

A) i) Consider the following page reference string :

1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5

How many page faults would occur for the following page replacement algorithms :

a) LRV

b) FIFO

Assume three frames.

**5**

ii) Which three requirements must be satisfied while designing a solution to the critical section problem ? Explain each in detail.

**3**

iii) What is the role of mode bit ? State the values of mode bit for kernel and user.

**2**

B) i) Write a short note on deadlock prevention strategies.

**5**

ii) Explain the following multithreading models

a) One-to-one model

b) Many-to-many model.

**3**

iii) Give the diagrammatic representation of single-level directory. Also list out the disadvantages of single-level directory structure.

**2**



[4018] – 402

T.Y. B.Sc. (Semester – IV) Examination, 2011

COMPUTER SCIENCE (Paper – II)

CS : 342 : Theoretical Computer Science and Compiler Construction – II  
(2008 Pattern) (New Course)

Time : 2 Hours

Max. Marks : 40

- Instructions :** 1) Figures to the **right** indicate **full** marks.  
2) **All** questions carry **equal** marks.  
3) **All** questions are **compulsory**.

1. Attempt **all** of the following : **(10×1=10)**

- a) List any two functions of Scanner.
- b) The following grammar is operator precedence grammar. Comment and justify.  
$$S \rightarrow SRA \mid a|b$$
$$A \rightarrow c|d, R \rightarrow e|F$$
- c) What do you mean by attribute grammar ?
- d) What is handle pruning ?
- e) Loader is an example of translator. Justify.
- f) Give the advantages of bootstrapping.
- g) What is the use of input buffering ?
- h) What is the purpose of flow graph ?
- i) Define syntax directed definition.
- j) Show the syntax tree representation and directed acyclic graph representation for the following expression.

$$N = N + 20$$

2. Attempt **any two** of the following : **(2×5=10)**

- a) Check whether the given grammar is LL(1) or not.

$$S \rightarrow a \mid \wedge \mid (R)$$

$$R \rightarrow T$$

$$T \rightarrow S, T \mid a$$

P.T.O.



- b) For the input expression  $(2+3) * (3+4) n$  design SDD and draw annotated tree using following grammar.

$$L \rightarrow E$$

$$E \rightarrow E_1 + T \mid T$$

$$T \rightarrow T_1 * F \mid F$$

$$F \rightarrow (E) \mid \text{digit}$$

- c) What is LEX ? Write steps of execution of LEX program. Explain any three LEX library functions in brief.

3. Attempt **any two** of the following:

**(2×5=10)**

- a) Check whether the following grammar is SLR or not.

$$S \rightarrow A \text{ and } A \mid A \text{ or } A$$

$$A \rightarrow (S) \mid \text{id}$$

- b) What is local optimization ? Generate DAG for the following basic block :

$$a = b + c$$

$$b = a - d$$

$$c = b + c$$

$$d = a - b$$

At which node, is it possible to optimize the block using the DAG ?

- c) Write a short note on Dependency Graph.

4. Attempt the following :

- a) Check whether the given grammar is LR(1) or not :

**6**

$$S \rightarrow aAd$$

$$A \rightarrow bAb \mid b$$

OR

- a) 1) Differentiate between SLR and LR(1).

**3**

- 2) Construct a Recursive Descent Parser for the following CFG:

**3**

$$S \rightarrow aA \mid bB$$

$$A \rightarrow aA \mid b$$

$$B \rightarrow dB \mid b$$



b) Construct Operator Precedence Table for following grammar : **4**

$$S \rightarrow L = R \mid R$$

$$L \rightarrow * R \mid \text{id}$$

$$R \rightarrow L$$

OR

b) 1) Compute FIRST and FOLLOW of the following grammar : **3**

$$S \rightarrow a ABbCD \mid \epsilon$$

$$A \rightarrow Amd \mid \epsilon$$

$$B \rightarrow SAn \mid hn \mid \epsilon$$

$$C \rightarrow Sf \mid Cg$$

$$D \rightarrow aBD \mid \epsilon$$

2) State one difference between annotated parse tree and dependency graph. **1**

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[4018] – 402

T.Y. B.Sc. (Semester – IV) Examination, 2011

COMPUTER SCIENCE (Paper – II)

CS : 342 : Theoretical Computer Science and Compiler Construction – II  
(2008 Pattern) (New Course)

Time : 2 Hours

Max. Marks : 40

- Instructions :** 1) Figures to the **right** indicate **full** marks.  
2) **All** questions carry **equal** marks.  
3) **All** questions are **compulsory**.

1. Attempt **all** of the following : **(10×1=10)**

- a) List any two functions of Scanner.
- b) The following grammar is operator precedence grammar. Comment and justify.  
$$S \rightarrow SRA \mid a|b$$
$$A \rightarrow c|d, R \rightarrow e|F$$
- c) What do you mean by attribute grammar ?
- d) What is handle pruning ?
- e) Loader is an example of translator. Justify.
- f) Give the advantages of bootstrapping.
- g) What is the use of input buffering ?
- h) What is the purpose of flow graph ?
- i) Define syntax directed definition.
- j) Show the syntax tree representation and directed acyclic graph representation for the following expression.

$$N = N + 20$$

2. Attempt **any two** of the following : **(2×5=10)**

- a) Check whether the given grammar is LL(1) or not.

$$S \rightarrow a \mid \wedge \mid (R)$$

$$R \rightarrow T$$

$$T \rightarrow S, T \mid a$$

P.T.O.



- b) For the input expression  $(2+3) * (3+4) n$  design SDD and draw annotated tree using following grammar.

$$L \rightarrow E$$

$$E \rightarrow E_1 + T \mid T$$

$$T \rightarrow T_1 * F \mid F$$

$$F \rightarrow (E) \mid \text{digit}$$

- c) What is LEX ? Write steps of execution of LEX program. Explain any three LEX library functions in brief.

3. Attempt **any two** of the following:

(2×5=10)

- a) Check whether the following grammar is SLR or not.

$$S \rightarrow A \text{ and } A \mid A \text{ or } A$$

$$A \rightarrow (S) \mid \text{id}$$

- b) What is local optimization ? Generate DAG for the following basic block :

$$a = b + c$$

$$b = a - d$$

$$c = b + c$$

$$d = a - b$$

At which node, is it possible to optimize the block using the DAG ?

- c) Write a short note on Dependency Graph.

4. Attempt the following :

- a) Check whether the given grammar is LR(1) or not :

6

$$S \rightarrow aAd$$

$$A \rightarrow bAb \mid b$$

OR

- a) 1) Differentiate between SLR and LR(1).

3

- 2) Construct a Recursive Descent Parser for the following CFG:

3

$$S \rightarrow aA \mid bB$$

$$A \rightarrow aA \mid b$$

$$B \rightarrow dB \mid b$$



b) Construct Operator Precedence Table for following grammar : **4**

$$S \rightarrow L = R \mid R$$

$$L \rightarrow * R \mid \text{id}$$

$$R \rightarrow L$$

OR

b) 1) Compute FIRST and FOLLOW of the following grammar : **3**

$$S \rightarrow a ABbCD \mid \epsilon$$

$$A \rightarrow Amd \mid \epsilon$$

$$B \rightarrow SAn \mid hn \mid \epsilon$$

$$C \rightarrow Sf \mid Cg$$

$$D \rightarrow aBD \mid \epsilon$$

2) State one difference between annotated parse tree and dependency graph. **1**

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[4018] – 403

**T.Y. B.Sc. (Semester – IV) Examination, 2011**  
**COMPUTER SCIENCE (Paper – III)**  
**CS – 343 : Computer Networks – II**  
**(2008 Pattern)**

Time : 2 Hours

Max. Marks : 40

*N.B. : 1) All questions are compulsory.*  
*2) Figures to the right indicate full marks.*

1. Attempt **all** of the following : **(10×1=10)**

- a) BSS without AP is called as adhoc architecture. Justify.
- b) A packet has arrived with a M bit value of 1. Is this the first fragment, the last fragment or middle ?
- c) “Physical address of a computer can change”. Comment.
- d) By using substitution cipher transform the message “difference between random access protocol with controlled access protocol”. Key is ‘4’.
- e) Explain socket address.
- f) List the types of user agent.
- g) What is passive hub ?
- h) Give any two differences between piconet and scatternet.
- i) The value of the total length field in an IPV<sub>4</sub> datagram is 36 and the value of the header length field is 5. How many bytes of data is the packet carrying ?
- j) Why MIME protocol is required ?

**P.T.O.**



2. Attempt **any two** of the following : (2×5=10)

- a) What are backbone networks ? Explain any two backbone networks.
- b) Explain recursive, iterative resolution and caching used in DNS.
- c) For the given IP address 205.16.37.39/28 in some block of addresses calculate :
  - a) Address mask
  - b) First address of the block
  - c) Last address of the block
  - d) Number of address in the block

3. Attempt **any two** of the following : (2×5=10)

- a) Why network address translation is needed ? How it is implemented ?
- b) Discuss four different cases requires the services of ARP.
- c) Explain three sections used in UDP checksum. Which common concepts are used in UDP operation ?

4. Attempt **any one** of the following (I or II) : (1×10=10)

I) a) By using transposition cipher convert the following :

Plain text : “ Please transfer one million dollar to my Swiss bank account six two two”.

Key : MEGABUCK.

b) Explain HTTP request and response messages.

II) a) Discuss classfull addressing in detail.

b) What is cryptography ? Explain two fundamental cryptographic principles.

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[4018] – 405

**T.Y. B.Sc. (Semester – IV) Examination, 2011**  
**COMPUTER SCIENCE (Paper – V)**  
**CS-345 : Programming in Java – II**  
**2008 Pattern (New)**

Duration : 2 Hours

Max. Marks : 40

1. Attempt **all** of the following : **(1×10=10)**

- a) List any 4 methods of the Font class.
- b) Explain the purpose of join method in the context of threads.
- c) What is an iterator ?
- d) List the types of JDBC drivers.
- e) How can the values of multi-valued parameters be fetched in a servlet ?
- f) What is a java bean ?
- g) Define the term socket.
- h) Write the syntax of comments in JSP.
- i) List the statement types for executing SQL queries.
- j) Which methods are used to obtain and store information from HttpSession object ?

2. Attempt **any two** of the following : **(2×5=10)**

- a) Write a multithreaded program to create 2 threads. One thread should infinitely display the message as “welcome” while other thread should infinitely display the message “Goodbye”. Synchronize the execution of these threads. So that the messages are displayed alternately.
- b) Explain the ResultSetMetaData and DatabaseMetaData with suitable example.
- c) Create a client socket which sends a number to the server. The server socket returns the sum of digits of the number if the number is positive, otherwise it sends an error message and closes the connection.

P.T.O.



3. Attempt **any two** of the following : **(2×5=10)**
- a) Write a program to read 10 strings from console and add them in a collection. The strings should be stored in the collection in the descending order. Display the elements of the collection using iterator.
  - b) Explain Servlet lifecycle.
  - c) Explain the following terms in context of JSP.
    - i) scriptlets
    - ii) expression.

4. Attempt **any one** of the following : **(A or B)** **(1×10=10)**
- A) 1) Write a program to draw a rectangle having height 100 and width 200 with red color. Display a message in the centre of the rectangle. **4**
- 2) What are the Resultset type ? **4**
- 3) List the various interforces in the collection framework. **2**
- B) 1) Explain the thread lifecycle. **4**
- 2) What is a cookie ? Explain how a cookie can be created and accessed in a servlet ? **4**
- 3) What are the important features of java beans ? **2**

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[4018] – 406

**T.Y.B.Sc. (Computer Science) (Semester – IV) Examination, 2011**  
**CS – 346 : BUSINESS APPLICATIONS (Paper – VI)**  
**(2008 Pattern)**

Time : 2 Hours

Max. Marks : 40

*Instructions: 1) Neat diagrams must be drawn wherever necessary.*  
*2) Black figures to the right indicate full marks.*  
*3) All questions are compulsory.*

1. Attempt **all** of the following : **(1×10=10)**
- a) Give benefits of market segments.
  - b) Define quotation.
  - c) What is the objective of performance appraisal ?
  - d) What is mean by internal sources of Recruitment ?
  - e) Give any two objectives of Material Requirement planning.
  - f) Define Direct Material.
  - g) What is lead time ?
  - h) What is mean by nominee ?
  - i) Give any two methodologies of six sigma
  - j) What is KPO ?
2. Attempt **any two** of the following : **(2×5=10)**
- a) Explain functions of Manpower Planning.
  - b) What is E-banking ? Explain 3 types of internet banking products based on levels of access granted.
  - c) What is ERP ? Explain different modules of ERP.

**P.T.O.**



3. Attempt **any two** of the following : (2×5=10)

- a) What is Sales Management ? Explain its functions in detail.
- b) List any four biometric devices and give benefits of biometric supported ATM.
- c) Give any five features of TQM.

4. Attempt the following :

- a) “Mahindra & Mahindra” is a vehicle manufacturing company having branches at Kandivali, Igatpuri and Nashik in Maharashtra. At each location around 500 employees are working. There is no scope for expansion of the company due to non-availability of space and political issues. Many other states offering the company a good package, providing a large space and other required facilities. Hence company has decided to start a new plant in other state, by minimizing the strength of each existing plant by 25%. Due to this many existing employees may have a chance of losing their jobs.

These employees are company’s assets and would not want to lose their skilled manpower. Company wants to adjust them to the new plant.

Suggest a suitable business process model that can be used for recruitments at new plant. To specify a business process :

- a) Suggest main processes using any diagram. 2
- b) Suggest atleast 3 input documents in detail. 3
- c) Suggest atleast 2 report layouts in detail. 2
- b) Give the report layout structure of “purchase order”. 3

OR

- b) A company is having main office at Mumbai which controls the sale of their product in south, east, west and north zone. At the end of each financial year they collect the information of targeted sale and actual sale from each zone. Define a structure for the report (textual or graphical) which represents the sales analysis at four zones. 3



[4018] – 801

**T.Y. B.Sc. (Semester – IV) Examination, 2011**  
**COMPUTER SCIENCE (Paper – I)**  
**CS – 341 : System Programming – II**  
**(2004 Pattern)**

Time : 2 Hours

Max. Marks : 40

- N.B. :*
- 1) *All questions are compulsory.*
  - 2) *All questions carry equal marks.*
  - 3) *Figures to the right indicate full marks.*
  - 4) *Write readable answers.*

1. Attempt **all** of the following : **(10×1=10)**
- i) Define Kernel.
  - ii) Give four different file management system calls.
  - iii) “Any executable file on a disk is called as a process” True/False – Justify.
  - iv) “Although SJF is optimal, it cannot be implemented at the level of short term CPU scheduling” True/False – Justify.
  - v) What is deadlock ?
  - vi) Define ‘Reentrant Code’.
  - vii) Give any two advantages of virtual memory.
  - viii) What is the difference between buffer and cache ?
  - ix) Explain Thrashing.
  - x) List any four ways of defining the logical structure of directory.

**P.T.O.**





4. Attempt **any one** of the following (**A** or **B**) : **(1×10=10)**

A) **Each** subquestion carries **2** marks.

- i) List and explain in brief any 4 services of operating system.
- ii) What is the drawback of priority scheduling ? Give solution to it.
- iii) Consider logical address space of 4 pages of 512 words each, physical memory is of 16 frames. Answer the following :
  - a) How many bits are in logical address ?
  - b) How many bits are in physical address ?
- iv) Write a short note on PCB.
- v) Define short term scheduler with queuing diagram.

B) i) Explain linked allocation and indexed allocation methods for files. **4**

ii) Define external and internal fragmentation. Also explain compaction. **4**

iii) “In unsafe state system is always in deadlock” True/False – Justify. **2**

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[4018] – 802

**T.Y. B.Sc. (Semester – IV) Examination, 2011**  
**Computer Science (Paper– II)**  
**CS – 342 : THEORETICAL COMPUTER SCIENCE AND**  
**COMPILER CONSTRUCTION – II**  
**(2004 Pattern)**

Time : 2 Hours

Max. Marks : 40

- Instructions :*
- 1) *Neat diagrams must be drawn wherever necessary.*
  - 2) *Black figures to the right indicate full marks.*
  - 3) *All questions carry equal marks.*
  - 4) *All questions are compulsory.*

1. Attempt **all** of the following :

**10**

- 1) Which actions are taken by Turing machine in one movement of Read/write head ?
- 2) Find *l*-value and *r*-value for following expression  
int &(\*z);
- 3) What do you mean by loop invariant computation ?
- 4) List phases of compiler in sequence.
- 5) LR parsers do not have left recursion : Justify.
- 6) All regular languages are not accepted by Turing machine, comment.
- 7) State rules to remove left recursion from context free grammar.
- 8) Define Augmented grammar with example.
- 9) State rules to find LEADING (A), where A is a non-terminal.
- 10) Shift -shift conflict can occur in LR parsers : Justify.

**P.T.O.**



2. Attempt **any two** of the following.

**10**

a) Check using pumping lemma, if the following language is context free or not

$$L = \{a^n b^m c^n d^m \mid m, n \geq 1\}.$$

b) Construct Turing machine for the language

$$L = \{a^n b^m c^{m+n} \mid m, n \geq 1\}$$

c) Check if following grammar is LL(1) or not ?

$$S \rightarrow ScB \mid cA$$

$$A \rightarrow AaB \mid B$$

$$B \rightarrow bB \mid \epsilon$$

3. Attempt **any two** of the following .

**10**

a) Check if following grammar is SLR or not ?

$$S \rightarrow B$$

$$B \rightarrow bDAe$$

$$D \rightarrow Ddm \mid \epsilon$$

$$A \rightarrow AmP \mid P$$

$$P \rightarrow B \mid a$$

b) Check if following grammar is LR(1) or not ?

$$P \rightarrow Q0 \mid 1Q2 \mid R_2 \mid 1RO$$

$$Q \rightarrow 3$$

$$R \rightarrow 2$$

c) Write a lex program to print no. of vowels and consonants in each line of a input text string.



4. Attempt **all** of the following :

a) Check if the following grammar is LALR or not ? **6**

$$S \rightarrow 0A3 | 1B3 | 0B4 | 1A4$$

$$A \rightarrow 2$$

$$B \rightarrow 2$$

b) Find out FIRST and FOLLOW for all non-terminals in the following grammar. **4**

$$S \rightarrow aABbCD \mid \epsilon$$

$$A \rightarrow A'$$

$$A' \rightarrow mdA' \mid \epsilon$$

$$B \rightarrow SAn \mid hn \mid \epsilon$$

$$C \rightarrow SfC'$$

$$C' \rightarrow gC'$$

$$D \rightarrow aBD \mid \epsilon$$

OR

b) Write Pseudo code for keywords 'if' and 'else' of 'C' language. **4**

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[4018] – 803

**T.Y. B.Sc. (Computer Science) (Semester – IV) Examination, 2011**  
**CS-343 : COMPUTER NETWORKS AND NETWORK**  
**ADMINISTRATION – II**  
**(2004 Pattern)**

Time : 2 Hours

Max. Marks : 40

- N.B.:* 1) *All questions are compulsory.*  
2) *Figures to the right indicate full marks.*  
3) *Draw neat and well labeled diagram wherever necessary.*

1. Answer the following : **(1×10=10)**

- a) Define nonadaptive routing algorithm.
- b) What is built in group ?
- c) Define Packet shiffer.
- d) What is online backup ?
- e) What is Fragmentation ?
- f) Define multiple login.
- g) Write any two difference between hubs and repeater.
- h) List the contents of response message of HTTP.
- i) Find Class, Netid, Hostid of following IP address 127.18.53.72.
- j) How address resolution problem affects network performance ?

2. Attempt **any two** of the following : **(2×5=10)**

- a) What is congestion ? What is mean by open loop and closed loop solutions ?
- b) Explain different methods used in HTTP.
- c) What is RAID ? Explain different RAID levels.

P.T.O.



3. Attempt **any two** of the following : **(2×5=10)**

- a) What is network administration ? Explain different types of accounts on network.
- b) Draw and explain frame format of IP. Why IP is called as best effort delivery protocol ?
- c) What is bridge ? Explain working of bridge.

4. Attempt **any one (I or II)** : **10**

- I) a) Distinguish in detail between virtual circuit and datagram subnet.
- b) Explain sending and receiving buffer and bytes and segment service of TCP.

II) a) Explain how Ping and Traceroute is useful for network administration.

b) Write a short note on :

- 1) Router
- 2) Redundent disk storage.

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[4018] – 804

**T.Y. B.Sc. (Semester – IV) Examination, 2011**  
**COMPUTER SCIENCE (Paper – IV)**  
**CS-344 : Server Databases and Application Development – II**  
**(2004 Pattern)**

Time : 2 Hours

Max. Marks : 40

- Instructions :** 1) All questions are compulsory.  
2) Black figures to the **right** indicate **full** marks.  
3) Neat diagrams must be drawn **wherever** necessary.

1. Attempt **all** of the following : **(10×1=10)**

- a) Php is an embedded language-comment.
- b) Define lexical structure.
- c) State any two sorting functions of associative array.
- d) Write full syntax of function which inserts and delete elements in an array.
- e) What are advantages of var-dump ( ) function ?
- f) State the purpose of ereg ( ) function.
- g) What is variable parameter function ?
- h) Write in short serialization.
- i) State the difference between get and post methods.
- j) Explain how to determine the size of file.

2. Attempt **any two** of the following : **(2×5=10)**

- a) Explain any five iterator function.
- b) Write notes on :
  - i) strtok ( )
  - ii) explode ( )
- c) What is lambda function ? Explain in detail with suitable example.

**P.T.O.**



3. Attempt **any two** of the following : **(2×5=10)**

- a) Write a php script to accept filename from user and upload the same file at specific location.
- b) Explain the introspection with suitable example.
- c) Write a php script to push a string character by character onto a stack and count number of times 'A' character occurred and also display content of stack on pop.

4. Attempt **any two** of the following : **(2×5=10)**

- a) Consider the following relational database company (cno, cname, region, state)  
Branches (bcode, bname, city, cno)

Write a php script to accept state name from user and print companyname and branchname and same state.

- b) Write a note on sticky form with suitable form.
- c) Write a php script to create a file substr.abc which contains function substr\_occur ( ) to check whether second string is in first string or not. Call same function in program substr. php.

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[4018] – 805

**T.Y. B.Sc. (Semester – IV) Examination, 2011**  
**COMPUTER SCIENCE**  
**CS - 345 : Programming in Advanced Java – II**  
**(2004 Pattern)**

Time : 2 Hours

Max. Marks : 40

**Instructions :** 1) *All questions are compulsory.*  
2) *Black figures to the right indicate full marks.*  
3) *All questions carry equal marks.*

1. Attempt **all** of the following : **(10×1=10)**
- a) Serialization makes the object persistence. Justify.
  - b) State any two methods of vector class.
  - c) Explain the significance of prepared statement.
  - d) What is the use of SetAutoCommit() ?
  - e) State the methods of GenericServlet class.
  - f) State three methods used for session tracking.
  - g) What is the difference between suspending a thread and stopping a thread ?
  - h) What is the use of notifyAll( ) method ?
  - i) What is the purpose of JAR files ?
  - j) State any two classes of java.rmi package.
2. Attempt **any two** : **(5×2=10)**
- a) Explain JSP directives with proper syntax.
  - b) Explain RMI architecture.
  - c) What is Java Servlet ? How web servers handle Http request for servlet ?  
State the advantages of servlet.

**P.T.O.**



3. Attempt **any two**: **(5×2=10)**

- a) Write JDBC program that insert the following details to book table.  
bookid, bookname, authorname, publisher. The program will also display number of columns and label of column.
- b) Write a multithreaded program to create threads, and use wait and notify methods to handle these threads.
- c) Write a java program to accept names of cities insert into arraylist and display the contents of arraylist in sorted order.

4. Attempt **any two** : **(5×2=10)**

- a) Write a servlet program to accept the details of client as client name , password and panid. Write a cookie which stores panid.
- b) Write a servlet program to get the following information about the server.
  - name of server
  - server port
  - server version
- c) Write a java program to create main thread and child thread using thread and runnable both.

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[4018] – 806

**T.Y. B.Sc. (Semester – IV) Examination, 2011**  
**COMPUTER SCIENCE**  
**CS – 346 : Software Engineering – II**  
**(2004 Pattern)**

Time : 2 Hours

Max. Marks : 40

- Instructions :*
- 1) *All questions are compulsory.*
  - 2) *Neat diagrams must be drawn wherever necessary.*
  - 3) *Black figures to the **right** indicate **full** marks.*

1. Attempt **all** of the following : **(1×10=10)**

- a) What are the two main pieces of information that are to be collected about each data element ?
- b) What is stress testing ?
- c) Differentiate between alpha and beta testing.
- d) What is the main drawback of the traditional implementation ?
- e) Versions of the system are possible in top down incremental implementation approach. State True / False and justify.
- f) Give any 2 controlling factors of maintenance.
- g) Write a short note on perfective maintenance.
- h) List out any two characteristics of KPA.
- i) Give any two aspects of software product where quality factor focuses on.
- j) Which organization's product is the WinRunner tool ?

2. Attempt **any two** of the following : **(2×5=10)**

- a) Differentiate between static and dynamic analysis CASE tools.
- b) Explain the importance of training. Differentiate between In-service and In-house training methods.
- c) Explain the side effects of maintenance.

**P.T.O.**



3. Attempt **any two** of the following : **(2×5=10)**

- a) Differentiate between black box testing and white box testing.
- b) Explain any five weaknesses of the CASE tool.
- c) Explain five process maturity levels of software engineering practices.

4. Attempt the following :

- a) A city hospital has just implemented its new system which caters to the needs of billing, information about doctors, patients, medicines etc.

Assume that the life of the system is 15 years, what are the different maintenance activities which are to be done from the day one of its operation to 15 years and beyond 15 years.

Choose any one of the module and give two examples for each different maintenance activity.

**6**

- b) Set the system boundaries for 'Library System'. Show which part is done manually, in batch, on-line and real-time.

**4**

OR

Explain the following :

- i) Quality Control
- ii) Quality Assurance.

**4**