

Total No. of Questions : 8]

SEAT No. :

**P1766**

**[5133]-1001**

[Total No. of Pages : 2

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

**Q1)** Attempt all questions.

- a) Explain the concept of strongly type language and statically type language with example. **[4]**
- b) State and explain the problem with using association list. How it is solved? **[4]**
- c) Define the terms **[2]**
  - i) Competition synchronization.
  - ii) Cooperation synchronization.

**Q2)** Attempt all questions.

- a) Describe static allocation of space for non - recursive subroutine. **[4]**
- b) Define Lisp function to rotate a list in right direction till n. **[4]**
- c) State 4 predicates in LISP with their purpose. **[2]**

**Q3)** Attempt all questions.

- a) Define thread and coroutine. state the steps to turn coroutine into thread. **[4]**
- b) Explain scope rule and binding rules with suitable example. **[4]**
- c) Why prolog does not have generic read predicate? **[2]**

**P.T.O.**

**Q4)** Attempt all questions.

- a) Explain with suitable example. How shared multiple inheritance is implemented? [4]
- b) Write a tail recursive prolog program to print numbers from n to 1. [4]
- c) What is lazy evaluation? [2]

**Q5)** Attempt all questions.

- a) What is semaphore? What operations does it support? [4]
- b) State a dangling pointer problem. Explain its solution. [4]
- c) What is co-routine ? state the difference between co-routine and sub routine. [2]

**Q6)** Attempt all questions.

- a) Discuss contiguous and row pointer layout of an array with an example. [4]
- b) Describe how virtual functions can be used to achieve the effect of subroutine closurs? [4]
- c) State the circumstances where bootstrapping is necessary. [2]

**Q7)** Attempt all questions.

- a) Explain difference between applicative and normal order evaluation of expression. [5]
- b) State six different syntactic constructs commonly used to create new thread of control in a concurrent program? Explain any one. [5]

**Q8)** Attempt all questions.

- a) Write a C/C++ function that declares an array statically, on the stack and on the heap. Explain which one is more efficient. [5]
- b) What are discriminated and free unions? Explain with the help of suitable diagram. [5]



Total No. of Questions : 8]

SEAT No. :

**P1767**

**[5133]-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 given eight questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *All questions carry equal marks.*
- 4) *Figures to the right side indicate full marks.*
- 5) *Assume suitable data if necessary.*

- Q1)** a) What is frame relay? Discuss its advantages. **[4]**  
b) Message : ADVANCED NETWORKING  
Design ceaser cipher scheme to code the message by replacing each alphabet with an alphabet two places down the line. **[4]**  
c) How router forwards the datagram based on host specific method? **[2]**
- Q2)** a) Explain the fragmentation process of IPV<sub>4</sub> datagram. **[4]**  
b) Explain CBC mode and the use of initialization vector (IV) in CBC. **[4]**  
c) What is the problem with smart card if large data needs to be processed. **[2]**
- Q3)** a) How does certificate based authentication works. **[4]**  
b) Explain how TCP handles window management. **[4]**  
c) State the difference between SSL & SHTTP. **[2]**
- Q4)** a) State the advantages of IP security. **[4]**  
b) Explain the key steps used in creation of digital certificate. **[4]**  
c) State and define types of multiplexing in Transport layer. **[2]**

**P.T.O.**

**Q5) a)** Explain various methods of delivering live audio and video. [4]

b) Consider the given algorithm for :  $a^b \text{ mod } n$  start: [4]

$C = 1$

for  $i := 1$  to  $b$

Calculate  $C = (C * a) \text{ mod } n$

next  $i$

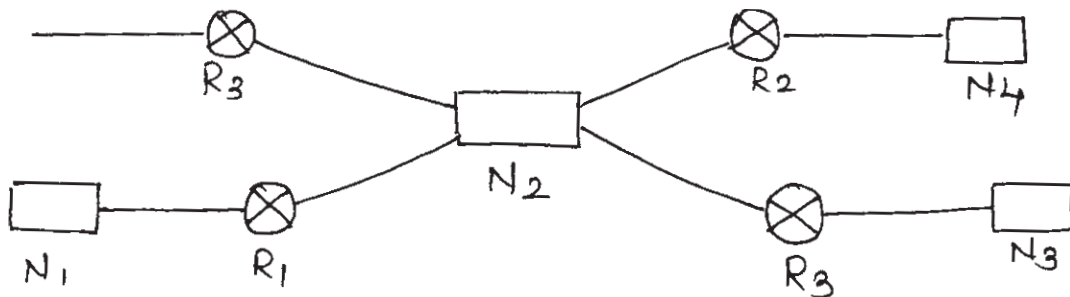
end

using this algorithm find the message digests for the result  $9^4 \text{ mod } 117$ .

c) State the query messages under ICMPV4. [2]

**Q6) a)** Discuss various attacks on IP packet. [4]

b) In the figure, which router sends out router link & network link LSAs?[4]



c) Explain the concept of kerberos. [2]

**Q7) a)** Consider the routing table for Router  $R_1$  Routing Table for  $R_1$  [5]

Mask	Network address	Next hop	Interface
/28	140.6.12.240	-	$M_2$
/25	140.6.12.128	-	$M_0$
/24	201.8.32.0	-	$M_3$
/16	201.8.0.0	-	$M_1$
Default	Default	140.6.12.244	$M_2$

- i) Show the forwarding process if a packet arrives at  $R_1$  with destination address 201.8.30.4.
  - ii) Show the forwarding process if packet arrives at  $R_1$  with destination address 20.54.28.75.
- b) Illustrate PEM protocol used for E-mail security. [5]
- Q8)** a) Explain the concept of firewall? Which of the techniques are used by the attacker to break the security of packet filter? [5]
- b) Explain the scenarios of protocol for connection establishment using three way handshake. [5]

**x      x      x**

Total No. of Questions :8]

SEAT No. :

**P1768**

[Total No. of Pages :4

**[5133] - 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 5 out of 8 questions.*
- 2) *Figures to the right indicate full marks.*
- 3) *All questions carry equal marks.*

**Q1)** Answer the following:

**[10]**

- a) Discuss the complicating factors in design of DDBMS.
- b) Explain Distributed catalog management.
- c) What are the objectives of query processing.

**Q2)** Answer the following:

**[10]**

- a) Define the process of localization of data involved in query.
- b) Consider the following relation

Person (Pno, Pname, Pcity, age) perform a horizontal fragmentation of person with respect to the following predicates:

P1: age < 40;

P2: age >= 40;

Consider the relation Dependents (dno, Pno, name) perform a derived fragmentation of Dependents with respect to the person relation.

Draw the join graph of Person  $\bowtie$  Dependents & state its types.

- c) What is nested transaction?

**P.T.O.**

**Q3)** Answer the following:

[10]

- a) Explain shared Memory & shared Disk.
- b) Explain each step of query processor by specifying input & output of each of the step.
- c) Explain terms:
  - i) Type incorrect query.
  - ii) Semantically incorrect query.

**Q4)** Answer the following:

[10]

- a) Consider the following relations

EMP (eno, ename, addr, age, dno)

DEPT (dno, dname, budget)

Emp relation is partitioned horizontally as

EMP1 =  $\sigma_{age < 20}$  (EMP)

EMP2 =  $\sigma_{20 < age < 40}$  (EMP)

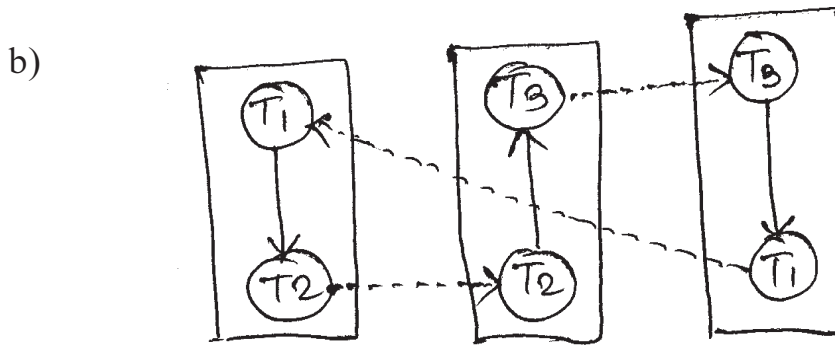
EMP3 =  $\sigma_{age \geq 40}$  (EMP)

DEPT relation is also partitioned horizontally as

DEPT1 =  $\sigma_{budget < 1,00,000}$  (DEPT)

DEPT2 =  $\sigma_{budget \geq 1,00,000}$  (DEPT)

Draw a join graph of EMP  $\bowtie$  DEPT. Is the graph simple or partitioned? If it is partitioned modify the fragments of EMP & DEPT so that the join graph of EMP  $\bowtie$  DEPT will be simple.



Apply the distributed deadlock detection algorithm and identify a global deadlock, if it exists.

c) What is Minterm predicate?

**Q5)** Answer the following:

[10]

a) Discuss the MDBS architecture.

b) Let  $Q = \{q_1, q_2, q_3\}$  be set of queries &  $A = \{A_1, A_2, A_3\}$  be set of attributes,  $S = \{S_1, S_2\}$  be a set of sites.

Matrix P describe attribute value & matrixes describe application access frequency Assume that  $ref_i(q_k) = 1$  &  $S_i$  &  $A_i$  key attribute, use Bond energy algorithm to vertical fragmentation of attributes in the set A.

$$\begin{array}{ccc}
 A_1 & A_2 & A_3 \\
 q_1 \begin{bmatrix} 1 & 1 & 0 \end{bmatrix} & & q_1 \begin{bmatrix} 2 & 28 \end{bmatrix} \\
 q_2 \begin{bmatrix} 1 & 0 & 1 \end{bmatrix} & & q_2 \begin{bmatrix} 30 & 8 \end{bmatrix} \\
 q_3 \begin{bmatrix} 1 & 0 & 0 \end{bmatrix} & & q_3 \begin{bmatrix} 33 & 35 \end{bmatrix} \\
 (P) & & (Q)
 \end{array}$$

c) Write short note on distributed deadlock delection.

**Q6)** Answer the following:

[10]

a) Explain Top-down design process of DDBMS.

b) Explain centralized 2PC protocol in distributed environment.

c) What are the correctness rules of fragmentation?



**Q7)** Answer the following:

[10]

- a) Consider data items  $x$  &  $y$  with the following read & write time stamps

$$RTS(x) = 10, WTS(x) = 10, RTS(y) = 12, WTS(y) = 8$$

If the following sequence of requests is received what will be the behaviour of Basic Time stamp ordering algorithm?

$$\langle R_1(x), 12 \rangle, \langle W_1(x), 12 \rangle, \langle R_2(x), 15 \rangle, \langle W_2(x), 13 \rangle$$

$$\langle R_3(y), 16 \rangle, \langle W_3(x), 11 \rangle, \langle W_4(x), 15 \rangle, \langle W_5(y), 15 \rangle$$

- b) Write note on workflow.

**Q8)** Answer the following:

[10]

- a) Consider the following query

```
SELECT ename, sal
```

```
FROM EMP, PROJ, ASG, PAY
```

```
WHERE EMP . eno = ASG . eno
```

```
and EMP . title = PAY . title
```

```
and (budget > 20,000 or dur > 24)
```

```
and ASG . Pno = PROJ . Pno
```

Compose the selection predicate corresponding to the where clause & transform it using idempotency rule into simplest form.

- b) Define the following terms:

i) Fix | Flush

ii) No-Fix | Flush

iii) Fix | No-Flush

iv) No-Fix | No-Flush

v) Check pointing

*EEE*

Total No. of Questions :8]

SEAT No. :

P1769

[Total No. of Pages :3

[5133] - 1004

M.Sc.

COMPUTER SCIENCE

CS-104: Design and Analysis of an Algorithms  
(2013 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

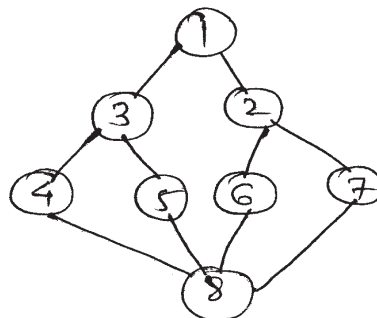
- 1) Attempt any five questions.
- 2) All questions carry equal marks.
- 3) Figures to the right indicates full marks.

Q1) Attempt all questions:

- a) What is principle of optimality? How dynamic programming can be used to solve problems that exhibit optimal structure. [4]
- b) Show the recurrence relation, [4]  
 $T(n) = m \cdot T(n/2) + an^2$ , is satisfied by  $T(n) = O(n^{\log m})$ .
- c) Define P and NP class problems. [2]

Q2) Attempt all questions:

- a) Explain 4 queen problem? Give algorithm to solve the 4 queen's problem using backtracking. [4]
- b) Give the BFS and DFS for the following graph. Show all steps. [4]

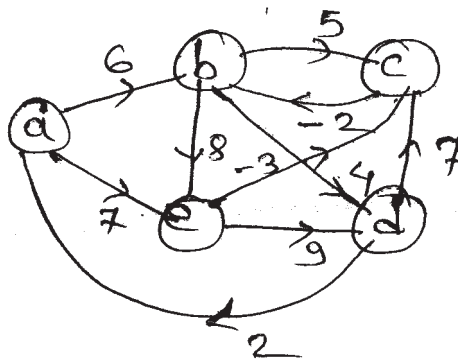


- c) Give the control abstraction for divide and conquer strategy. [2]

P.T.O.

**Q3)** Attempt all questions:

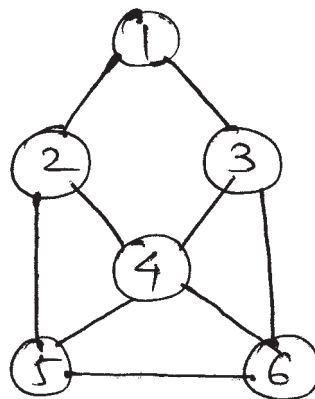
- a) Solve the following problem of 0|1 knapsack using LCBB, where  $n = 4$ ,  $P = (10, 10, 12, 18)$  and  $W = (2, 4, 6, 9)$ ,  $M = 15$ . [4]
- b) Generate a single source shortest path for following graph using Bellman Ford. [4]



- c) Justify True/False, Huffman code is fixed length code. [2]

**Q4)** Attempt all questions:

- a) Explain insertion sort with example. Make analysis of insertion sort and generate its time complexity. [4]
- b) What is mean by Hamiltonian cycle? Find all Hamiltonian cycles for the following graph. [4]



- c) Define  $\theta$  notation and show  $5n^2 + 2n$  is  $\theta(n^2)$  [2]

**Q5)** Attempt all questions:

- a) Explain the functions that characterize a non-deterministic algorithm. [4]
- b) Explain the various problems which can be solve using problem reduction techniques of Horner's rule. [4]
- c) Backtracking is a breadth first solution True/False. Justify. [2]

**Q6)** Attempt all questions:

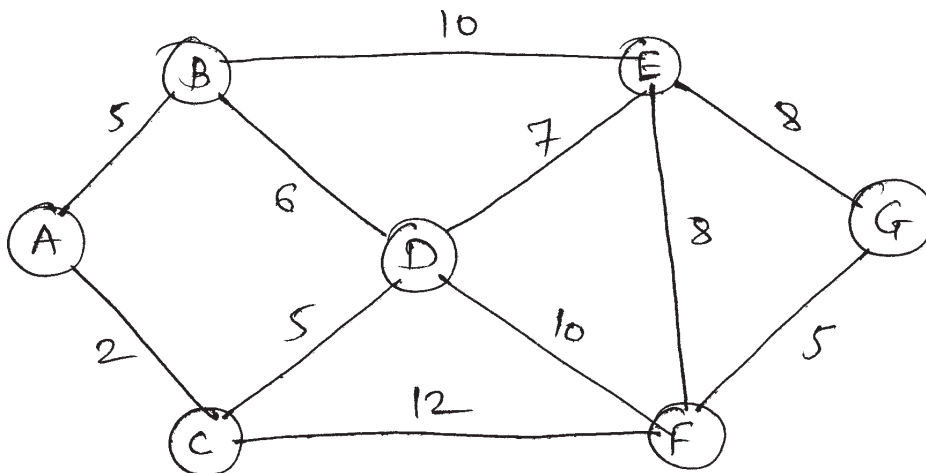
- a) Explain counting sort algorithm. [4]
- b) What is m-color graph problem? Give the formulation for implicit and explicit constraints in case of m-color graph problem with n-nodes/vertices. [4]
- c) What is negative weighted cycle? Does Flyod warshall algorithm consider negative weighted cycle. [2]

**Q7)** Attempt all questions:

- a) Obtain the reduced cost matrix for TSP using dynamic programming. [5]

$$\begin{bmatrix} \infty & 7 & 3 & 12 & 8 \\ 3 & \infty & 6 & 14 & 9 \\ 5 & 8 & \infty & 6 & 18 \\ 9 & 3 & 5 & \infty & 11 \\ 18 & 14 & 9 & 8 & \infty \end{bmatrix}$$

- b) Using greedy approach of Prim's and Kruskal algorithm, find out the minimum cost spanning tree for the given graph, [5]



**Q8)** Attempt all questions:

- a) Why quick sort is also called as partition exchange sort? Derive its best case and worst case running time. [5]
- b) What is difference, between Greedy method and dynamic programming. compute the optimal sequence of matrix chain multiplication for the matrices of order (10×30), (30×5), (5×60), (60×20). [5]

*EEE*

Total No. of Questions : 8]

SEAT No. :

**P1770**

**[5133]-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.*
- 2) *All questions carry equal marks.*
- 3) *Figures to the right indicates full marks.*

**Q1)** Attempt the following:

- a) How to handle the problem of lack of flow control with UDP client server communication? **[4]**
- b) Explain any 5 options supported by IPv4. **[4]**
- c) List out errors given by connect(). **[2]**

**Q2)** Attempt the following:

- a) Explain different memory manipulation function. **[4]**
- b) Explain the syntax of getsockopt() and setsockopt(). **[4]**
- c) List out different options supported by SOL\_SOCKET Level. **[2]**

**Q3)** Attempt the following:

- a) Explain the concept of fork() and exec(). **[4]**
- b) Write a client side code for TCP Echo client. **[4]**
- c) Why to use connect() in the definition of UDP client and server? **[2]**

**Q4)** Attempt the following:

- a) Explain the concept of SIGPIPE. Explain the scenario when it is raised. **[4]**
- b) Explain the syntax of select(). **[4]**
- c) List out different Byte Ordering Functions. **[2]**

**P.T.O.**

**Q5)** Attempt the following:

- a) Explain the structure of hostent and serent [4]
- b) Explain the concept of wait() and waitpid() [4]
- c) List out different byte manipulation function. [2]

**Q6)** Attempt the following:

- a) Explain the socket address structure for IPv4 and IPv6 Family. [4]
- b) What is the purpose of getpeername () and getsockname()? [4]
- c) What do you mean by SIGCHLD [2]

**Q7)** Attempt the following:

- a) Write a server side code using stream protocol for reversing the string inputed by the client. [5]
- b) Explain SO\_KEEPALIVE and SO\_LINGER in detail. [5]

**Q8)** Attempt the following:

- a) Write a code for client server communication using IPv4 address family, where current date and time is output. [5]
- b) How does the state is maintain on the server? [5]



Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :3

**P1771**

**[5133] - 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) *Solve any five questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*

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

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

- a) Write a short note on contrast stretching.
- b) Explain the basics of intensity thresholding.
- c) State any two methods of generating signature.

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

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

- a) State the equation of 2D discrete Fourier transform and its inverse. Describe any two properties of 2D discrete Fourier transform.
- b) Explain the different noise probability density functions encountered in image restoration.
- c) What is blind spot?

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

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

- a) Illustrate the use of chain code.
- b) What is the use of Hit - or - miss transform? Explain its uses with the help of suitable diagrams and definition.
- c) Give co-ordinates of  $N_4(P)$  and  $N_8(P)$  if point 'P' is (80, 85) position.

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

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

- a) Explain the model for image degradation and restoration.
- b) Explain the steps in processing an image in frequency domain.
- c) Find city block and chess board distance between points P(25, 25) and Q(30, 35).

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

- a) Explain the working of 'Homomorphic Filter'.
- b) What is thresholding? Write an iterative algorithm for global thresholding.
- c) List any two segmentation approaches.

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

- a) Sketch different edge models and write three steps in edge detection.
- b) Explain Zooming and shrinking in digital images. How does it take places?
- c) Write the equation of hole filling.

**Q7)** Attempt all of the following: **[5+5=10]**

- a) Explain the concept of image sampling and quantization.
- b) Given a 3-bit image size  $32 \times 32$  pixels having intensity distribution as shown in the table given below, when intensity levels are in the range 0-7. Apply histogram equalization techniques and find the transfer function  $T_R$  which relates input image intensity level  $r_k$  to output image intensity level  $s_k$ .



Intensity level	Number of Pixels
$R_0 = 0$	344
$R_1 = 1$	103
$R_2 = 2$	57
$R_3 = 3$	47
$R_4 = 4$	76
$R_5 = 5$	211
$R_6 = 6$	127
$R_7 = 7$	59

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

**[5+5=10]**

- Explain Erosion and dilation with the help of diagrams. Show that erosion and dilation are duals of each other.
- Write a short note on boundary approximation using 'MPP'.

*EEE*

Total No. of Questions : 8]

SEAT No. :

**P1772**

**[5133]-2002**

[Total No. of Pages : 3

**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) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to right indicate full marks.*

**Q1) a) Explain deadlock scenario for link ( ) system call. [4]**

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

```
main ( )
```

```
{
```

```
    int status;
```

```
    if (fork ( ) == 0)
```

```
        execl ("/bin/date", "date", 0);
```

```
    wait (&status);
```

```
}
```

c) Explain sigqueue ( ) function. [2]

**Q2) a) State and explain the data structures used for demand paging. [4]**

b) State and explain setjump ( ) and longjump ( ) functions. [4]

c) Write any four operations related to inode. [2]

*P.T.O.*

- Q3) a)** Explain the behavior of following 'C' program. **[4]**
- ```

#include <fcntl.h>
main ()
{
    int fd;
    char lilbuf[20], bigbuf[1024];
    fd = open (."/etc/passwd",O_RDONLY);
    read(fd, lilbuf, 20);
    read(fd, bigbuf, 1024);
    read(fd, lilbuf, 20);
}

```
- b) State and explain the 'param' parameter values of malloc ( ) used for advanced memory allocation. **[4]**
- c) Justify - in Linux the files are usually accessed via file names. **[2]**
- Q4) a)** Write program to demonstrate Race condition in catching signal. **[4]**
- b) Explain kill ( ) and raise ( ) system call. **[4]**
- c) State the difference between named and unnamed pipe. **[2]**
- Q5) a)** Write a 'C' program that copies its standard input to standard output. **[4]**
- b) Explain processor affinity. **[4]**
- c) State and define memset ( ) and mememp ( ). **[2]**
- Q6) a)** Explain the behavior of following 'C' program **[4]**
- ```

#include<signal.h>
Main (int argc char * argv [ ])
{
    char buf [256];
    if (argc! = 1)
        signal (.SIGCLD, SIG-IGN);
    while(read (0, buf, 256));
    if (fork ( ) == 0)
        exit(0);
}

```
- b) Explain thread scheduling scenarios in windows operating system. **[4]**
- c) State the structure of priority array. **[2]**

- Q7) a)** Draw and discuss the data structures offer two processes open files. **[5]**  
b) Explain the functions, sigprocmask ( ), sigpending ( ), sigsuspend ( ), signal ( ). **[5]**

- Q8) a)** Explain the behavior of following 'C' program. **[5]**

```
Void print-chars (int n, char c)
{
    int i;
    for (i = 0; i < n; i ++)
    {
        char *s;
        int j;
        s = calloc (i + 2, 1);
        if (!s)
            {
                perror ("calloc")
                break;
            }
        for (j = 0; j < i + 1; j ++)
            S[j] = C;
        printf("%s\n", S);
        free (s);
    }
}
```

(Consider n = 7 and C is \*)

- b) Explain the checking and handling signals in process state diagram. **[5]**



Total No. of Questions : 8]

SEAT No :

**P1773**

**[5133]-2003**

[Total No. of Pages :3

**M.Sc.**

**COMPUTER SCIENCE**

**CS - 203:Data Mining & Data Warehousing  
( 2013 Pattern) ( Semester-II)**

*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) List any five data mining issues and discuss any two of them in detail. **[4]**  
b) Define : **[4]**  
i) Closed frequent itemset  
ii) Maximal frequent itemset  
c) Snowflake schema reduces redundancy. Comment. **[2]**
- Q2)** a) Explain K-means algorithm for clustering of the data. **[4]**  
b) What is the function of attribute selection measure? What are commonly used attribute selection measures for induction of decision tree? **[4]**  
c) Classification is a supervised learning technique comment. **[2]**
- Q3)** a) The following table shows the data regarding number of lectures attended by students and marks scored in final exam. Use the method of least square to find an equation for prediction of the marks of a student based on his/her attendance. Predict the marks of a student having attendance of 45 lectures. **[4]**

**P.T.O.**

Attendance(No.of days)	Marks obtained
56	45
67	59
83	77
73	69
34	26
49	35
98	86
27	20

- b) Write note on-Graph Mining. [4]  
c) Explain “Class Imbalance Problem”. [2]
- Q4)** a) Normalize the following set of data using [4]  
i) Min-Max normalization with new minimum=0 and new maximum=1.  
ii) Z-score normalization.  
Dataset is 50, 70, 100, 150, 200.
- b) Write a note on - Text Indexing Techniques. [4]  
c) What is Laplacian Correction? Why it is required? [2]
- Q5)** a) What are crawlers? Describe in brief each component of crawler. [4]  
b) Explain Hierarchical clustering strategies. [4]  
c) What different visualization techniques are used in KDD? [2]
- Q6)** a) Explain support vector machine for linearly inseparable data. [4]  
b) Explain any four data transformation strategies in brief. [4]  
c) Define: [2]  
i) Stop words  
ii) Stem words
- Q7)** a) Following table contains tuples from training data set of a car showroom. Attribute “purchases” is a class label attribute with two distinct values “Yes” and “No”. Using Naive Bayesian classification find out what will be the class label value for tuple [5]  
(Low, Senior, No, Excellent)

TID	Income	Age	Married	Credit-rating	Purchases
1	High	Middle	Yes	Excellent	Yes
2	Medium	Middle	Yes	Fair	Yes
3	Low	Middle	Yes	Excellent	No
4	High	Senior	Yes	Excellent	Yes
5	High	Middle	No	Excellent	No
6	Medium	Young	No	Fair	No
7	Medium	Senior	Yes	Excellent	Yes
8	High	Senior	No	Fair	No
9	Low	Young	Yes	Excellent	Yes
10	High	Young	No	Fair	No

b) Compare and contrast enterprise Datawarehouse and Datamails. [5]

**Q8) a)** Explain in brief each of the criteria based on which classification models are evaluated. [5]

b) Find out the frequent itemsets in the following dataset using Apriory algorithm. Assume minimum support count of 2. [5]

Transaction id	Items
T1	Milk, Sugar, Bread, Egg
T2	Sugar, Bread, Butter
T3	Milk, Egg, Sugar
T4	Bread, Butter, Egg
T5	Bread, Butter, Milk
T6	Bread, Butter
T7	Milk, Sugar, Egg
T8	Bread, Egg



Total No. of Questions :8]

SEAT No. :

**P1774**

[Total No. of Pages :2

[5133] - 2004

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

**Q1)** Attempt the following:

- a) Explain disconnected architecture in ADO.NET. Write the steps to implement disconnected architecture. [4]
- b) What is a webservice? What are the characteristics of webservice. [4]
- c) What are partial methods. [2]

**Q2)** Attempt the following:

- a) Explain font and color dialog box with example. [4]
- b) What is assembly? Explain components of assembly. [4]
- c) Explain:TCP client. [2]

**Q3)** Attempt the following:

- a) Explain CLR and its components. [4]
- b) Write a C# program, to copy content of one file into another file. (Use stream Reader and stream writer) [4]
- c) What are cookies. [2]

**P.T.O.**



**Q4)** Attempt the following:

- a) Short note on pen class in GDI +. [4]
- b) Write a C# program, create a user-defined exception class stack exception. Construct a class stack with members-array of integers and top of stack. The class has two methods push() and pop(). When the stack is empty or full throw the stack exception. [4]
- c) What is iterators. [2]

**Q5)** Attempt the following:

- a) What is pass by reference. Explain ref and out parameters with example.[4]
- b) What is the difference between ASP×page and HTML page? Write a simple program to display “Hello world” using ASP.NET. [4]
- c) Explain structures in C#. [2]

**Q6)** Attempt the following:

- a) Write a short note on ASP.NET page lifecycle. [4]
- b) Define generics and explain generic methods with suitable example. [4]
- c) Short note on IsPostBack. [2]

**Q7)** Attempt the following:

- a) What is delegates? Explain multicast delegates with suitable example.[5]
- b) What is serialization? List types of serialization and explain any one in detail. [5]

**Q8)** Attempt the following:

- a) Explain ASP.NET server controls. [5]
- b) Explain Data Adapter with example. [5]

*EEE*

Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :4

**P1775**

**[5133] - 2005**

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

**CS-206: ARTIFICIAL INTELLIGENCE**

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

*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.*

**Q1) a) What are frames? Explain with example. [4]**

b) Explain means ends analysis algorithm. [4]

c) State any two A.I. techniques. [2]

**Q2) a) Write short note on learning from examples with any one techniques. [4]**

b) Give state space representation of “water jug problem”. [4]

Where there are 2 jugs of 4L & 3 L respectively we want 2L water in 4L jug.

c) Define requirements of good control strategy. [2]

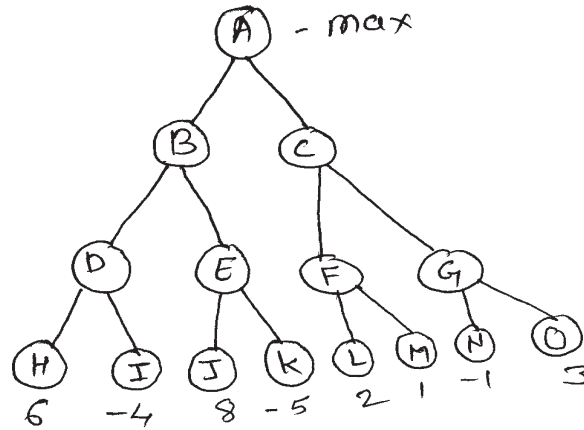
**Q3) a) Explain the MINIMAX procedure. [4]**

b) Write short note on Semantic Net. [4]

c) Describe any 2 characteristics of problem with example. [2]

**P.T.O.**

**Q4) a)** Apply alpha-beta pruning algorithm to the following search tree. [4]



Show final search tree after applying algorithm and show alpha-beta value.

- b) Write state space representation of “Monkey- banana problem” also specify initial & final state & list of actions as operators | rules. [4]
- c) What is heuristic function? [2]

**Q5) a)** Convert following statements into WFFs [4]

- i) Marcus was a man
- ii) Marcus was a pompeian
- iii) All pompeians were Roman
- iv) Caesar was a ruler
- v) All romans were either loyal to caesar or hate him.
- vi) Every one is loyal to someone.
- vii) People only try to assassinate rulers they are not loyal to
- viii) Marcus tried to assassinate caesar.

- b) Write AO\* Algorithm. [4]
- c) Represent the following using semantic nets every batsman hit a ball.[2]

- Q6)** a) Write short note on script. [4]  
 b) Write short note on production system. [4]  
 c) What does PTRANS primitive act indicate in a conceptual dependency representation? [2]

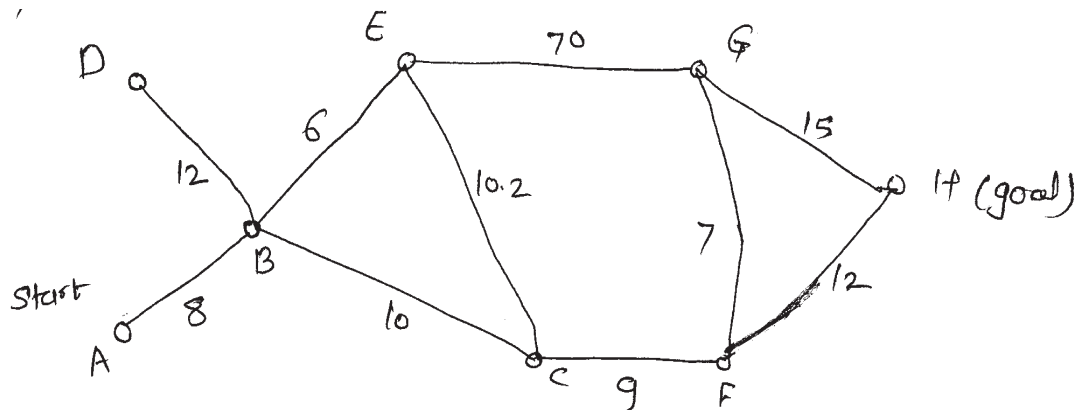
**Q7)** a) Consider the following English statements & their WFF's equivalent. [5]

English statement	FOPL / WFF's
Jack owns a dog	$\exists x : \text{dog}(x) \wedge \text{owns}(\text{Jack}, x)$
Every dog owner is an animal lover	$\forall x : (\exists y : \text{Dog}(y) \wedge \text{owns}(x, y) \Rightarrow \text{Animal Lover}(x))$
No animal lover kills an animal	$\forall x : \text{Animal Lover}(x) \Rightarrow (\forall y : \text{Animal}(y) \Rightarrow \sim \text{kills}(x, y))$
Either Jack or curiosity killed Tuna, the cat	$\text{kills}(\text{jack}, \text{Tuna}) \vee \text{kills}(\text{curiosity}, \text{Tuna})$ $\forall x : (\text{cat}(x) \Rightarrow \text{Animal}(x))$

using Resolution prove that curiosity did not kill Tuna.

b) Write short note on Rote learning. [5]

**Q8)** a) Consider the following graph [5]



Using A\* algorithm, work out a route from (start)A to H (goal). Use the following cost function -

$G(n)$  = The cost of each move as the distance bet<sup>n</sup> each node.

$H(n)$  = The heuristic cost.

Heuristic costs given below

A	24
B	18.6
C	17.1
D	15.2
E	13.5
F	10
G	8.5
H	0

- b) Construct semantic net representation for [5]
- i) Doctor (marcus), Black smith (marcus)
  - ii) Priya gave the Pink flowered vase to her teacher.

*EEE*

Total No. of Questions : 8]

SEAT No :

**P1776**

**[5133]-2006**

[Total No. of Pages :2

**M.Sc.**

**COMPUTER SCIENCE**

**CS - 207:Advanced Design & Analysis of Algorithm  
( 2013 Pattern) ( Semester-II)**

*Time : 3 Hours]*

*[Max. Marks :50*

*Instructions to the candidates:*

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

**Q1) Solve**

- a) Write note on splay tree. [4]
- b) Explain dynamic trees with example. [4]
- c) Write applications of Fibonacci heaps. [2]

**Q2) Solve:**

- a) Write Rabin-karp string search algorithm. [4]
- b) Write note on suffix trees. [4]
- c) What is patricia trees? [2]

**Q3) Solve:**

- a) Explain steiner forest problem. [4]
- b) Write note on k-median on a cycle. [4]
- c) Define maxflow and minflow. [2]

**P.T.O.**

**Q4)** Solve:

- a) How to solve TSP using complete enumeration. [4]
- b) Write note on steiner tree. [4]
- c) Give any one application of suffix tree. [2]

**Q5)** Solve:

- a) Explain primal dual method to solve TSP. [4]
- b) What is Group steiner trees? [4]
- c) Define Intractable problem. [2]

**Q6)** Solve:

- a) Explain in brief cutting plane method. [4]
- b) Write note on convex optimization. [4]
- c) What is optimization problem. [2]

**Q7)** Solve:

- a) Formulate 0/1 knapsack problem as integer linear programming problem. [5]
- b) Discuss any problem to which complete enumeration is applied. [5]

**Q8)** Solve

- a) Explain KPM algorithm for strings. [5]
- b) Write note on discrete optimization. [5]



Total No. of Questions : 8]

SEAT No. :

**P1777**

**[5133]-3001**

[Total No. of Pages : 2

**M.Sc.**

**COMPUTER SCIENCE**

**CS - 301 : Software Metrics and Project Management  
(2013 Pattern) (Semester - III)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Attempt any Five question of the following.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*

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

- a) What are the qualities required for a project manager? **[4]**
- b) What are the roles and responsibilities that a metrics plan should have?**[4]**
- c) Define:-
  - i) NPV
  - ii) ROI **[2]**

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

- a) State the importance of GQM and explain it with example. **[4]**
- b) What is solicitation planning? Explain solicitation in detail. **[4]**
- c) Explain in brief Mc Cabe's cyclomatic complexity measure. **[2]**

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

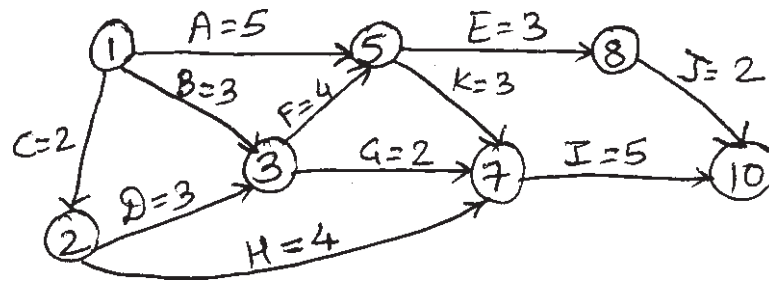
- a) Explain the overall change control process with a neat diagram. **[4]**
- b) What are the basic components or goals of a metrics plan? **[4]**
- c) List the outputs of administrative closure in project Communication Management. **[2]**

**P.T.O.**



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

- a) Define critical path in Time Management. Also, Determine the critical path for the following [5]



- b) Draw the Work Break Down structure (WBS) for Hotel Management system. [5]

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

- a) Explain any four activities involved in software measurement. [4]  
 b) Explain any four tools and techniques used for risk quantification process. [4]  
 c) State the purpose of statement of Work(SOW). [2]

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

- a) Explain the Bohem's software quality model. [4]  
 b) Write a short note on team development process in Human Resource Management? [4]  
 c) Define:- i) Measurement ii) Quality according to ISO [2]

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

- a) Explain COCOMO model in Cost Management. Calculate the effort in person-months if the software project is of organic mode. [5]  
 b) Explain any five aspects of IT project that affects the quality of project? [5]

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

- a) Explain all the phases in CMM model. [4]  
 b) What is the PDM? Explain the four types of relationship between activities used in PDM. [4]  
 c) List the outputs of Performance Reporting process in communication management. [2]



Total No. of Questions : 8]

SEAT No :

**P 1778**

**[5133]-3002**

[Total No. of Pages :2

**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 of the following questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*

**Q1)** Attempt the following:

- a) What is Android Os? Explain its architecture in detail. [4]
- b) Name the requirements of mobile IP and justify them. Does mobile IP fulfill them all? [4]
- c) Explain following terms for mobile device i) Portability ii) Mobility. [2]

**Q2)** Attempt the following:

- a) How direct sequence spread spectrum works? List its advantages and disadvantages. [4]
- b) Draw and explain GPRS transmission protocol model. [4]
- c) What do you mean by co-COA? [2]

**Q3)** Attempt all:

- a) Compare SDMA and TDMA. [4]
- b) Explain WAP Push Architecture. [4]
- c) Define FA. [2]

**Q4)** Attempt all:

- a) Compare CSMA-CA and CSMA-CD. [4]
- b) Explain UMTS architecture. [4]
- c) Define MN. [2]

**P.T.O.**

**Q5)** Attempt all:

- a) Explain different types of handover used in UMTS. [4]
- b) Compare different types of transmission errors that occur in wireless and wired network. What additional role does mobility play? [4]
- c) Define destination sequenced distance vector routing. [2]

**Q6)** Attempt all:

- a) Compare I-TCP and snooping TCP. [4]
- b) Explain Agent Discovery mechanism of Mobile IP. [4]
- c) What is near and far terminals in MAC. [2]

**Q7)** Attempt all:

- a) Discuss features and life cycle of Android. [5]
- b) What is reverse tunneling? Why is it needed? [5]

**Q8)** Attempt all:

- a) Explain how CN communicates with MN when MN is in a foreign network. [5]
- b) What are the advantages of IPV6 in mobile IP? [5]



Total No. of Questions : 8]

SEAT No :

P1779

[5133]-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 the 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) Explain any two properties of neural networks. Differentiate between supervised and unsupervised learning. [4]
- b) For the following two fuzzy sets finds its union and intersection. [4]

$$\tilde{A} = \left\{ \frac{0.2}{\text{train}} + \frac{0.5}{\text{bike}} + \frac{0.3}{\text{boat}} + \frac{0.8}{\text{plane}} + \frac{0.1}{\text{house}} \right\}$$
$$\tilde{B} = \left\{ \frac{1}{\text{train}} + \frac{0.2}{\text{bike}} + \frac{0.4}{\text{boat}} + \frac{0.5}{\text{plane}} + \frac{0.2}{\text{house}} \right\}$$

- c) Draw the diagram of artificial neuron. [2]

**Q2)** Attempt the following:

- a) Write a note on pattern space and weight space. [4]
- b) using genetic algorithm maximize  $f(x)=x^2+1$  with initial  $x$  values of (12,25,5,19). [4]
- c) Define fuzzy set. [2]

**P.T.O.**

**Q3)** Attempt the following:

- a) Two fuzzy sets  $\underline{A}$  and  $\underline{B}$  both defined on  $X$ , are as follows. [4]

$\mu(x_i)$	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$
$\underline{A}$	0.2	0.3	0.4	0.7	0.1
$\underline{B}$	0.4	0.5	0.6	0.8	0.9

Find i)  $(\underline{A})_{0.6}$  ii)  $(\underline{B})_{0.2}$  iii)  $(\underline{A} \cup \underline{B})_{0.6}$  iv)  $(\underline{A} \cap \underline{B})_{0.5}$

- b) Explain the concept of convex fuzzy set. What is a fuzzy number? [4]  
 c) Define convex hulls. [2]

**Q4)** Attempt the following:

- a) Determine the proposition “IF K THEN V” for the fuzzy sets given below. [4]

$$K = \left\{ \frac{0}{q} + \frac{0.2}{t} + \frac{1}{r} + \frac{1}{c} \right\} \quad V = \left\{ \frac{0}{n} + \frac{0.3}{s} + \frac{0.8}{g} + \frac{1}{e} \right\}$$

- b) Write a note on multilayered network architectures. [4]  
 c) What is intensification? [2]

**Q5)** a) Let  $X = \{x_1, x_2, x_3\}$   $Y = \{y_1, y_2, y_3\}$  and  $Z = \{z_1, z_2, z_3\}$  be the universe of discourse on which the following fuzzy sets be defined respectively. [4]

$$\underline{A} = \left\{ \frac{1}{x_1} + \frac{0.5}{x_2} + \frac{0.2}{x_3} \right\} \quad \underline{B} = \left\{ \frac{0}{y_1} + \frac{0.5}{y_2} + \frac{0.3}{y_3} \right\}$$

$$\underline{C} = \left\{ \frac{0.1}{z_1} + \frac{0.6}{z_2} + \frac{1}{z_3} \right\}$$

Find the following:

- i)  $R = A \times B$   
 ii)  $S = B \times C$   
 iii)  $T = R \circ S$  using max-min composition.  
 b) Define GA. Give the outline of the basic GA. [4]  
 c) What is the centroid method of defuzzification? [2]

**Q6)** Attempt the following:

- a) The perceptron learning algorithm works well for linearly separable sets but does not guarantee for linearly non-separable sets. Explain. [4]
- b) For the following two fuzzy sets [4]

$$\text{Fast} = \tilde{F} = \left\{ \frac{0}{10} + \frac{0.6}{20} + \frac{0.8}{30} + \frac{1}{40} \right\}$$

$$\text{Slow} = \tilde{S} = \left\{ \frac{0.5}{10} + \frac{0.8}{20} + \frac{1}{30} + \frac{0.85}{40} \right\}$$

Find the membership functions for

- i) not fast and very slow
- ii) not very slow and very fast.
- c) State the equation for sigmoidal signal function. [2]

**Q7)** Attempt the following:

- a) Write a note on features of membership functions of fuzzy sets. [5]
- b) Simulate the execution of perceptron learning algorithm for each epoch on the following inputs (1, 1, 1) (1, 1, -1) (1, 0, -1) (-1, 1, 1) (-1, 1, -1) (-1, 0, -1) with weight vector (0, 1, 0) and  $\eta=1$ . What is the final weight vector? [5]

**Q8)** Attempt the following:

- a) Write a note on properties of Genetic Algorithms. [5]
- b) List components of neural networks and explain them. [5]



Total No. of Questions : 8]

SEAT No. :

**P1780**

**[5133]-3004**

[Total No. of Pages : 2

**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 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) Explain the structure of WSDL document with proper description. [4]
- b) Explain the Web Service architecture with respective of protocol stack in detail. [4]
- c) List out the different roles in Web Service architecture. [2]

**Q2)** Attempt the following:

- a) Write client side and server side code in java to calculate current age if date of birth is inputed. [4]
- b) What is SOA. Explain the SOA in business process model point of view. [4]
- c) What do you mean by inter application communication. List out its known application. [2]

**Q3)** Attempt the following:

- a) Write a note on Header block of SOAP node. Explain different types of roles supported by header block. [4]
- b) Write note on WSDL binding and explain how it access specific services. [4]
- c) What is mean by Multitenancy? [2]

**P.T.O.**

**Q4)** Attempt the following:

- a) How does UDDI support categorization in UDDI registry. [4]
- b) How does error handling done in SOAP. Explain in brief. [4]
- c) What do you mean by interoperability? [2]

**Q5)** Attempt the following:

- a) Explain different style of SOAP communication with proper example. [4]
- b) What do you mean by Service discovery? Highlight the role of service discovery in SOA. [4]
- c) How web services are differ from component. [2]

**Q6)** Attempt the following:

- a) Write a note on Public, Private and Hybrid Community model of web services. [4]
- b) Write down steps to implement web service. [4]
- c) What are advantages and disadvantages of SOAP. [2]

**Q7)** Attempt the following:

- a) Give the difference between REST and SOAP. Explain the architecture of Restful services in detail. [5]
- b) Write a client side and server side java code to return the amount of fees balanced of the student if the roll no and academic year is inputted. (Use database connectivity assume mysql/sql server as database). [5]

**Q8)** Attempt the following:

- a) Discuss the different product of Google in the point of view of SaaS,PaaS,IaaS. [5]
- b) Explain the concept of Virtualization. Write a note on Type I and Type II hypervisors. [5]





Total No. of Questions : 8]

SEAT No. :

**P1781**

**[5133]-3005**

[Total No. of Pages : 2

**M.Sc.**

**COMPUTER SCIENCE**

**CS-306: Database and System Administrator  
(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 wherever necessary.*
- 3) *Figures to the right indicate full marks.*

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

- a) What are the different file manipulation commands under LINUX? [4]
- b) Explain how MYSQL uses the disk space. [4]
- c) What is the explicit table locking? [2]

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

- a) Explain MERGE storage engine. [4]
- b) What are the directory listing options in LINUX Operating system? [4]
- c) What is SQL Parser? [2]

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

- a) What are the names and contents of file directories in LINUX? [4]
- b) Explain the SAMBA server? Its configuration and uses. [4]
- c) Give any two features of MEMORY storage engine? [2]

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

- a) Explain the INNODB storage engine? [4]
- b) Explain any four commands used in MYSQL client program? [4]
- c) Give the effects of using safe updates option? [2]

**P.T.O.**

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

- a) Explain MYSQL output formats? [4]
- b) What is client command and SQL statement? [4]
- c) What is key buffer and buffer pool? [2]

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

- a) What are the different disk checking commands in Linux operating system? [5]
- b) What are the usage of ping, telnet & FTP program in LINUX operating system? [5]

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

- a) Explain MEMORY and FEDERATED storage engine? [5]
- b) What is advisory lock and explain its all functions? [5]

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

- a) How file and directory listing is done in LINUX? [4]
- b) Explain MYSQL architecture with diagram? [4]
- c) Give any two responsibilities of system administrator? [2]



Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :2

**P1782**

**[5133] - 3006**

**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 GUI programming and mixed language programming. **[4]**

b) Explain Lambda terms. **[4]**

c) What is the output of following script **[2]**

```
T1=(10,20,30,40,50)
```

```
T2=(100,200,300)
```

```
T3=T1+T2
```

```
print T3
```

**Q2) a)** Explain generators and iterators with example. **[4]**

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

c) What is the output of following script **[2]**

```
for letter in "Python":
```

```
    if letter == "h":
```

```
        break
```

```
    print letter
```

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

- Q3)** a) What are free and bound variables in Lambda Calculus? Find Free and Bound variables for expression  $(\lambda x. x z) \lambda y. w \lambda w. w y z x$  [4]
- b) Explain any four principles of FP. [4]
- c) Write functions in python to get current working directory and to change current directory with example. [2]
- Q4)** a) Write a script to determine if the given substring is present in the string. [4]
- b) Explain lambda functions in python with the help of examples. [4]
- c) What is dictionary? How we can create it using dict() function. [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 spaces. [4]
- c) What is the difference between list, tuple and sets? [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) What is mixed language programming. [2]
- Q7)** a) Reduce the following expression using Applicative order and Normal order  $(\lambda x. (\lambda y. \lambda z. z y) x) p (\lambda x. x)$  [5]
- b) Write python script to do following [5]
- Create a Employee class, add constructor to the class that accepts name and salary as parameters, add name and salary as data members of the Employee class, add methods to display Employee name and salary. Add another method to count number of employees using class variable.
- Q8)** a) Explain substitution with examples. [5]
- b) What are functional forms? Explain composition, construction and apply to all with examples. [5]

*EEE*

Total No. of Questions : 8]

SEAT No. :

**P1783**

**[5133]-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 indicate full marks.*

- Q1)** a) Explain Architecture of BI. [4]  
b) Explain cluster Analysis for date mining. [4]  
c) Define Metadata. [2]
- Q2)** a) How does a KPI differ from an operational metric? [4]  
b) What is data warehouse? Describe characteristics of data warehouse. [4]  
c) What are some of popular application areas of text mining? [2]
- Q3)** a) Explain Artificial neural networks for Data mining. [4]  
b) What are the most common tasks addressed by NLP? [4]  
c) What is the goal of operational planning? [2]
- Q4)** a) Discuss the major issues in implementing BI. [4]  
b) How does CRISP-DM differ from SEMMA? [4]  
c) What is web mining? [2]
- Q5)** a) What are the main challenges the web poses for knowledge discovery? [4]  
b) Explain six sigma in performance management methodology. [4]  
c) Explain any two application of data mining. [2]

**P.T.O.**

- Q6)** a) What is data integration. Describe the three steps of the ETL process. **[4]**
- b) What are dashboards? Explain the characteristics of a well-designed dashboard. **[4]**
- c) What are the limitations of on-demand systems? **[2]**
- Q7)** a) What is data visualization? What are some of major challenges associated with displaying BPM & BI application data. **[5]**
- b) Explain how CDM works. What are the major benefits of CMD? **[5]**
- Q8)** a) What is RFID? Explain what kinds of data are read/recorded through RFID? **[5]**
- b) Consider the casestudy of a successful bottling company ensure that its vending machines are profitable. The data warehouse of the company collects not only historical data but also near-real-time data from each vending machine (viewed as a store) that could be transmitted via wireless connection to head quaters. The phases of DW system includes sales, product sells out, machine related information. Reports are generated based on the requirement of the system. An architecture is required to increase the promptness of the request and to forecast the demand. The boundries of the company can be increased with active DW architecture.
- Suggest a DW architecture that will be best suitable for the above case study & justify your answer. **[5]**

**x x x**

Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :2

**P1784**

**[5133] - 4001**

**M.Sc.**

**COMPUTER SCIENCE**

**CS - 402: Parallel Computing**

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

*Time : 3 Hours]*

*[Max. Marks :50*

*Instructions to the candidates:*

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

- Q1)** a) What do you mean by multi cores programming? Give suitable example.  
b) Write a note on Flynn's Taxonomy.  
c) Give two different approaches for parallel computing.

**[4+4+2]**

- Q2)** a) Explain various applications of parallel computing.  
b) Elaborate Foster's design paradigm for multi computing programming.  
c) What do you mean by explicit parallelism?

**[4+4+2]**

- Q3)** a) Explain PRAM model of parallel computation in detail.  
b) How software multithreading is done using TBB?  
c) What do you mean by cluster?

**[4+4+2]**

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

- Q4)** a) Give an overview of programming with shared memory.  
b) Write a short note on PVM.  
c) What do you mean by CUDA?

[4+4+2]

- Q5)** a) Write any four advanced features of MPI.  
b) Explain Cache coherence problem.  
c) What do you mean by GPGPU?

[4+4+2]

- Q6)** a) Explain various OpenMP constructs.  
b) Write various programmability issues in parallel computing.  
c) What is Cilk ++?

[4+4+2]

- Q7)** a) Explain Beowulf cluster in detail.  
b) Give various performance issues in OpenMP.

[5+5]

- Q8)** a) How cluster programs are evaluated and tuned?  
b) Explain thread binding in OpenMP.

[5+5]

*EEE*



Total No. of Questions : 8]

SEAT No. :

**P1785**

**[5133]-4002**

[Total No. of Pages : 2

**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 diagrams must be drawn wherever necessary.*
- 3) *Figures to right indicate full marks.*

- Q1)** a) Explain the basic design of Real Time Operating Systems (RTOS). [4]  
b) Write a short note on ARM RISC architecture. [4]  
c) What is interrupt? List different types of interrupts. [2]
- Q2)** a) Write short note on Run-time libraries. [4]  
b) Define simulation. Explain low level simulation. [4]  
c) Define flash memory. [2]
- Q3)** a) How can a real time performance be derived from a non real time system? [4]  
b) Explain the pre-processor. [4]  
c) What is buffer exchange? [2]
- Q4)** a) Explain JTAG and OnCE. [4]  
b) What are the various techniques of saving the memory space? [4]  
c) List different software tools required for designing an embedded system. [2]

*P.T.O.*

- Q5)** a) How do functions differ from ISRs, task, threads and processes? [4]  
b) Discuss the problems with real time without a RTOS. [4]  
c) Mention any two input devices used in a embedded system. [2]
- Q6)** a) Explain the pre-emptive and non-preemptive kernel. [4]  
b) Explain the read and write cycles of an DRAM cell with suitable diagram. [4]  
c) Define page and segment. [2]
- Q7)** a) What are different types of addressing modes of 8051? Explain any two. [5]  
b) Explain the priority levels for RTOS architecture. [5]
- Q8)** a) Explain the task level and symbolic debugger. [5]  
b) Draw a block diagram of generic timer/counter section in a microcontroller and explain the function of each block in brief. [5]



Total No. of Questions : 8]

SEAT No :

**P1786**

**[5133]-4003**

[Total No. of Pages :2

**M.Sc.**

**COMPUTER SCIENCE**

**CS - 404:Software Quality Assurance**

**( 2013 Pattern) ( 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.*

**Q1)** Answer the following:

- a) Explain the term Software Quality. Why quality is important. **[4]**
- b) Explain software quality configuration management Audit. **[4]**
- c) Explain software testing. **[2]**

**Q2)** Answer the following:

- a) What are the Mc Call's Quality factors? Explain. **[4]**
- b) Write a short note on white box testing. **[4]**
- c) List out the class of Software Development risks. **[2]**

**Q3)** Answer the following:

- a) What are walkthroughs and what they can be used for? **[4]**
- b) Explain the concept of 'CASE TOOLS'. **[4]**
- c) Which factors affects the quality of IT projects. **[2]**

**P.T.O.**

**Q4)** Answer the following:

- a) Write a short note on SEI-CMM. [4]
- b) Explain the use of templates and checklists in software quality. [4]
- c) Define Version Control. [2]

**Q5)** Answer the following:

- a) What are the sources of corrective and preventive actions? [4]
- b) Explain in detail 'Review' and its types. [4]
- c) Explain inspections and its use. [2]

**Q6)** Answer the following:

- a) Explain Scatter diagram with example. [4]
- b) Define product. Explain the use of process Quality metrics in software Quality. [4]
- c) Explain ISO 9001. [2]

**Q7)** Answer the following:

- a) Define Software Quality Assurance. Explain the objectives of SQA. [5]
- b) Explain Verification and Validation and its use in software development. [5]

**Q8)** Answer the following:

- a) Explain quality control and tools and techniques used for quality control. [5]
- b) Explain process Quality metrics. [5]



Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :3

**P1787**

**[5133] - 4004**

**M.Sc.**

**COMPUTER SCIENCE**

**CS-405: Modeling & Simulation**

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

*Time : 3 Hours]*

*[Max. Marks :50*

*Instructions to the candidates:*

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

**Q1)** Attempt the following:

- a) Write a note on Graph or Network transition based simulations. [4]
- b) What is a source system. Explain the types of system with examples of each. [4]
- c) What is validation at the behavioral level. [2]

**Q2)** Attempt the following:

- a) Discuss the advantages and disadvantages of simulation. [4]
- b) Discuss the importance of Output analysis. [3]
- c) Explain sensitivity analysis. [3]

**Q3)** Attempt the following:

- a) List and briefly discuss the components found in most discrete event simulation models. [4]
- b) What is transient behavior. [2]
- c) Write a note on probability distributions and estimation. [4]

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

**Q4)** Attempt the following:

- a) Write a note on Actor based simulations. [4]
- b) Write a note on the application areas of simulation. [4]
- c) What is the difference between continuous and discrete formalisms. [2]

**Q5)** Attempt the following:

- a) Write a note on hybrid systems and their simulators. [4]
- b) Discuss the concept of probability in modeling. [4]
- c) What is stepped and event based time. [2]

**Q6)** Attempt the following:

- a) Write a note on Queues and Random noise. [5]
- b) What is a generator and transducer. [3]
- c) What is a discrete event. [2]

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

- a) Write a note on process based simulators. [5]
- b) Write a note on Analyzing models. [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-idly” 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.

*EEE*