

Total No. of Questions :8]

SEAT No. :

P1801

[Total No. of Pages :3

[5233] - 1001

M.Sc.

COMPUTER SCIENCE

CS-101: Principles of Programming Languages

(2013 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Figures to the right indicate full marks.*
- 2) *Neat diagram must be drawn whenever necessary.*
- 3) *Attempt any five questions.*
- 4) *All questions carry equal marks.*
- 5) *Assume suitable data, if necessary.*

Q1) Attempt ALL of the following:

[4+4+2=10]

- a) Object lifetimes correspond to one of three principal storage allocation mechanisms. List all three mechanisms and explain any one in detail.
- b) What is *short-circuit* Boolean evaluation? Why is it useful?
- c) Name any two languages in each of the following categories: von-neumann and logical.

Q2) Attempt ALL of the following:

[4+4+2=10]

- a) Define and explain with example, free union, and discriminated union.
- b) Define
 - i) fixed stack-dynamic array
 - ii) stack-dynamic array
 - iii) fixed heap-dynamic array
 - iv) heap-dynamic arrayWhat are the advantages of each?
- c) What is the difference between compiler and pre-processor?

P.T.O.

Q3) Attempt ALL of the following: **[4+4+2=10]**

- a) What is dangling reference? Explain tombstone and lock-and-keys approach.
- b) Define
 - i) static chain
 - ii) static_depth
 - iii) nesting_depth
 - iv) chain_offset.
- c) What is calling sequence?

Q4) Attempt ALL of the following: **[4+4+2=10]**

- a) What is the difference between a *value* model of variables and a *reference* model of variables?
- b) Describe the logical architecture of an SIMD computer. What level of program concurrency is best supported by SIMD computers?
- c) Describe the three string length options.

Q5) Attempt ALL of the following: **[4+4+2=10]**

- a) Explain the significance of the “this” parameter in object-oriented languages.
- b) Explain shared and replicated inheritance.
- c) What is l-value and r-value?

Q6) Attempt ALL of the following: **[4+4+2=10]**

- a) Write a LISP program to count total no of top-level elements in a list (Eg. (count '(1 (2 3) 4 5)) o/p: 4)
- b) Write a prolog program to find factorial of a number.
- c) What is tail-recursion?

Q7) Attempt ALL of the following:

[5+5=10]

- a) Consider the following pseudocode.

```
x: integer — global
procedure set x(n : integer)
```

```
    x := n
```

```
procedure print x
```

```
    write integer(x)
```

```
procedure first
```

```
    set x(1)
```

```
    print x
```

```
procedure second
```

```
    x : integer
```

```
    set x(2)
```

```
    print x
```

```
set x(0)
```

```
first()
```

```
print x
```

```
second()
```

```
print x
```

What does this program print if the language uses static scoping? What does it print with dynamic scoping?

- b) What is semaphore? What are the disadvantages of semaphore in cooperation synchronization and in competition synchronization.

Q8) Attempt ALL of the following:

[5+5=10]

- a) Write a LISP program to compute m^n (Eg. (power 3 4) o/p:81).

- b) Consider the following sentences.

John likes all animals. Cat, bird, dog and snake are animals. Write a prolog program such that goal: likes (john, snake) return /false, whereas for other animal it will return true.

EEE

Total No. of Questions :8]

SEAT No. :

P1802

[5233]-1002

[Total No. of Pages : 3

M.Sc.

COMPUTER SCIENCE

**CS - 102 : Advanced Networking
(2013 Pattern) (Semester - I)**

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) Attempt any five questions from the given eight questions.*
- 2) Neat diagram must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Attempt all of the following-

- a) How does firewall performs Network address Translation? **[4]**
- b) Explain SIP. Is there any drawback to prevent using SIP for video? Justify. **[4]**
- c) What is Initialization vector (IV)? What is its significance? **[2]**

Q2) Attempt all of the following-

- a) Design a Caesar cipher scheme to codify the message by replacing each alphabet with an alphabet two places down the line. Obtain the cipher text for the given plaintext. Plain text: NETWORK MANAGEMENT. **[4]**
- b) Explain any one email security protocol. **[4]**
- c) Why CSMA/CD is not used in gigabit ethernet. **[2]**

Q3) Attempt all of the following-

- a) Explain four types of error handled by ICMPv6. **[4]**
- b) Explain the working of Kerberos. **[4]**
- c) Explain in brief : A firewall. **[2]**

P.T.O.

Q4) Attempt all of the following-

- a) What is Frame Relay? Discuss its advantages. [4]
- b) Explain the structure of a router. [4]
- c) What is the problem with smart cards if large data needs to be processed? [2]

Q5) Attempt all of the following:

- a) Explain the four characteristics of real time audio - video communication. [4]
- b) Consider the following routing table for router R1. [4]

Mask	Network Address	Next - Hop	Interface
/26	180.70.165.192	-	m ₂
/25	180.70.65.128	-	m ₀
/24	201.4.22.0	-	m ₃
/22	201.4.16.0	-	m ₁
Default	Default	180.70.65.200	m ₂

- i) Show the forwarding process if a packet arrives at R₁ with destination address 201.4.22.40.
- ii) Show the forwarding process if a packet arrives at R₁ with destination address 20.24.30.75.
- c) What is key wrapping? How it is useful? [2]

Q6) Attempt all of the following:

- a) What is the purpose of RTCP? Discuss its messages. [4]
- b) Given two prime numbers P=17 and Q = 29. Find out N, E & D in RSA encryption process. [4]
- \ c) What is DNS spoofing? [2]

Q7) Attempt all of the following:

- a) Explain in detail services provided by UDP & TCP. [5]
- b) Compare ICMPv4 and ICMPv6. [5]

Q8) Attempt all of the following:

- a) Explain the steps in various rounds of AES. [5]
- b) Write a short note on key management in IPsec. [5]



Total No. of Questions : 8]

SEAT No. :

P1803

[Total No. of Pages : 4

[5233] - 1003

M. Sc. (Computer Science)
CS - 103 : DISTRIBUTED DATABASE
CONCEPTS
(2013 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *Attempt any five out of eight questions.*
- 2) *Figures to the right indicate full marks.*
- 3) *All questions carry equal marks.*

Q1) Answer the following:

- a) What is the need of Distribution? What are the advantages of Distribution? [4]
- b) List and explain in brief any four characteristics of query processor. [4]
- c) Define [2]
 - i) Linear tree
 - ii) Bushy tree

Q2) Answer the following:

- a) Write short note on : Peer-to-peer Architecture. [4]
- b) Consider the following relations [4]

Item (Item_no, Item_name, Rate, Quantity, S_no)

Supplier (S-no, S_name, S_address, S_city)

Item relation is fragmented as

Item1 = $\sigma_{\text{rate} < 500}$ (Item)

Item2 = $\sigma_{\text{rate} \geq 500 \text{ and rate} < 2000}$ (Item)

Item3 = $\sigma_{\text{rate} \geq 2000}$ (Item)

P.T.O.

Supplier relation is fragmented as

$$\text{Supplier1} = \sigma_{S_city = \text{“Pune”}}(\text{Supplier})$$

$$\text{Supplier2} = \sigma_{S_city \neq \text{“Pune”}}(\text{Supplier})$$

Draw join graph between the fragments of Item and Supplier. Is this graph simple? If not how it can be converted to simple join graph?

c) Define [2]

- i) Two-step transaction
- ii) Restricted transaction

Q3) Answer the following

- a) Let $Q = \{q_1, q_2, q_3\}$ be a set of queries, $A = \{A_1, A_2, A_3\}$ be a set of attributes, and $S = \{S_1, S_2, S_3\}$ be a set of sites. The matrix X describes the attribute usage values and the matrix Y gives application access frequencies. Assume that $ref_i(q_k) = 1$ for all q_k and S_i and that A_1 is the key attribute. Use Bond Energy and vertical partitioning algorithms to obtain a vertical fragmentation of attributes in the set A. [4]

	A_1	A_2	A_3		S_1	S_2	S_3	
q_1	1	1	0		q_1	2	30	5
q_2	1	0	1		q_2	28	0	22
q_3	1	0	0		q_3	33	35	4
	X				Y			

- b) Which are different search strategies used by query optimizer? State advantages and disadvantages of each of the method. [4]
- c) Draw an operator tree for the following query [2]

Select e_name

From emp, dept

Where emp.dno = dept.dno and emp.age > 40

and dept.location = “Mumbai” and emp.salary > 30000

Q4) Answer the following

- a) Consider the following query [4]
- ```

Select e_name
From employee, project
Where employee.pno = project.pno and project.dept = "Finance"
and employee.designation = "Manager"

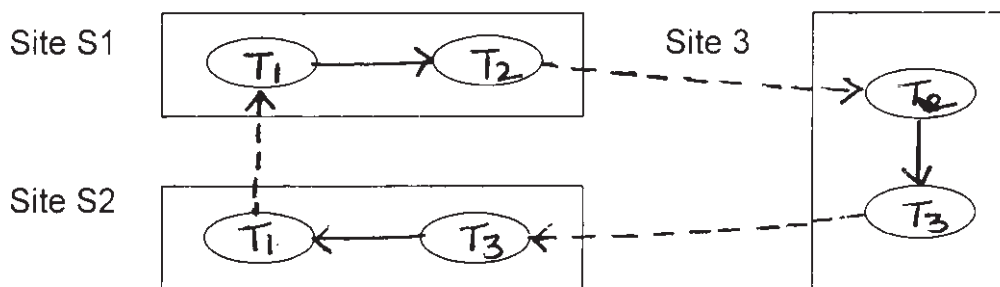
```
- Apply centralized Ingress Algorithm and optimize this query.
- b) With a proper diagram show and explain how message transfer takes place in Centralized 2 PL [4]
- c) What are the characteristics of a Distributed DBMS having (A1, D1, H2) architecture? [2]

**Q5)** Answer the following

- a) List the four steps of Query decomposition and explain any one in detail. [4]
- b) Write note on : In-place updates [4]
- c) Define [2]
- i) Unilingual MDBS
  - ii) Multilingual MDBS

**Q6)** Answer the following

- a) Explain 2 Phase Commit protocol. [4]
- b) Consider the following DWFG



Apply Distributed deadlock detection algorithm and identify whether global deadlock exists or not. [4]

- c) Consider the following query [2]

Select c\_name, balance

From customer, account, cust\_acc

Where customer.c\_no = cust\_acc.c\_no and

account.a\_no = cust\_acc.a\_no and account.balance > 100000

Draw query graph and join graph for above query.

**Q7)** Answer the following

- a) A query needs to take the join of two relations, Employee is internal relation and Department is external relation. Join is on common attribute d\_no. Explain all the execution strategies, which the query optimizer of system R\* will consider. [5]
- b) What is the meaning of “Optimistic” concurrency control? Write the three rules of optimistic concurrency control protocol. [5]

**Q8)** Answer the following

- a) The following two queries are found to be frequently executed queries during requirement analysis. They are executed at two different sites.
- i) Select \* from Employee where age < 30
- ii) Select \* from Employee where age >= 30

Find out set of simple predicates, minterm predicates and perform horizontal fragmentation of Employee relation.

During requirement analysis, it was also found that the join of employee and Dependent relations is frequent. Both the relations share a common attribute e\_no. Perform the horizontal fragmentation of Dependent relation such that performance of join will improve. [5]

- b) Draw state transition diagram of Termination protocol and explain how coordinator handle various timeout situations. [5]



Total No. of Questions : 8]

SEAT No. :

**P1804**

[Total No. of Pages : 3

[5233] - 1004

M.Sc.

**COMPUTER SCIENCE**

**CS-104 : Design & Analysis of Algorithms**

**(2013 Pattern) (Semester - I)**

*Time : 3 Hours]*

*[Max. Marks :50*

*Instructions to the candidates:*

- 1) *Attempt any five questions.*
- 2) *All questions carry equal marks.*
- 3) *Figures to the right indicate full marks.*
- 4) *Neat diagrams must be drawn wherever necessary.*

- Q1)** a) Write Merge sort algorithm. What is its time complexity? [4]  
b) Explain string editing problem and longest common subsequence problem. [4]  
c) Explain optimal storage on Tapes problem. [2]
- Q2)** a) Consider the following instance for job sequencing with deadlines problem using greedy method where,  $n = 5$ .  
( $P_1, P_2, P_3, P_4, P_5$ ) = (20, 10, 1, 15, 5)  
( $d_1, d_2, d_3, d_4, d_5$ ) = (2, 1, 3, 2, 3) [4]  
b) Prove that the time complexity of strassen's algorithm is  $O(n^{2.81})$ . [4]  
c) Define "Big-Oh" notation. [2]
- Q3)** a) Write a non-deterministic algorithm for Max Clique decision problem. [4]  
b) Let  $a_1, a_2, a_3, \dots, a_n$  be  $n$  distinct coin types such that  $a_1 \geq a_2 \geq a_3 \geq \dots \geq a_n$  &  $a_n = 1$ . We have to make up an exact amount  $c$  using coins of their coin types. The coins are available in unlimited quantity.  
i) Design a Greedy Algorithm to minimize the no. of coins used.  
ii) Show that a feasible solution may not exist if  $a_n \neq 1$ .  
iii) Is the solution obtained by Greedy method optimal? Justify your answer? [4]  
c) Show that there is no solution to the 2-queen's problem. [2]

**P.T.O.**

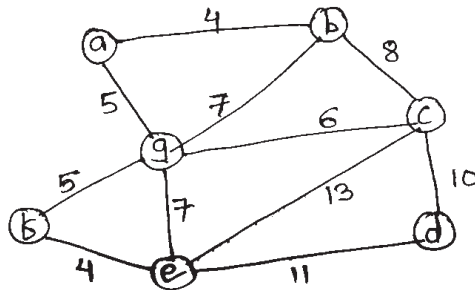
**Q4) a)** Obtain the reduced cost matrix for the travelling salesperson instance

given by the cost matrix 
$$\begin{bmatrix} \infty & 11 & 10 & 9 & 6 \\ 8 & \infty & 7 & 3 & 4 \\ 8 & 4 & \infty & 4 & 8 \\ 11 & 10 & 5 & \infty & 5 \\ 6 & 9 & 5 & 5 & \infty \end{bmatrix}$$
 [4]

b) Explain Quick sort algorithm sorts a sequence S using Divide and Conquer approach. [4]

c) Define articulation point and bridge edge. [2]

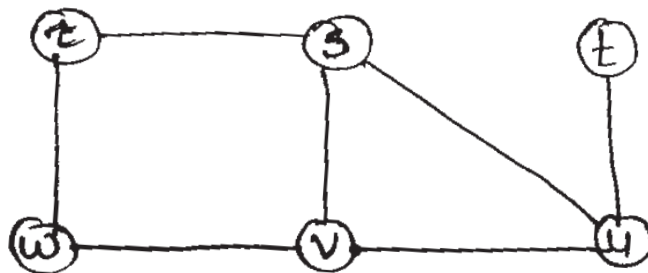
**Q5) a)** What is minimum spanning tree? Using Prim's algorithm find the minimum spanning tree of the following graph G. [4]



b) Determine the polynomial of smallest degree that interpolate the point (0, 5), (1, 10) & (2, 20). [4]

c) Discuss explicit constraints & implicit constraints of state space tree. [2]

**Q6) a)** Explain BFS, what is its time complexity? Illustrate it on the following graph. [4]



b) Order the following function in their increasing order of growth rates  $e^n$ ,  $n^n$ ,  $n!$ ,  $\log_e(n^n)$ ,  $n^2$ . Justify your ranking. [4]

c) What is Huffman's Greedy Algorithm? [2]

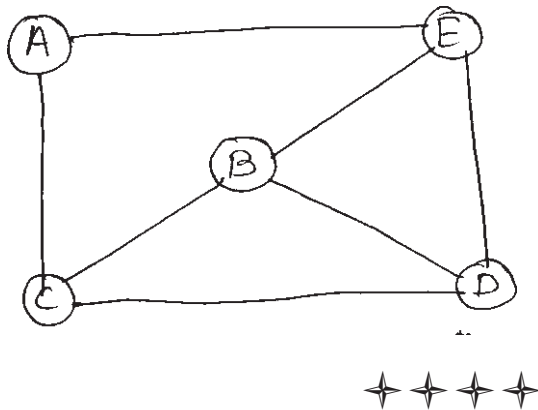
**Q7) a)** What is the best way to multiply a chain of matrices with dimensions that are  $10 \times 5$ ,  $5 \times 2$ ,  $2 \times 20$ ,  $20 \times 12$ ,  $12 \times 4$ ,  $4 \times 60$  using dynamic method. [5]

b) Explain Dijkstra's algorithm. What is its complexity? [5]

**Q8) a)** Solve 0|1 knapsack problem with  $n = 4$ ,  $m = 8$ ,  $P = (9, 10, 12, 9)$ ,  $W = (3, 8, 6, 4)$ .

Using dynamic programming. State Dominance Rule. [5]

b) What is m-colorability graph problem? Find out all possible solutions with exactly 3 color for following graph. [5]



Total No. of Questions : 8]

SEAT No. :

**P1805**

[5233]-1005

[Total No. of Pages : 2

**M.Sc.**

**COMPUTER SCIENCE**

**CS : 105 : Network Programming  
(2013 Pattern) (Semester - I)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Attempt any five questions from given eight questions.*
- 2) *Neat diagram must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Assume suitable data if necessary.*

- Q1)** a) Write a short note on wrapper function. [4]  
b) Explain concurrent servers. [4]  
c) Write syntax of shutdown function and explain in short. [2]
- Q2)** a) Explain termination of server process in details. [4]  
b) Explain TCP Echo server: str - echo function. [4]  
c) Explain Generic socket Address structure. [2]
- Q3)** a) Write echo client function for TCP. [4]  
b) Discuss crashing and rebooting of server process. [4]  
c) List characteristics of TCP. [2]
- Q4)** a) What are signals? Explain posix signal handling. [4]  
b) Explain Interrupted system calls. [4]  
c) Write down wait ( ) & waitpid function. [2]

*P.T.O.*

- Q5)** a) Explain signal driven I/O model. [4]  
b) Write a program to implement str-cli function using select. [4]  
c) Write poll ( ) function. [2]
- Q6)** a) Explain blocking and unblocking I/O model. [4]  
b) Write a VDP program that uses connect to determine outgoing interface.[4]  
c) SO-KEEPALIVE socket option - explain. [2]
- Q7)** a) Define poll function. State any 3 constant used to specify its event flag. [5]  
b) Explain gethostbyname 2 function. [5]
- Q8)** a) Explain SIGPIPE signal. Why it is required? [5]  
b) Write a code snippet for server which handles zombies. [5]



Total No. of Questions :8]

SEAT No. :

**P1806**

[Total No. of Pages :3

[5233] - 2001

M.Sc.

COMPUTER SCIENCE

**CS-201: Digital Image Processing  
(2013 Pattern) (Semester - II)**

*Time : 3 Hours]*

*[Max. Marks :50*

*Instructions to the candidates:*

- 1) *Answer any five questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*

**Q1) a)** Explain the use of digital image processing. State any two applications. **[4]**

b) Given below is 'x' a section of horizontal intensity profile from an image. Illustrate the 1<sup>st</sup> and 2<sup>nd</sup> derivative of the 1 - D digital function represented by 'x'. Depict zero - crossing if any. **[4]**

Scan line :

X :

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 5 | 5 | 5 | 5 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

c) Define 2 - D ideal low pass filter. **[2]**

**Q2) a)** Explain the Image formation model. **[4]**

b) Define morphological operations of reflection and translation. **[4]**

c) Mention two ranges of EM spectrum used for imaging. Give one application each. **[2]**

**P.T.O.**



- Q3)** a) Write a short note on Butterworth high pass filter in frequency domain. [4]  
 b) Explain the use of wiener filtering. [4]  
 c) Write 2 properties of opening operation. [2]
- Q4)** a) Explain Image subtraction and Image averaging. Why it is used in Image Enhancement? [4]  
 b) Explain Image degradation/restoration process with the help of suitable diagram. [4]  
 c) State any two methods of generating signature. [2]
- Q5)** a) Explain the properties of 2 - D fourier Transform. [4]  
 b) Explain the image acquisition process using sensor array. [4]  
 c) Define Intensity Thresholding. [2]
- Q6)** a) Define and state the steps used for Homomorphic filtering. [4]  
 b) Write a note on shape numbers. [4]  
 c) Define convolution Theorem. [2]
- Q7)** a) Use the following table to find the transformation function that is obtained with histogram equalization technique. The image is a 3 - bit  $64 \times 64$  digital image. [5]

| rk     | nk   |
|--------|------|
| r0 = 0 | 700  |
| r1 = 1 | 1113 |
| r2 = 2 | 800  |
| r3 = 3 | 706  |
| r4 = 4 | 300  |
| r5 = 5 | 274  |
| r6 = 6 | 192  |
| r7 = 7 | 11   |

- b) Write the adaptive mean filtering algorithm. [5]

- Q8)** a) Write a note on : **[5]**
- i) Erosion.
  - ii) Dilation.
- b) Describe the fundamental steps of Digital Image Processing. **[5]**



Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :3

**P1807**

**[5233] - 2002**

**M.Sc.**

**COMPUTER SCIENCE**

**CS - 202 : Advanced Operating System**

**(2013 Pattern) (Semester - II)**

*Time : 3 Hours]*

*[Max. Marks :50*

*Instructions to the candidates:*

- 1) *Answer ANY FIVE questions.*
- 2) *Draw neat diagrams wherever necessary.*
- 3) *Figures to the right indicate full marks.*

- Q1)** a) Under which circumstances, the process is swapped out. [4]
- b) Explain read (), write (), read v (), write v () with syntax and example. [4]
- c) What is symbolic link. [2]
- Q2)** a) In which situations, windows O.S. increases current priority value of threads. [4]
- b) Write a 'C' program which prints type of file where a file name is accepted through command line. [4]
- c) Explain the fields of Inode. [2]
- Q3)** a) Explain advanced signal management. [4]
- b) Write a 'C' program to illustrate use of getpid, getppid by creating as many child processes as possible. [4]
- c) What is ACL? [2]

**P.T.O.**

**Q4) a)** Explain wait ( ), waitpid ( ), wait 3 ( ), wait 4 ( ) system call with syntax and example. **[4]**

b) Discuss the concepts of pipes and write a 'C' program to create a file in which 'zero data' should be written at every 6<sup>th</sup> offset 10 times and 'a' at other locations. [use lseek ( )] **[4]**

c) Give any two design goals of windows. **[2]**

**Q5) a)** Explain any 2 advantages and 2 disadvantages of mmap ( ). **[4]**

b) Explain the behaviour of following 'C' program. **[4]**

```
main ()
{
 int fd;

 char buf [1024];

 fd = create ("junk", 0666);

 lseek (fd, 2000, 2);

 write (fd, "hello", 5);

 close (fd);

 sd = open ("junk", O_RDONLY);

 read (fd, buf, 1024);

 read (fd, buf, 1024);

 read (fd, buf, 1024);

}
```

c) Justify the following- **[2]**

No process can pre-empt another process executing in kernel.

- Q6)** a) Explain read ( ) system call with its data structures. [4]  
b) Explain kill ( ) and raise ( ) functions. [4]  
c) What are Daemons. [2]
- Q7)** a) Explain second scenario for buffer allocation. [5]  
b) Explain in detail demand paging - a memory management technique. [5]
- Q8)** a) Draw and Explain process state transition diagram. [5]  
b) Explain alarm ( ) and pause ( ) with syntax and example. [5]



Total No. of Questions : 8]

SEAT No. :

**P1808**

[Total No. of Pages : 3

[5233] - 2003

M.Sc.

COMPUTER SCIENCE

CS-203 : Data Mining & Data Warehousing

(Semester - II) (2013 Pattern)

*Time : 3 Hours]*

*[Max. Marks :50*

*Instructions to the candidates:*

- 1) *Answer any five out of eight questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*

- Q1)** a) Explain the process of Knowledge Discovery in Databases. [4]  
b) Define: [4]  
i) Support  
ii) Confidence  
iii) Strong Association Rule  
iv) Frequent itemset  
c) List the four properties of Data Warehouse. [2]
- Q2)** a) What are the drawbacks of k-means algorithm for clustering. [4]  
b) How OLAP is different from OLTP. [4]  
c) Data mining techniques are evolved from many disciplines. Comment.[2]
- Q3)** a) List three commonly used Attribute Selection Measures and discuss the drawbacks of each one of them. [4]  
b) Write note on - Graph mining. [4]  
c) Define: [2]  
i) Precision  
ii) Recall

**P.T.O.**

**Q4) a)** What are reasons because of which inaccuracy gets generated in the data in Data Warehouse. [4]

b) The following table shows the data regarding age of a person and the calories the person should consume. Use the method of least square to find an equation for prediction of amount of calories a person should consume based on his/her age. Predict the amount of calories a person of an age of 55 should consume

| Age (in years) | Calories |     |
|----------------|----------|-----|
| 56             | 2000     |     |
| 67             | 1500     |     |
| 83             | 1000     |     |
| 73             | 1200     |     |
| 34             | 3000     |     |
| 49             | 2200     |     |
| 58             | 1900     |     |
| 62             | 1700     | [4] |

c) What are the reasons of overfitting of a mining model? [2]

**Q5) a)** What is Web Mining? Explain Web Mining Taxonomy. [4]

b) What is a cluster? What are the applications of clustering Mining technique? Clustering is a supervised learning. Comment. [4]

c) Explain Bootstrap method of evaluating a classification model. [2]

**Q6) a)** Explain the algorithm for decision tree induction. [4]

b) With a proper diagram explain the multitier architecture of Data Warehouse. [4]

c) Explain in brief Agglomerative clustering strategy. [2]

**Q7) a)** Construct FP-tree for the following Dataset. **[5]**

| Transaction_id | Items                   |
|----------------|-------------------------|
| T <sub>1</sub> | Milk, Sugar, Bread, Egg |
| T <sub>2</sub> | Sugar, Bread, Butter    |
| T <sub>3</sub> | Milk, Egg, Sugar        |
| T <sub>4</sub> | Bread, Butter, Egg      |
| T <sub>5</sub> | Bread, Butter, Milk     |
| T <sub>6</sub> | Bread, Butter           |
| T <sub>7</sub> | Milk, Sugar, Egg        |
| T <sub>8</sub> | Bread, Egg              |

b) Explain support vector machine for linearly separable data. **[5]**

**Q8) a)** Write note on - Text Indexing Techniques. **[5]**

b) Following table contains tuples from training dataset of a bank. Attribute “Sanction Loan” is a class label attribute with two class label values “Safe” and “risky”. Using Naive Bayesian classification find out what will be the class label value for tuple **[5]**

(Medium, Middle, Business, No)

Dataset is

| TID | Income | Age    | Occupation | Other loan | Sanction loan |
|-----|--------|--------|------------|------------|---------------|
| 1   | High   | Middle | Service    | Yes        | Safe          |
| 2   | Medium | Middle | Service    | No         | Safe          |
| 3   | Low    | Young  | Service    | No         | Risky         |
| 4   | Low    | Senior | Business   | No         | Risky         |
| 5   | High   | Middle | Business   | No         | Safe          |
| 6   | Medium | Young  | Service    | No         | Safe          |
| 7   | Medium | Senior | Business   | No         | Risky         |
| 8   | Medium | Senior | Service    | Yes        | Safe          |
| 9   | Low    | Young  | Service    | Yes        | Risky         |
| 10  | High   | Young  | Service    | No         | Safe          |





Total No. of Questions : 8]

SEAT No. :

**P1809**

[5233]-2004

[Total No. of Pages : 2

**M.Sc.**

**COMPUTER SCIENCE**

**CS - 205 : Programming With Dot Net  
(2013 Pattern) (Semester - II)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Answer any five questions.*
- 2) *Figures to the right side indicate full marks.*

**Q1)** Solve.

- a) Write a console program in C# to read a text file line by line from mentioned file system location. **[4]**
- b) What are the events and delegates in C# . Net ? Whether delegates are depends on events or not justify by example. **[4]**
- c) Differentiate between datareacter and data Adapter. **[2]**

**Q2)** Solve.

- a) Explain ASP. NET page life cycle with help of diagram. **[4]**
- b) What is web service? List and explain participating technologies in web service. **[4]**
- c) Write short note on sealed classes and partical classes. **[2]**

**Q3)** Solve.

- a) How parameters can be passed to method? Give example. **[4]**
- b) Describe 5 access specifiers in C#. Net. **[4]**
- c) Explain TCP client. **[2]**

**Q4)** Solve.

- a) What is the difference between ASP page and HTML page? Write a program to display current time using ASP. NET. **[4]**
- b) What are DOT NET assemblies? Explain types of assemblies with example. **[4]**
- c) Differentiate between value type and reference type. **[2]**

**P.T.O.**

**Q5) Solve.**

- a) Write note on exception handling in C#. Catch block is optional. Justify with example. **[4]**
- b) Consider the table EMP (empno, ename, basic). Write code to connect the database to C# windows applications Gridview using disconnected ADO. NET. **[4]**
- c) Explain boxing and unboxing with example. **[2]**

**Q6) Solve.**

- a) List types of dialog boxes. Explain save File Dialog Box and color Dialog Box. **[4]**
- b) Draw the compilation model of any. NET application. List types of JIT compilers. **[4]**
- c) Write short note on Dataview. **[2]**

**Q7) Solve.**

- a) Explain ADO. NET architecture. Differentiate between connected and disconnected architecture in ADO. NET. **[5]**
- b) Explain client side state management techniques in ASP. NET. **[5]**

**Q8) Solve.**

- a) Explain server side state management techniques in ASP. NET. **[5]**
- b) What do you mean by page load event and page is back property in detail. **[5]**



Total No. of Questions : 8]

SEAT No. :

[Total No. of Pages : 2

**P1810**

[5233]-2005

M.Sc.

**COMPUTER SCIENCE**  
**206 : Artificial Intelligence**  
**(2013 Pattern) (Semester-II)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Answer any five questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicates full marks.*

- Q1)** a) What is a Artificial Intelligence? Explain any one application of AI. [4]  
b) Explain the significance of PEAS in AI. [4]  
c) State any 2 AI techniques. [2]

- Q2)** a) Describe the four criterias in designing a search algorithm. [4]  
b) Explain Hill climbing algorithm. [4]  
c) Define search strategy. [2]

- Q3)** a) Explain MINI-MAX search algorithm. [4]  
b) Represent the following sentence into the appropriate semantic network diagram. "Ishu tooked the book from Rutu". [4]  
c) What is knowledge & data. [2]

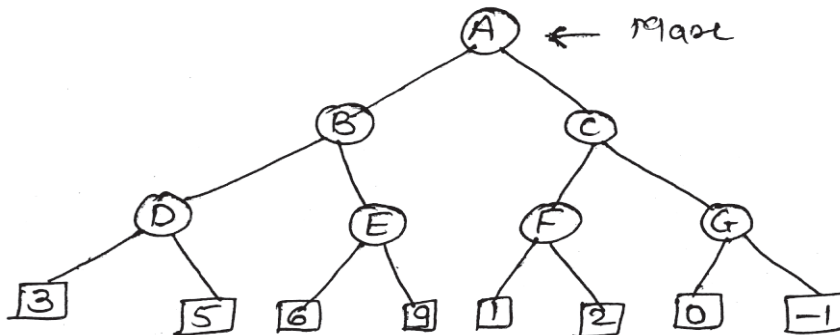
- Q4)** a) Define Heuristics. Explain the significance of Heuristics function in the informed search with suitable examples. [4]  
b) Explain states of 'water jug problem', where there are 2 jugs of 4 lit & 3 lit respectively & goal is '2 lit water in 4 lit jug'. [4]  
c) Give CD representation of the statement "Rahul play the football with Bipin". [2]

**P.T.O.**

- Q5) a)** Write note on: [4]
- i) Inductive learning
  - ii) Explanation-based learning
- b) Differentiate between propositional logic and first-order logic? Write the rules for converting the FOL to CNF. [4]
- c) State the significance of alpha-cut off in alpha-beta pruning. [2]

- Q6) a)** What is Natural Language Processing (NLP). Explain its phases. [4]
- b) What are probability axioms? Explain Baye's rule with a suitable example. [4]
- c) What does MTRANS Primitive act indicate in a conceptual dependency representation? [2]

- Q7) a)** Explain Unification algorithm with a suitable example. [5]
- b) Apply alpha-beta pruning algorithm to following search tree and indicate where the cut-offs occur. [5]



- Q8) a)** Explain the architecture of an Expert system with their components. [5]
- b) Construct semantic net representation for [5]
- i) John gave mary the book
  - ii) Pompion (Marcus), Black Smith (Marcus)



Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :2

**P1811**

**[5233] - 2006**

**M.Sc.**

**COMPUTER SCIENCE**

**CS-207: Advance Design & Analysis of Algorithm**

**(2013 Pattern) (Semester - II)**

*Time : 3 Hours]*

*[Max. Marks :50*

*Instructions to the candidates:*

- 1) Answer any 5 questions.*
- 2) All questions carry equal marks.*
- 3) Figures to the right indicate full marks.*

**Q1)** Attempt the following :

**[4+4+2=10]**

- a) Explain simplex method.
- b) Write a note on suffix trees.
- c) Define splay trees.

**Q2)** Attempt the Following :

**[4+4+2=10]**

- a) What are fibonacci heaps? Where are they used?
- b) Write a note on discrete optimization.
- c) Explain topological sort with example.

**Q3)** Attempt the following :

**[4+4+2=10]**

- a) Explain group steiner tree problem.
- b) Explain convex optimization in detail.
- c) Explain K - median problem.

***P.T.O.***

**Q4) Attempt the Following :** **[4+4+2=10]**

- a) Explain cutting plain method.
- b) Explain convex optimization in detail.
- c) What is heuristic optimization.

**Q5) Attempt the Following :** **[4+4+2=10]**

- a) Write a note on B - trees.
- b) Write a note on Intractable problem.
- c) Write applications of string searching.

**Q6) Attempt the Following :** **[4+4+2=10]**

- a) Write a note on set - cover via primal dual.
- b) Explain dynamic trees.
- c) Define max flow and min flow.

**Q7) Attempt the Following :** **[5+5=10]**

- a) Explain KMP algorithm for strings.
- b) Explain Boyer - Moore algorithms.

**Q8) Attempt the Following :** **[5+5=10]**

- a) What is principle behind Robin - krap algorithm. Explain its working.
- b) Explain the concept of universal steiner trees with its applications.



Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :3

**P1812**

**[5233] - 3001**

**M.Sc.**

**COMPUTER SCIENCE**

**CS-301: Software Metrics & Project Management**

**(2013 Pattern) (Semester - III)**

*Time : 3 Hours]*

*[Max. Marks :50*

*Instructions to the candidates:*

- 1) *Attempt any five questions from given eight questions.*
- 2) *Neat diagram must be drawn whenever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Use of simple calculator is allowed.*

**Q1)** Attempt the following:

- a) By what attributes software size can be described in software metric.[4]
- b) Explain Project Management framework with diagram. [4]
- c) What do you mean by reliability? [2]

**Q2)** Attempt the following:

- a) Write a note on GQM. [4]
- b) What is good data and explain the role of data collection in software measurement. [4]
- c) List the contents of project charter. [2]

**Q3)** Attempt the following:

- a) Explain Positive risk response in risk management. [4]
- b) Define Cost estimates and explain its types. [4]
- c) Define MTTF and MTTR. [2]

**P.T.O.**

**Q4)** Attempt the following:

- a) What do you mean by internal and external attributes in software measurement? [4]
- b) Write a note in cost of quality in project quality management. [4]
- c) List the tools used in Quality Control. [2]

**Q5)** Attempt the following:

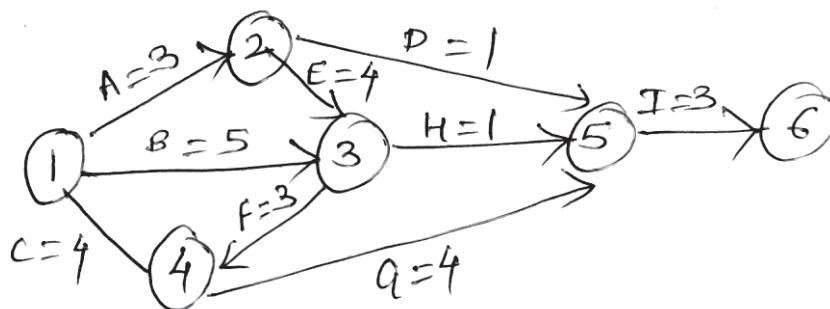
- a) Explain performance reporting in communication management. [4]
- b) Write a note on process maturity model. [4]
- c) Define CPIF and CPMF. [2]

**Q6)** Attempt the following:

- a) Define Risk Identification and explain Risk Categories. [4]
- b) Design WBS for Website design System. [4]
- c) List the qualities of project manager. [2]

**Q7)** Attempt the following:

- a) What do you mean by critical path method and solve following [5]



- b) Explain tools and techniques for planning purchase and acquisition. [5]



**Q8)** Attempt the following:

- a) What is Project Integration Management and explain any explain its processes (any four). **[5]**
- b) Explain five main types of power used in Thamhain and wilemon's Influence theory in human resource management. **[5]**

*EEE*

Total No. of Questions :8]

SEAT No. :

[Total No. of Pages : 2

**P1813**

**[5233]-3002**

**M.Sc.**

**COMPUTER SCIENCE**

**CS - 302 : Mobile Computing**

**(2013 Pattern) (Semester - III)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Attempt any five questions.*
- 2) *All questions carry equal marks.*
- 3) *Figures to the right indicates full marks.*

**Q1)** Attempt all of the following-

- a) Explain Packet Delivery to and from Mobile Node. **[4]**
- b) What are the advantages of FHSS over DSSS? **[4]**
- c) Explain Snooping TCP. **[2]**

**Q2)** Attempt all of the following-

- a) Why CSMA/CD cannot be used in wireless network? **[4]**
- b) Explain WAP architecture. **[4]**
- c) How MACA resolves hidden and exposed terminal problem? **[2]**

**Q3)** Attempt all of the following-

- a) What is smooth handover in mobile Ip? **[4]**
- b) Compare HLR with VLR. **[4]**
- c) List any two advantages of IPv6 in mobile IP? **[2]**

**Q4)** Attempt all of the following-

- a) Explain architecture of GPRS? **[4]**

**P.T.O.**

- b) What are the features of WML? [4]
- c) What is COA? [2]

**Q5)** Attempt all of the following:

- a) What is reverse tunneling? Why it is needed? [4]
- b) How localization is achieved in GSM? [4]
- c) What is WAE? [2]

**Q6)** Attempt all of the following:

- a) What are the advantages of spread spectrum technology? [4]
- b) Why large cells are not used in cellular system? [4]
- c) Explain Indirect - TCP? [2]

**Q7)** Attempt all of the following:

- a) What improvements are needed in TCP for 2.5/3G networks? [5]
- b) What are the qualities of services (QOS) does GPRS supports? [5]

**Q8)** Attempt all of the following:

- a) What is Mobile TCP? What are its advantages and disadvantages? [5]
- b) Name all entities with their functionality in GSM. [5]



Total No. of Questions : 8]

SEAT No. :

**P1814**

**[5233] - 3003**

[Total No. of Pages : 3

**M.Sc.**

**COMPUTER SCIENCE**

**CS - 303 : Soft Computing**

**(2013 Pattern) (Semester - III)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Attempt any five questions from given eight questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Use of simple calculator is allowed.*

**Q1)** Attempt the following:

- a) Define artificial neural network. Explain the architectures of neural network. **[4]**
- b) For the following two fuzzy sets find its union and intersection. **[4]**

$$\tilde{A} = \left\{ \frac{0.15}{1} + \frac{0.25}{2} + \frac{0.6}{3} + \frac{0.9}{4} \right\}$$

$$\tilde{B} = \left\{ \frac{0.2}{1} + \frac{0.3}{2} + \frac{0.5}{3} + \frac{0.8}{4} \right\}$$

- c) Define support of a membership function. **[2]**

**Q2)** Attempt the following:

- a) Write a note on properties of TLNS. **[4]**
- b) For the following fuzzy relation matrix R, determine  $\lambda$  - cut relations for the following  $\lambda$  - values on R,  $\lambda_1, \lambda_{0.8}, \lambda_{0.6}, \lambda_{0.3}$  **[4]**

$$R = \begin{bmatrix} 1 & 0.8 & 0.3 & 0.7 \\ 0.8 & 1 & 0.9 & 1 \\ 0.3 & 0.9 & 1 & 0.6 \\ 0.7 & 0.1 & 0.6 & 1 \end{bmatrix}$$

- c) List out two advantages of genetic algorithms. **[2]**

**P.T.O.**

**Q3)** Attempt the following:

- a) Using Genetic Algorithm maximize  $f(x) = x^2 + 1$  with initial x values of (12, 25, 5, 19). Show one crossover and mutation operation. [4]
- b) Write a note on fuzzy (Rule - Based) systems. [4]
- c) What do you mean by error correction rule and gradient rule? [2]

**Q4)** Attempt the following: [4]

- a) Consider the following fuzzy sets

$$\tilde{A} = \left\{ \frac{0.1}{x_1} + \frac{0.9}{x_2} + \frac{0.0}{x_3} \right\}$$

$$\text{and } \tilde{B} = \left\{ \frac{0}{y_1} + \frac{1}{y_2} + \frac{0}{y_3} \right\}$$

Determine the implication relation “IF A THEN B”.

- b) Write a note on perceptron learning algorithm. [4]
- c) What is cluster validity in fuzzy classification? [2]

**Q5)** Attempt the following:

- a) Consider the following fuzzy sets [4]

$$\text{“Low temperature”} = \left\{ \frac{1}{40} + \frac{0.7}{50} + \frac{0.5}{60} + \frac{0.3}{70} + \frac{0}{80} \right\}$$

$$\text{“High temperature”} = \left\{ \frac{0}{40} + \frac{0.2}{50} + \frac{0.4}{60} + \frac{0.7}{70} + \frac{1.0}{80} \right\}$$

Find the following membership functions

- i) temperature not very low
  - ii) temperature not very high
  - iii) temperature not very low and not very high
- b) State reasons how genetic algorithms are different from traditional algorithms. [4]
- c) What is fuzzy tolerance relation. [2]

**Q6)** Attempt the following:

- a) Simulate the execution of perceptron learning algorithm for each epoch on the following inputs (1, 0, 0) (1, 0, 1) (1, 1, 0) (1, 1, 1) with weight vector (0, 0, 0) and  $n = 1$ . What is the final weight vector? [4]
- b) Consider the following fuzzy numbers. [4]

$$\underline{A} = \text{“approximately 2”} = \left\{ \frac{0.6}{1} + \frac{1}{2} + \frac{0.8}{3} \right\}$$

$$\underline{B} = \text{“approximately 6”} = \left\{ \frac{0.8}{5} + \frac{1}{6} + \frac{0.7}{7} \right\}$$

Using zadeh’s extension principle calculate fuzzy number “approximately 12”.

- c) Write the equation for Gaussian signal function. [2]

**Q7)** Attempt the following:

- a) List components of neural networks and explain them. [5]
- b) Explain methods of defuzzification. [5]

**Q8)** Attempt the following:

- a) Differentiate supervised and unsupervised learning. Explain any two application domain of neural network. [5]
- b) Discuss strengths and limitations of Genetic Algorithms. [5]



Total No. of Questions : 8]

SEAT No. :

**P1815**

[Total No. of Pages : 2

[5233] - 3004

**M.Sc.**

**COMPUTER SCIENCE**

**CS-305 : Web Services**

**(2013 Pattern) (Semester - III)**

*Time : 3 Hours]*

*[Max. Marks :50*

*Instructions to the candidates:*

- 1) *Attempt any five questions.*
- 2) *All questions carry equal marks.*
- 3) *Figures to the right indicate full marks.*

- Q1)** a) Write a simple SOAP program that returns the value of a particular stock ticker symbol. [4]
- b) What is SLA? Describe its parts. [4]
- c) Write in short about public and private registries. [2]
- Q2)** a) Enlist and explain in brief various cloud service delivery models provided by providers. [4]
- b) Explain in detail : [4]
- i) <t Model>
- ii) <business Entity>
- c) Why a service description is necessary for representing Web Services? [2]
- Q3)** a) What are perceived benefits of cloud computing? [4]
- b) What are two most popular forms of communication messaging used in SOAP? [4]
- c) Define hosted architecture and hypervisor architecture used in virtualisation. [2]

**P.T.O.**

- Q4)** a) Define and describe Web Service implementation with its elements. [4]  
b) Write a Web Service java code which includes two methods such as a method for returning price of a book by passing author name and book name and another method for ordering book by giving quantity which returns total amount for order. [4]  
c) Give the impacts & shortcomings of Web Services. [2]
- Q5)** a) Describe various characteristics of Web Services. [4]  
b) Write a short note on UDDI specifications. What it includes? [4]  
c) Give the types of Web Services, describe it in short. [2]
- Q6)** a) Write examples for <wsdl : types> and <wsdl : message> elements. [4]  
b) How to develop Web Service in Java using eclipse and Apache Tomcat server? [4]  
c) Give four differentiating points between public and private cloud. [2]
- Q7)** a) Explain in detail core building blocks of Web Services. [5]  
b) What are various WSDL message exchange patterns? Illustrate any two by writing XML code snippet. [5]
- Q8)** a) Give an example code snippet of SOAP intermediary and explain how it functions. [5]  
b) Give an example of Iaas and Paas type of services with its usage. [5]





Total No. of Questions : 8]

SEAT No. :

**P1816**

[5233]-3005

[Total No. of Pages : 2

**M.Sc.**

**COMPUTER SCIENCE**

**CS - 306 : Database and System Administration**

**(2013 Pattern) (Semester - III)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Attempt any five questions.*
- 2) *All questions carry equal marks.*
- 3) *Figures to the right indicate full marks.*

**Q1)** Attempt all questions.

- a) Communication protocols in MySQL, Explain in details. **[4]**
- b) Explain Parsing in details with steps in sequence. **[4]**
- c) "MySQL databases are relational". Comment on it. **[2]**

**Q2)** Attempt all questions.

- a) MySQL Storage Engine. Explain in details. **[4]**
- b) Explain "mysqldiskusage" and how to display output using mysqldiskusage. Explain in details. **[4]**
- c) Explain commands (create database, use, show, help). **[2]**

**Q3)** Attempt all questions.

- a) MySQL Commands (Client Commands), explain in details (with syntax and examples). **[4]**
- b) Statement terminator and DELIMITER explain in Details. **[4]**
- c) Explain MySQL 3 layer model (One line for one layer) with diagram. **[2]**

**P.T.O.**

**Q4)** Attempt all questions.

- a) Explain Locking in details for MyISAM and InnoDB. [4]
- b) Explain MyISAM storage engine in details. [4]
- c) Explain Static and Dynamic table characteristics for MyISAM table storage engine. [2]

**Q5)** Attempt all questions.

- a) Explain Logical and Physical backup in details. [4]
- b) What is advisory lock and explain its all functions. [4]
- c) Give any two responsibilities of system administrator. [2]

**Q6)** Attempt all questions.

- a) Explain users and groups in details (discuss create, modify and delete in details.) Explain permissions of users and groups in details. [4]
- b) Explain FEDERATED storage engine in details. [4]
- c) Explain explicit table locking in details. [2]

**Q7)** Attempt all questions.

- a) Explain in details MERGE storage engine. [5]
- b) Point - in Time (Incremental) Recovery Using the Binary Log. [5]

**Q8)** Attempt all questions.

- a) Explain Input/output redirection in File handling of linux with example. [5]
- b) Explain FSCK in details with all options. [5]



Total No. of Questions : 8]

SEAT No. :

**P1817**

[5233]-3006

[Total No. of Pages : 2

**M.Sc.**

**COMPUTER SCIENCE**

**CS 307: Functional Programming**

**(2013 Pattern) (Semester - III)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Answer any five questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*

**Q1) a)** Explain productive pairs of programming languages. **[4]**

b) Explain the grammar of Lambda Calculus. **[4]**

c) What is the output of following script

```
P = re.compile ("hell*o")
```

```
m = re.match ("hell*o", "hellooooo world")
```

```
m.group() [2]
```

**Q2) a)** Explain advantages and disadvantages of Functional Programming. **[4]**

b) Explain the map and reduce function with example. **[4]**

c) What is the output of following script

```
x = input ("enter data:")
```

```
Enter data: 2 +1/2.0
```

```
print x [2]
```

**Q3) a)** Define Free and Bound Variables. Find Free and Bound variables if  
 $S \rightarrow (\lambda xz.x)(\lambda y.xy)$  **[4]**

b) Implement stack and queue using List in Python. **[4]**

c) Write functions in python to get current working directory and to change current directory with example. **[2]**

**P.T.O.**

- Q4)** a) Write a script to determine if the given substring is present in the string. [4]  
 b) What are anonymous functions? How can they be defined and used in python? [4]  
 c) Write the output for the following Python codes.  
 $A = \{1:100, 2:200, 3:300, 4:400, 5:500\}$   
 print A. items ()  
 print A. keys ()  
 print A. values () [2]
- Q5)** a) Differentiate Lazy and eager evaluation. Describe principles of naming.[4]  
 b) Write python script to read and print file on screen omitting all blank lines. [4]  
 c) What is tuple? What is the output of following code  
 $T = (10, 20, 30, 40, 50)$   
 $T1 = T[2:4]$   
 print T1 [2]
- Q6)** a) Write a function for computing Fibonacci numbers to show lazy evaluation in python. [4]  
 b) Explain varieties of FP languages. [4]  
 c) List and explain python membership and identity operators. [2]
- Q7)** a) Reduce the following expression using Applicative order and Normal order  $(\lambda x.(\lambda y.\lambda z.zy)x)p(\lambda x.x)$  [5]  
 b) Write python script to do following  
 Create a student class, add constructor to the class that accepts name and rollno as parameters, add name and rollno as data members of the student class, add getter methods for name and rollno. Add static attribute named count to the class. [5]
- Q8)** a) Define substitution recursively? Explain with examples. [5]  
 b) Formally define alpha conversion and beta reduction. Explain alpha conversion with examples. [5]



Total No. of Questions : 8]

SEAT No. :

**P1818**

[5233]-3007

[Total No. of Pages : 2

**M.Sc.**

**COMPUTER SCIENCE**

**CS-308 : Business Intelligence  
(2013 Pattern) (Semester-III)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Answer any five questions.*
- 2) *Figures to the right side indicate full marks.*

- Q1)** a) Explain Extract Transform and Load (ETL) process in BI. [4]  
b) How is data warehousing structured in web based architecture. [4]  
c) Differentiate Transactional processing and Analytical Processing. [2]
- Q2)** a) Describe Data Integration [4]  
b) What do you understand by Real time data ware housing? [4]  
c) Define: Cube [2]
- Q3)** a) List the major BPM processes. [4]  
b) Explain operational planning. [4]  
c) Give any 2 datamining applications. [2]
- Q4)** a) Explain Balance Score card. [4]  
b) Explain the taxonomy of datamining. [4]  
c) Define Strategy Gap. [2]
- Q5)** a) What are the major data preprocessing steps? Explain. [4]  
b) Explain the process of text mining. [4]  
c) Give any 2 benefits of Collaborative Decision Making. [2]

**P.T.O.**

- Q6)** a) Give the main areas of web mining? [4]  
b) How knowledge is extracted from web data? [4]  
c) Give any 2 application areas of text mining. [2]
- Q7)** a) Explain the integration process of BI with Non- BI systems. [5]  
b) Explain on-Demand BI and its benefits. [5]
- Q8)** a) Explain in detail the purpose of KPI and its metrics. [5]  
b) The client is a leader in the market in the design and production of innovative base materials used as the foundation for printed circuit boards. For over two decades, the client has been the preferred laminate to the supplier to the top performing PCB manufacturers, delivering high quality innovative solutions that minimize cost and cut manufacturing time. The client was using SAP's WAD for its dashboard requirements and was not completely satisfied with the capabilities and high TCO. In order to transform its dashboard platform it was looking at leveraging the advance capabilities of xcelsius. In addition, many of the clients business, users had been spending hours creating ms- power-point excel reports at the end of week-month-quarter. The main objective of this transformation program was to save this manual efforts and time by creating the documents directly using live office. [5]

What type of data warehousing architecture is best suited for the above case study.



Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :2

**P1819**

**[5233] - 4001**

**M.Sc.**

**COMPUTER SCIENCE**

**CS-402: Parallel Computing**

**(Elective) (2013 Pattern) (Semester - IV)**

*Time : 3 Hours]*

*[Max. Marks :50*

*Instructions to the candidates:*

- 1) *Answer any five questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *All the questions carry equal marks.*
- 5) *Assume suitable data, if necessary.*

**Q1)**

**[4 + 4 + 2]**

- a) How multithreading is done using Cilk ++?
- b) Write a note on Flynn's Taxonomy.
- c) What do you mean by sieve of Eratosthenes.

**Q2)**

**[4 + 4 + 2]**

- a) Give various applications of parallel computing.
- b) Explain CC - NUMA with neat labeled diagram.
- c) What do you mean by explicit parallelism?

**Q3)**

**[4 + 4 + 2]**

- a) Explain BSP model in detail.
- b) How thread synchronization is done in TBB?
- c) What do you mean by SMP?

***P.T.O.***

**Q4)**

**[4 + 4 + 2]**

- a) Write various data Scope attribute clauses in open MP.
- b) Write a note on PVM.
- c) What do you mean by CUDA?

**Q5)**

**[4 + 4 + 2]**

- a) Write any 4 advanced features of MPI.
- b) Differentiate : SISD vs. MISD.
- c) What do you mean by GPGPU?

**Q6)**

**[4 + 4 + 2]**

- a) How directive binding is done in open MP?
- b) Write various programmability issues in parallel computing.
- c) Differentiate : Device pointers vs. Host pointers.

**Q7)**

**[5 + 5]**

- a) Explain Beowulf cluster in detail.
- b) Write syntax of parallel loops in Open MP.

**Q8)**

**[5 + 5]**

- a) How cluster programs are evaluated & tuned.
- b) Differentiate parallel computing vs. Cluster computing.





Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :2

**P1820**

**[5233] - 4002**

**M.Sc.**

**COMPUTER SCIENCE**

**CS - 403 : Embedded System**

**(2013 Pattern) (Semester - IV)**

*Time : 3 Hours]*

*[Max. Marks :50*

*Instructions to the candidates:*

- 1) Answer any five questions.*
- 2) Neat diagram must be drawn whenever necessary.*
- 3) Figures to the right indicate full marks.*

**Q1) a) Draw a simple parallel I/O port and explain its basic operation. [4]**

b) Write short note on real time operating system. [4]

c) Define an embedded system. [2]

**Q2) a) Draw a neat diagram for the compilation process and explain it briefly.[4]**

b) Explain JTAG and OnCE briefly. [4]

c) What is a flash memory? [2]

**Q3) a) Briefly explain the time slice mechanism for multitasking operating system. [4]**

b) Explain the basic buffer structure with suitable diagram. [4]

c) List different software tools required for designing an embedded system. [2]

***P.T.O.***

- Q4)** a) How is a real time performance derived from a non-real time system?[4]  
b) Write a note on cross compilers. [4]  
c) Define maskable and non-maskable interrupts. [2]
- Q5)** a) Explain the high level language simulation. [4]  
b) Explain the read and write cycles of an DRAM cell with suitable diagram. [4]  
c) What is a peripheral? List any two types of peripherals. [2]
- Q6)** a) Briefly explain the preemptive and non preemptive kernel. [4]  
b) Write short note on Circular buffer. [4]  
c) Define Page and Segment. [2]
- Q7)** a) What are the advantages and disadvantages of buffer exchange? [5]  
b) Explain priority levels for Real Time Operating system architecture. [5]
- Q8)** a) Explain the ‘Serial Lines’ and ‘From disk’ methods of downloading the code to the target board. [5]  
b) Explain task level and symbolic debugger. [5]



Total No. of Questions : 8]

SEAT No. :

[Total No. of Pages :2

**P1821**

**[5233] - 4003**

**M.Sc. (Computer Science)**

**CS - 404 : SOFTWARE QUALITY ASSURANCE**

**(Semester - IV) (2013 Pattern)**

*Time : 3 Hours]*

*[Max. Marks :50*

*Instructions to the candidates:*

- 1) *Attempt any five questions.*
- 2) *Neat diagrams & must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*

**Q1)** Answer the following.

- a) Explain the Objectives of software Quality Assurance. [4]
- b) Explain in detail the term 'Review' and also explain the various types of reviews. [4]
- c) Define version control [2]

**Q2)** Answer the following.

- a) Explain the guidelines for software configuration audit [4]
- b) Explain the impact of CASE TOOLS on Software quality. [4]
- c) Explain the importance of staff training. [2]

**Q3)** Answer the following.

- a) Explain the role of validation and verification in software quality. [4]
- b) Write a short note on Mc calls Quality model. [4]
- c) Define 'product' [2]

**P.T.O.**

**Q4)** Answer the following.

- a) Explain the features of ISO 9001. [4]
- b) Explain inspections and walk throughs in software quality. [4]
- c) What is the main purpose of SEI-CMM. [2]

**Q5)** Answer the following.

- a) Explain with example the use of Run charts in software quality. [4]
- b) Differentiate between testing and debugging. [4]
- c) Which factors affect the quality of IT project. [2]

**Q6)** Answer the following.

- a) Explain the terms : Software errors, software faults and software failures. [4]
- b) Write a short note on process quality metrics. [4]
- c) Explain software testing. [2]

**Q7)** Answer the following.

- a) Write a short note on templates. [5]
- b) Explain the difference between software quality assurance and software quality control. [5]

**Q8)** Answer the following.

- a) Explain utilization of quality cost for decision making. [5]
- b) Write a short note on pareto analysis. [5]



Total No. of Questions : 8]

SEAT No. :

**P1822**

[5233]-4004

[Total No. of Pages : 3

**M.Sc.**

**COMPUTER SCIENCE**

**CS - 405 : Modeling & Simulation**

**(2013 Pattern) (New) (Semester - IV)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Attempt any five questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Assume suitable data if necessary*

**Q1)** Attempt the following.

- a) What is stepped and event based time in simulations. [4]
- b) Discuss the components of an Experimental frame. [4]
- c) What are hybrid simulations. [2]

**Q2)** Attempt the following.

- a) Write a note on sources and propagation of error. [4]
- b) Discuss the characteristics of a good random number generator. [3]
- c) Explain the process of verification and validation of a model. [3]

**Q3)** Attempt the following.

- a) Write a note on 'Need for Modeling and Simulation'. [4]
- b) Discuss the different types of Simulations. [4]
- c) What is the importance of a simulation clock. [2]

**Q4)** Attempt the following.

- a) Explain all the entities of the Framework for Modeling & Simulation. [4]
- b) What is a random variable and a distribution function. [4]
- c) Which are the different Types of model validity. [2]

**P.T.O.**

**Q5)** Attempt the following.

- a) Explain Switching Automata with an example. [4]
- b) Discuss Qualitative and Quantitative comparison of a Model and source System behavior. [4]
- c) Compare 'Static' and 'Dynamic' simulation models. [2]

**Q6)** Attempt the following.

- a) Discuss the models of arrival processes. [5]
- b) How is testing of hypothesis done. [3]
- c) What is Fitness of a cell in cell automata. [2]

**Q7)** Write a note on the following.

- a) Write a note on Probability distributions and estimation. [5]
- b) What are the differences between 'Experimenting with actual system' and 'Experimenting with a model of the system' [5]

**Q8)** Attempt the Case Study and answer the following questions

“Single Server Queuing System”

Consider a single server queuing system for which the inter arrival times  $A_1, A_2, \dots$  are independent and identically distributed random variables. A customer who arrives and finds the server idle enters service immediately, and the service times  $S_1, S_2, \dots$  of the successive customers are IID random variables that are independent of the inter arrival times. A customer who arrives and finds the server busy joins the end of a single queue. Upon completing service for a customer, the server chooses a customer from the queue in a first-in first out manner.

The simulation will begin in the “empty-and-idle” state i.e. no customers are present and the server is idle. At time 0, we will begin waiting for the arrival of the first customer, which will occur after the first inter arrival time,  $A_1$ , rather than at time 0. We wish to simulate this system until a fixed number( $n$ ) of customers have completed their delays in queue; i.e., the simulation will stop when the  $n$ th customer enters service. Note that the time the simulation ends is thus a random variable, depending on the observed values for the inter arrival and service time random variables.

From a single run of the simulation resulting in customer delays  $D_1, D_2, \dots, D_n$ . Expected average number of customers in the queue is denoted by  $q(n)$ .  $Q(t)$  denotes the number of customers in queue at time  $t$ .  $T(n)$  is the time required to observe 'n' delays in queue.

### Questions

- a) Define Discrete and Continuous system. Identify whether the System is Discrete or Continuous System and justify your answer **[5]**
  
- b) Identify the following components for the system:- **[5]**  
System state, Simulation Clock, Event List,  
Initialization routine and Report Generation

