

Total No. of Questions :8]

SEAT No. :

**P3277**

**[5037]-1001**

[Total No. of Pages : 2

**M.Sc.**

**COMPUTER SCIENCE**

**CS-101 : Principle 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 indicate full marks.*
- 4) *Neat diagrams must be drawn wherever necessary.*

**Q1)** Answer the following.

- a) What is object closure? Explain with suitable example in C++ [4]
- b) Explain why ordering within an expression is important? [4]
- c) What is container? [2]

**Q2)** Answer the following.

- a) What is enumeration type? Give design issues for enumeration types. [4]
- b) Explain the concept of macros in 'C' with suitable example. [4]
- c) "Dataflow languages provide inherently parallel model", Justify true or false" [2]

**Q3)** Answer the following.

- a) Consider the student Database  
Studies-in (Student -name, Course)  
Scores (Student - name, Percentage)  
Write prolog program to list all students who are not from BCS course  
(Use cut and fail) [4]
- b) Explain the two solutions to dangling pointer problem? [4]
- c) What is memorization [2]

**P.T.O.**

**Q4)** Answer the following:

- a) Name eight major categories of control flow mechanisms. [4]
- b) Explain any four concepts of oops [4]
- c) “Functional languages are referentially transparent”. Justify whether True or False. [2]

**Q5)** Answer the following:

- a) Explain the static method binding and dynamic method binding in C++ [4]
- b) What is semaphore? Explain the wait and release operations for semaphore [4]
- c) What are instantiated and uninstantiated variables in prolog? [2]

**Q6)** Answer the following:

- a) Explain the MIMD architecture. [4]
- b) Explain initialization and assignment in C++ with suitable example. [4]
- c) What is slice? Name any two language supporting slices [2]

**Q7)** Answer the following:

- a) Write a lisp function for finding the GCD of two numbers [5]
- b) Explain various categories of arrays based on binding to subscript ranges & storage [5]

**Q8)** Answer the following:

- a) Consider the following sentences  
“Jack and shelly are friends. Peter and Mery are friends. Jack is friend of Bob. Jane is friend of shelly. Mike is Bob’s friend. Friend of friend is a friend”.  
Write a prolog program to find friends of jack. [5]
- b) What is a “simple” subprogram? Give the actions taken when control returns from the simple subprogram [5]

✓ ✓ ✓

Total No. of Questions : 8]

SEAT No. :

[Total No. of Pages : 2

**P3278**

**[5037]-1002**

**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) *Figures to the right indicates full marks.*

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

- a) Compare distance vector and link state routing. **[4]**
- b) Transform a following message using playfair cipher technique. **[4]**  
Message: ATTACK TOMORROW  
Keyword: CIPMER
- c) What is anonymous electronic money? **[2]**

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

- a) Explain IPv4 to IPv6 transition. **[4]**
- b) Write a note on clark's solution to silly window syndrome that degrades the TCP performance. **[4]**
- c) What is DNS spoofing? **[2]**

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

- a) List the different technologies used to connect two remote devices in point to point WAN. Explain any one in detail. **[4]**
- b) What is attack? Explain active and passive attacks. **[4]**
- c) Which are the key participants in SET? **[2]**

**P.T.O.**

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

- c) Explain key principles of security. [4]
- b) What is digital certificate? Explain the steps involved in the creation of digital certificate. [4]
- c) What is virus? State the phases of a virus lifetime. [2]

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

- a) When is a Demilitarized zone (DMZ) required? How is it implemented? [4]
- b) Given two prime number  $P=7$ ,  $Q=17$ . Find  $N, E$  and  $D$  in RSA encryption process. [4]
- c) What is keyberos ? State the parties involved in it. [2]

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

- a) What is Frame Relay? Discuss its advantages. [4]
- b) Consider the following routing table for the router  $R_1$ . [4]

Mask	NetworkAddress	Next-Hop	Interface
/27	202.14.17.224	—	$m_1$
/26	145.23.12.192	—	$m_3$
/24	14.5.23.12.0	—	$m_0$
Default	Default	130.56.12.4	$m_2$

- i) Show the forwarding process if a packet arrives at  $R_1$  with destination address 145.23.12.204.
- ii) Show the forwarding process if a packet arrives at  $R_1$  with destination address 221.45.14.78.
- c) What is use of IV in CBC mode? [2]

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

- a) How Bellman-Ford algorithm is used to find shortest path? [5]
- b) Explain the buffer allocation handled in transport layer. [5]

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

- a) Explain in detail the security handshake pit falls. [5]
- b) Justify: Application gateway firewall are more secure than packet filters. [5]



Total No. of Questions : 8]

SEAT No. :

**P3279**

**[5037]-1003**

[Total No. of Pages : 5

**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.*

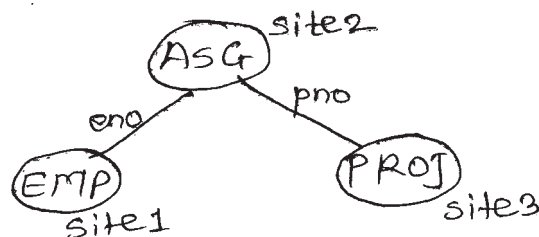
**Q1)** Answer the following:

- a) Write a short note on the components of DDBMs. [4]
- b) What questions are arises while designing DDBMs. [4]
- c) Write the complexity of the following relational algebra operations [2]
  - i) Semijoin
  - ii) Cartesian product.

**Q2)** Answer the following:

- a) Consider the join graph given below for the relational algebra query. [4]

$PROJ \bowtie_{pno} EMP \bowtie_{eno} ASG$



Using the information given below, describe a join program which will need minimum data transfer .

**P.T.O.**

Size (EMP) = 100 , Size (ASG) = 200

Size (PROJ) = 300

Size (EMP ⋈ ASG) = 300, Size (ASG ⋈ PROJ) = 200

- b) Explain the layers of query processing. [4]
- c) State the 3 dimensions based on which architectural models for a DDB is defined. [2]

**Q3)** Answer the following:

- a) Write a short note on Query optimization process with special emphasis on the search space generation & the search strategies used. [4]
- b) Explain shared Disk & shared nothing architecture. [4]
- c) Consider the following relation [2]
  - i) EMP (eno, ename, title)
  - ii) PROJ (pno, pname, budget, location)
  - iii) ASG (eno, pno, resp, dur)

Give the Query graph for the following query

SELECT ename, pname

FROM EMP, PROJ, ASG

WHERE Emp. eno = ASG . eno

and dur > 12.

**Q4)** Answer the following:

- a) Simplify the following query & transform it into an optimized operator tree using the restructuring algorithm. [4]

SELECT ename, pname

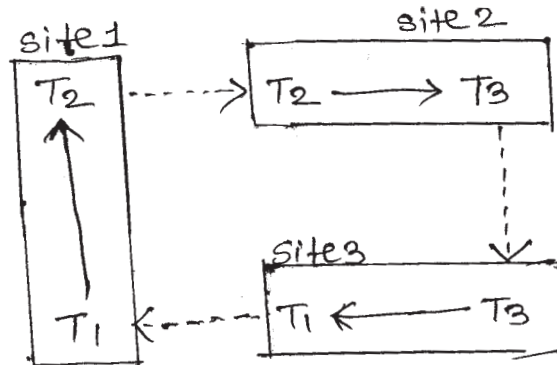
FROM PROJ, ASG, EMP

WHERE dur > 12 and EMP. eno = ASG . eno

and ASG. pno = PROJ. pno

and (title = "Comp. Engg" or ASG. pno < "P<sub>3</sub>")

- b) Consider the DWFG given below [4]



Detect the deadlock using the distributed deadlock detection algorithm.

- c) What is checkpointing. [2]

Q5) Answer the following:

- a) Simplify the following Query using idempotency rules

SELECT title

FROM Emp

WHERE (not (title = "Programmer")) and

(title = "Programmer" or title = "Elect Engg")

and (not (title = "Elect Engg"))

or ename = "Rahul" [4]

- b) What are the difference between multi DBMS and Distributed DBMS. [4]

- c) What is minterm predicate? Give example. [2]

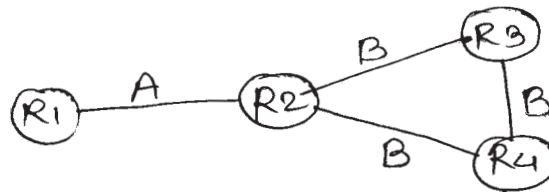
Q6) Answer the following:

- a) Discuss various types of information required in allocating of fragments to different site. [4]

- b) List out all characteristics of query processor & explain any one in detail. [4]
- c) List any four types of failures that can occurs in Distributed database.[2]

**Q7)** Answer the following:

- a) Consider the join graph of fig. A & statistics of fig. B and apply SDD - 1 algorithm with  $T_{msg} = 20$  and  $T_{T_R} = 1$ . [5]



Relation	Size
$R_1$	1000
$R_2$	1000
$R_3$	2000
$R_4$	1000

Attribute	Size	SFsj
$R_1.A$	200	0.5
$R_2.A$	100	0.1
$R_3.B$	300	0.9
$R_4.B$	150	0.4
$R_2.B$	100	0.2

- b) Consider a data item x, let  $RTM(x) = 21$  &  $WTM(x) = 20$ . Let the pair  $(\langle Ri(x), TS \rangle, \langle Wi(x), Ts \rangle)$  denote a read|write request of transaction  $T_i$  on item x with time stamp  $T_s$ . Indicate the behaviour of the basic time stamp method with following sequence of requests:- [5]

$\langle R_1(x), 19 \rangle, \langle R_2(x), 22 \rangle, \langle W_3(x), 29 \rangle,$

$\langle W_4(x), 23 \rangle, \langle R_5(x), 28 \rangle, \langle W_6(x), 27 \rangle,$



**Q8)** Answer the following:

- a) Let  $Q = \{q_1, q_2, q_3\}$  be the set of queries,  $A = \{A_1, A_2, A_3, A_4\}$  be the set of attributes and  $S = \{S_1, S_2\}$  be the set of sites. The matrix a, given below, describes the attribute usage values and matrix b gives application access frequencies. Assume that  $ref(q_k) = 1$  for all  $q_k$  and  $S_1$  and  $A_3$  is the key attribute. Apply clustering algorithm and partitioning algorithm (if required) and obtain vertical partitions of the relation. **[5]**

	$A_1$	$A_2$	$A_3$	$A_4$		$S_1$	$S_2$	
$q_1$	1	1	1	0	]	$q_1$	5	20
$q_2$	0	1	1	0	]	$q_2$	25	8
$q_3$	0	0	1	1	]	$q_3$	30	6
(a)						(b)		

- b) Consider EMP & PAY are horizontally fragmented as **[5]**

$$EMP_1 = \sigma_{title} = \text{“Elect Engg” (EMP)}$$

$$EMP_2 = \sigma_{title} = \text{“System” (EMP)}$$

$$EMP_3 = \sigma_{title} = \text{“Mech Engg.” (EMP)}$$

$$EMP_4 = \sigma_{title} = \text{“Programmer” (EMP)}$$

$$PAY_1 = \sigma_{sal} \geq 30000 \text{ (PAY)}$$

$$PAY_2 = \sigma_{sal} < 30000 \text{ (PAY)}$$

Draw the join graph  $EMP \bowtie_{title} PAY$ , is this graph simple or partition. If it is partition modify the fragmentation of either employee to pay so that the join graph  $EMP \bowtie_{title} pay$  is simple.



Total No. of Questions :8]

SEAT No. :

**P3280**

[Total No. of Pages :4

[5037] - 1004

M.Sc.

COMPUTER SCIENCE

CS - 104 : Design and 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 whenever necessary.*

**Q1)** Answer the following :

- a) Write a selection sort algorithm & obtain its best & worst case running time. **[4]**
- b) Explain longest common subsequence problem Give the recurrence relation for the optimal solution when the problem is to be solved using dynamic programming. **[4]**
- c) Merge sort is in - place algorithm Justify. **[2]**

**Q2)** Answer the following :

- a) Devise a divide and conquer strategy to determine the total no. of positive numbers in an array of n numbers. **[4]**
- b) Consider the following instance for job sequencing with deadlines problem where  $n = 7$   
 $(p_1, p_2, \dots, p_7) = (6, 13, 20, 15, 6, 8, 33)$   
 $(d_1, d_2, \dots, d_7) = (2, 1, 4, 3, 2, 1, 2)$   
Give solution obtained using greedy method that uses set representation. **[4]**
- c) Define  $\theta$  and  $\Omega$  notation. **[2]**

**P.T.O.**

**Q3)** Answer the following :

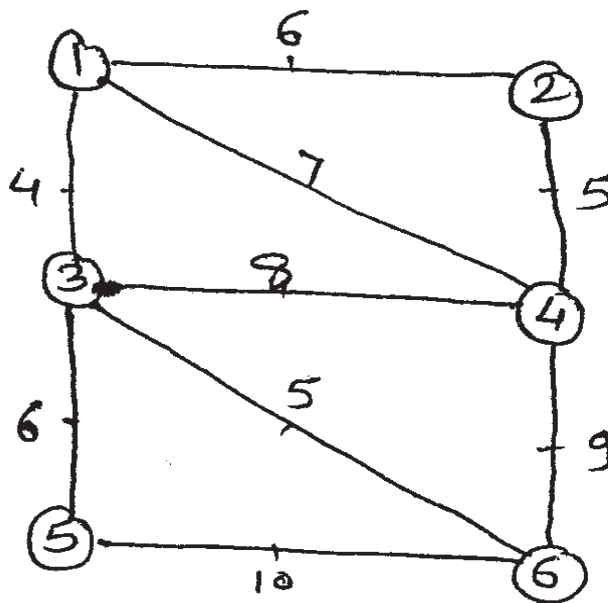
- a) Find an optimal solution to the knapsack problem instance  $n = 7, m = 25, p = (16, 17, 8, 3, 3, 9, 8), w = (16, 4, 4, 5, 8, 3, 3)$  using greedy strategy. [4]
- b) Write a non - deterministic algorithm to solve knapsack problem. [4]
- c) Why Least cost search method is preferred over LIFO and FIFO Branch Bound Method. [2]

**Q4)** Answer the following :

- a) Draw the portion of the state space tree generated by LCBB for 0/1 knapsack problem instance given by  $n = 3, m = 10, p = (8, 5, 5), w = (6, 5, 5)$ . [4]
- b) Use strassen's algorithm to compute the matrix product of following matrices giving each computation step. [4]
- c) Explain AVL tree. [2]

**Q5)** Answer the following :

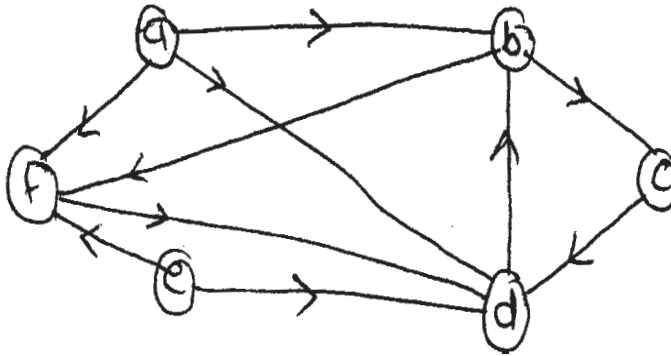
- a) What is minimum spanning tree? Using prims algorithm find the minimum spanning tree of following Graph G. [4]



- b) Determine the polynomial of smallest degree that interpolate the point  $(0, 5) (1, 10) (2, 21)$ . [4]
- c) Show that there is no sol<sup>n</sup> for 3 queen problem. [2]

**Q6)** Answer the following :

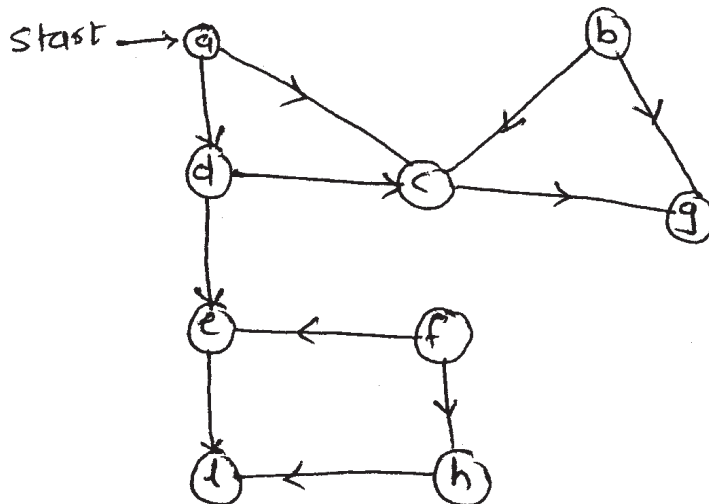
- a) What is strongly connected component? Find the strongly connected components of the following graph (start from vertex a). [4]



- b) Order the following function in ascending order of the growth rate  $\log_2 n, n, n \log_2 n, n^2, n^3, 2^n$ . [4]
- c) Explain Optimal Merge patterns. [2]

**Q7)** Answer the following :

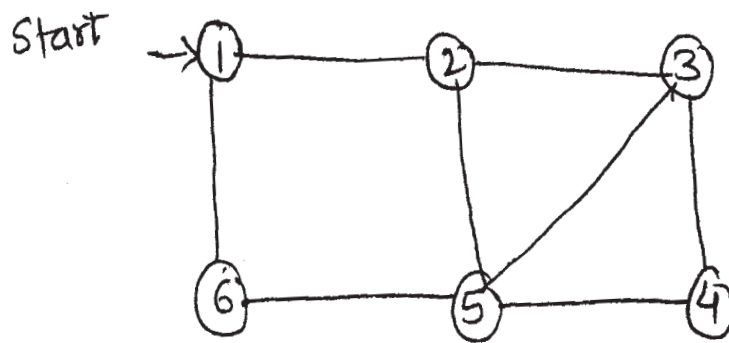
- a) Find the topological sort of the following graph? What is its time complexity. [5]



- b) What is the best way to multiply a chain of matrices with dimensions that are  $5 \times 10, 10 \times 3, 3 \times 12, 12 \times 5, 5 \times 50, 50 \times 6$  using dynamic programming method. [5]

**Q8)** Answer the following :

- a) What is principle of optimality? Solve 0/1 knapsack problem with  $n = 4$ ,  $m = 34$ ,  $p = (2, 5, 8, 1)$ ,  $w = (10, 15, 6, 9)$  using dynamic programming [use function method]. **[5]**
- b) What is Hamiltonian cycle? Find out all possible Hamiltonian cycle for the following graph. **[5]**



Total No. of Questions :8]

SEAT No. :

**P3281**

**[5037]-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 diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Assume suitable data if necessary.*

- Q1)** a) Explain how does error handling is performed by using functions. [4]  
b) Why most value-result arguments such as length a socket address structure be passed by reference. [4]  
c) Define connect function. [2]
- Q2)** a) Under what conditions a socket is ready for writing. [4]  
b) Describe the steps involved in normal termination of our client & server.[4]  
c) Define protocol registration. [2]
- Q3)** a) State the different address conversion functions used by IPV4. [4]  
b) Write a note on Daemonizing. [4]  
c) State the use of SIGPIPE signal. [2]
- Q4)** a) State the difference between TCP & UDP. [4]  
b) How does UDP handles lost datagrams? [4]  
c) Define b zero and memset function. [2]
- Q5)** a) Write a client function to echo lines on a datagram socket. [4]  
b) Under which conditions poll function Returns the Specified event? [4]  
c) State SO-LINGER option. [2]

**P.T.O.**

- Q6)** a) Write an outline for echo client processing. [4]  
b) Explain the behavior of connect () function when it is called multiple times by UDP socket. [4]  
c) Define select function. [2]
- Q7)** a) Explain the status of client & server while the server is blocked in the call to accept ( ). [5]  
b) Discuss the different messages used by active client in chat protocol. [5]
- Q8)** a) Describe different client side considerations [5]  
b) Discuss different socket options used by IPV 6. [5]



Total No. of Questions :8]

SEAT No. :

**P3282**

**[5037]-2001**

[Total No. of Pages :3

**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) *All questions carry equal marks.*
- 4) *Figures to the right indicate full marks.*

- Q1)** a) Explain Image Acquisition using sensor arrays. **[4]**
- b) Explain the steps involved in unsharp masking. What is the importance of weight(k) in unsharp masking. **[4]**
- c) Write correct equations for forward and inverse DFT. **[2]**
- Q2)** a) What are chain codes? What is the purpose of normalizing a chain code. **[4]**
- b) Explain morphological operations of Dilation and Erosion. **[4]**
- c) State the difference between boundary and an edge. **[2]**
- Q3)** a) Write a short note on lowpass filters in frequency domain. **[4]**
- b) Explain and state the use of Wiener filtering. **[4]**
- c) Define Euclidean distance and city- block distance between pixels  $p(x,y)$  &  $q(s,t)$ . **[2]**

**P.T.O.**



**Q4) a)** Consider the following two images. **[4]**

$$f_1 = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 2 \\ 1 & 1 & 1 \end{bmatrix} \quad f_2 = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 1 & 0 \\ 0 & 1 & 1 \end{bmatrix}$$

Let  $a_1=1$  and  $a_2=-1$ . Prove that subtraction is a linear operator.

b) Explain the working of 'Homomorphic filter'. **[4]**

c) State three fundamental steps performed in edge detection. **[2]**

**Q5) a)** Given below is 'X': a section of horizontal intensity profile from an image. Illustrate the 1<sup>st</sup> & 2<sup>nd</sup> derivative of the 1-D digital function represent by 'X'. Depict zero crossing, if any. **[4]**

2	2	2	5	5	5	5	2	2	2	3	4	4	4	5	5	5	2	2	2
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

b) What is selective filtering? Describe Bandreject & Bandpass filters. **[4]**

c) Mention two ways of estimating degradation function. **[2]**

**Q6) a)** What do you mean by signature? Show how to find signatures for a circular and a square boundary. **[4]**

b) Give any two noise models along with their probability density functions and the systems in which they are found. **[4]**

c) State the 2-D convolution theorem. **[2]**

**Q7) a)** Explain the fundamental steps in digital image processing with the help of a block diagram. **[5]**

b) Given a 32-bit image of size  $32 \times 32$  pixels having intensity distribution as shown in the table given below, where intensity levels are in the range 0-7. Apply histogram equalization technique & find the transfer function  $T(r)$  which relates input image intensity level  $r_k$  to output image intensity level  $S_k$ . **[5]**

Intensity Level	Number of pixels
$r_0 = 0$	98
$r_1 = 1$	346
$r_2 = 2$	233
$r_3 = 3$	119
$r_4 = 4$	84
$r_5 = 5$	71
$r_6 = 6$	54
$r_7 = 7$	19

**Q8) a)** Define 'opening' and 'closing' operations. In what way do they differ from each other. **[5]**

b) Explain the basics of intensity thresholding. **[5]**



Total No. of Questions : 8]

SEAT No. :

**P3283**

**[5037]-2002**

[Total No. of Pages : 2

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

**CS-202 : ADVANCED OPERATING SYSTEM**

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

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to candidates:*

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

- Q1)** a) Explain structure of a buffer header? Also Explain how kernel maintains the buffer cache. [4]  
b) What is a process? Draw and explain state transition diagram of a process. [4]  
c) Symbolic link incur more overhead than hard link-Justify [2]
- Q2)** a) Write a note on signal set [4]  
b) Explain fork () and vfork () system call. [4]  
c) What is processor affinity? [2]
- Q3)** a) Write a c program which creates file with hole in it. [4]  
b) Explain session & process groups. [4]  
c) Explain sticky bit. [2]
- Q4)** a) How to get a information associated with a file ? What all information we get [4]  
b) Describe the various conditions for boosting the priority of threads. [4]  
c) Explain getrlimit () system call [2]
- Q5)** a) Write a c program to demonstrate the use of atexit () system call. [4]  
b) Explain following system calls. [4]  
i) Memset ()  
ii) Memchr ()  
iii) Memcmp ()  
iv) Memmove ()  
c) Explain realtime priorities. [2]

**P.T.O.**

**Q6) a)** Explain kernel data structure after execution of dup () system call. [4]

b) Write the output of the following program [4]

With explanation.

```
    Main ()
{   int  i = 0;
    for ( i = 0 ; K2 ; i ++ )
    {   fork ();
        Print f (“\n I am process at i = % \n ; i);
    }
    if ( Fork c) == 0)
        Print (“\n this is a child process”);
}
```

c) What do you mean by unreliable signals? [2]

**Q7) a)** Explain a system call used to create anonymous memory mapping. Also list down the benefits of allocating memory via anonymous memory mapping. [5]

b) Write a C program that prints type of a file for each command line argument. [5]

**Q8) a)** Write a note on thread life cycle with respect to windows O.S. [5]

b) Explain read system call. Also explain which I/O parameters are set during execution of read system call. [5]

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Total No. of Questions :8]

SEAT No. :

**P3284**

**[5037]-2003**

[Total No. of Pages :4

**M.Sc.**

**COMPUTER SCIENCE**

**CS-203: Data Mining and Data Warehousing**

**(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 whenever necessary.*
- 3) All questions carry equal marks.*
- 4) Assume suitable data if necessary.*

**Q1) a)** Explain hierarchical method of clustering. **[4]**

b) Define Data warehouse. Explain each of its property in brief. **[4]**

c) Define: **[2]**

i) Precision

ii) Recall

**Q2) a)** What is the need of preprocessing of data? What are the steps in preprocessing? **[4]**

b) Explain any four issues in the process of Data mining. **[4]**

c) “When the values of class lable are descrete, the model used to predict class label is called Predictor” Comment. **[2]**

**P.T.O.**

**Q3) a)** The dataset contains following transactions. **[4]**

TID	List of Items
T <sub>1</sub>	Milk, Bread, Butter
T <sub>2</sub>	Bread, Milk
T <sub>3</sub>	Sugar, Milk, Bread
T <sub>4</sub>	Bread, Butter
T <sub>5</sub>	Bread, Butter, Milk
T <sub>6</sub>	Milk, Sugar
T <sub>7</sub>	Milk, Bread, Butter
T <sub>8</sub>	Milk, Butter

If minimum support count is 4, find out frequent itemsets using APRIORI algorithm.

b) Explain two commonly used text indexing techniques. **[4]**

c) Explain the terms: **[2]**

i) Noise

ii) Outliers

**Q4) a)** Draw and explain 3 - tier architecture of Data warehouse. **[4]**

b) How efficiency of Apriori algorithm can be improved? Explain any one of the method in detail. **[4]**

c) In Clustering the values of class labels are not known. Comment. **[2]**

- Q5)** a) Explain the process of KDD (Knowledge Discovery in Database). [4]
- b) What are different commonly used attribute selection measures? Write disadvantages of each one. [4]
- c) Define: [2]
- i) Closed frequent itemset.
- ii) Maximal frequent itemset.

**Q6)** a) What are the two problems with Rule Based classification method? How these problems are handled? [4]

- b) Following are the age and body fat values for 8 persons. [4]

Age	% body fat
23	9.5
23	26.5
27	7.8
27	17.8
39	31.4
41	25.9
47	27.4
49	27.2

Normalize body fat% based on z-score normalization.

- c) Define: [2]
- i) Stop words
- ii) Stem words

- Q7) a)** Consider the following training data set with class label buys-computer, having two distinct values {yes, no}. [5]

TID	Age	Income	Student	Buys - computer
1	Youth	Medium	Yes	Yes
2	Youth	Low	Yes	No
3	Middle-aged	High	No	Yes
4	Senior	High	No	No
5	Senior	Low	No	No
6	Senior	High	Yes	No
7	Youth	High	Yes	Yes
8	Middle -aged	Medium	Yes	Yes
9	Youth	Medium	No	No
10	Youth	High	No	No

Predict the class label for the following tuple X using naïve Bayesian classifier. X= (youth, medium, yes).

- b) Write note on - web usage mining. [5]

- Q8) a)** Explain the problem of “class imbalance”, which occurs while assessing accuracy of classification model. How is it handled? [5]

- b) The following data is collected about the students in a class. [5]

No. of lectures attended	Marks Obtained
30	56
18	42
40	75
20	49
36	65
32	60
43	80
09	36
25	25
22	48

Using straight-line regression analysis predict how many marks a student, who has attended 28 lectures, will score?

*EEE*



Total No. of Questions : 8]

SEAT No. :

**P3285**

**[5037]-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) *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)** Attempt the following:

- a) How does visual studio .NET work as integrated Development Environment? **[4]**
- b) What is a Webservice? Explain its features. **[4]**
- c) List the common page and control events in ASP.NET. **[2]**

**Q2)** Attempt the following:

- a) List the five types of web controls of ASP.NET. Explain any one in detail. **[4]**
- b) What is common type system? Which two categories of types are derived from system. Object, explain. **[4]**
- c) What is the role of Assembly loader? **[2]**

**Q3)** Attempt the following:

- a) Write a static method to accept param array of integers. The method should find the sum of all integers passed and display the result. Write a program to call a method. **[4]**
- b) What are properties in C#? Also state True or False : Properties can not be passed as ref or out parameters. **[4]**
- c) How does C# use virtual and override method? **[2]**

**P.T.O.**

**Q4)** Attempt the following:

- a) Write a console based application for the following. Create a class named player that contains player name, runs scored as data members. Create a class named Team that contains an array of players. Implement IEnumerable Interface for class Team. [4]
- b) What is the role of webclient class? Write THREE properties and THREE methods of webclient class. [4]
- c) List two properties and two events of control class. [2]

**Q5)** Attempt the following:

- a) What do you mean by serialization? List types of serialization. Explain any one in detail. [4]
- b) Design a simple console application for testing reflection concept. [4]
  - Define software Attribute as custom Attribute.
  - Write two classes BOIAccount, SBIAccount. Apply software Attribute to these classes.
  - Write Test class which will read attributes applied on each classes using reflection technique.
- c) How does the explicit resource management take place in garbage collection? [2]

**Q6)** Attempt the following:

- a) Which objects are mainly used in ADO.NET to work with data? Also explain their roles. [4]
- b) Write a short note on web application programming. [4]
- c) What is Delegate chaining? [2]

**Q7)** Attempt the following:

- a) Write a program to draw a rectangle using Linear Gradient Brush with red and yellow colour. Also fill the rectangle with colour. Write only Override Onpaint event. [5]
- b) Write a short note on ASP.NET architecture. [5]

**Q8)** Attempt the following:

- a)
  - i) State True or False : The .NET assemblies could be in the form of an application (EXE) or a class libraries (DLL). [5]
  - ii) List and explain the main components of assembly. [5]
- b) How client application can consume the web service? [5]

**x x x**

Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :4

**P3286**

**[5037] - 2005**

**M.Sc.**

**COMPUTER SCIENCE**

**CS - 206 : Artificial Intelligence**

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

*Time : 3 Hours]*

*[Max. Marks :50*

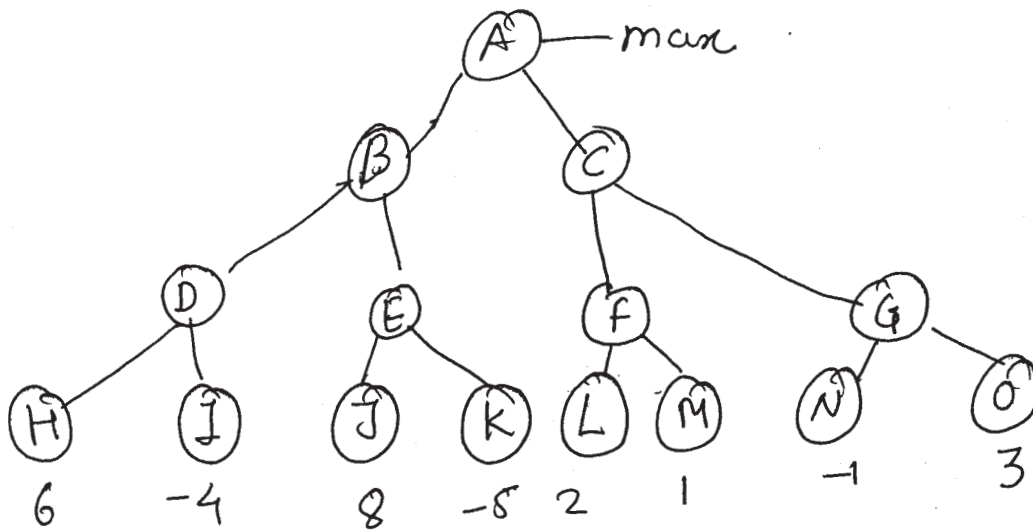
*Instructions to the candidates:*

- 1) *Solve any 5 questions out of 8.*
- 2) *Figures to the right show full marks.*
- 3) *Assume suitable data, if necessary.*
- 4) *Neat diagrams must be drawn wherever necessary.*

- Q1)** a) Write short note on semantic nets. [4]  
b) Explain generate & Test strategy of problem solving. [4]  
c) State any two AI techniques. [2]
- Q2)** a) Write short note on learning by parameter adjustment. [4]  
b) Discuss refinements in MINIMAX algorithm with alpha-beta cutoffs. [4]  
c) Define AI. [2]
- Q3)** a) Describe any two approaches of representing knowledge. [4]  
b) Compare Scripts and frames using example. [4]  
c) Distinguish between knowledge and data. [2]

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

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



Show final search tree after applying algorithm & show alpha-beta values.

b) Give state-space representation for following instance of Traveling Salesman problem. [4]

	Boston	Newyork	Miami	Dallas	S.F.
Bostan		250	1450	1700	3000
Newyork	250		1200	1500	2900
Miami	1450	1200		1600	3300
Dallas	1700	1500	1600		1700
S.F.	3000	2900	3300	1700	

c) Give semantic net representation for "The dog bit the mail carrier". [2]

**Q5)** a) Convert following WFF to CNF  $\forall x : [\text{Roman}(x) \wedge \text{caesar}] \vee \forall y : \exists z : \text{hate}(y, z) \rightarrow \text{think crary}(x, y) ]$  [4]

b) Write short note on learning with macro operators. [4]

c) Distinguish between alpha-beta search and MINIMAY search. [2]

**Q6)** a) Write short note on production system. [4]

b) Write short note on scripts. [4]

c) State less desirable properties of knowledge. [2]

**Q7)** a) What is Resolution? Describe Resolution algorithm with example. [5]

b) Consider the 8- puzzle problem. This is a simple puzzle on a 3\*3 grid where you can move the other tiles into the gap until you get the puzzle into goal position. [5]

Start	State	Blank	A	C
		H	B	D
		E	F	G
Gal	State	A	B	C
		H	Blank	D
		G	F	E

i) Find appropriate “Estimate of heuristic (h)” function for this problem

ii) State the appropriate g (cost of coming to particular node from initial node) function.

iii) Explain how function g plays an important role in guiding the search.

**Q8) a)** Translate following english statements to FOPL: **[5]**

- i) Every student who takes A1 passes it in the same semester.
- ii) There is atleast one student who does not hate (any of) A1 homework.

**b)** Consider following statements. **[5]**

- i) Ravi likes all kind of food.
- ii) Apples and chicken are food.
- iii) Anything anyone eats and is not killed is food.
- iv) Ajay eats peanuts and is still alive.
- v) Rita eats everything that Ajay eats.

Convert above statements to WFF in first order predicate calculus.



Total No. of Questions : 8]

SEAT No. :

**P3287**

**[5037]-2006**

[Total No. of Pages :2

**M.Sc.**

**COMPUTER SCIENCE**

**CS - 207 : Advance Design & Analysis of Algorithms  
(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 indicates full marks.*

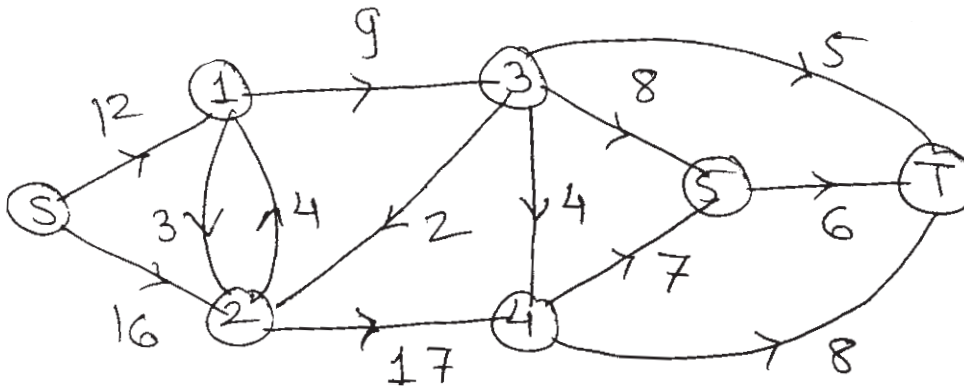
- Q1)** a) What is Primal - dual method? Where is it applied? [4]  
b) Write a note on 'Solution to TSP with complete enumeration'. [4]  
c) What is cutting plane method? What is it's use. [2]
- Q2)** a) How to use approximation algorithm to solve group steiner tree problem?[4]  
b) Discuss discrete optimization. [4]  
c) What is the concept of K median problem? [2]
- Q3)** a) Write & explain the algorithm to delete a node from Fibonacciheap. [4]  
b) Discuss convex programming with ellipsoid method. [4]  
c) Where do we require string searching. [2]
- Q4)** a) What are the types of enumeration method? [4]  
b) What are suffix trees? How they are advantageous? [4]  
c) What is topological sort? What are its limitations? [2]

**P.T.O.**

- Q5)** a) Explain the working of Boyer-Moore string searching algorithm. [4]  
 b) Discuss working of Simplex method. [4]  
 c) What are splay trees. [2]

- Q6)** a) Explain how linear programming can work to solve different problems. [4]  
 b) Write KMP algorithm. [4]  
 c) Where is heuristic optimization used? [2]

- Q7)** a) Find out maximum flow through the following network. [5]



- b) Write a note on memory management using B trees. [5]

- Q8)** a) How can we use universal steiner trees to solve TSP? [5]  
 b) Explain the working & use of dynamic trees. [5]





Total No. of Questions :8]

SEAT No. :

P3288

[5037]-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 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) Explain Scope verification and control in Scope management. [4]
- b) Write a note on Metric plan. [4]
- c) Define ROI and NPV [2]

Q2) Attempt the following.

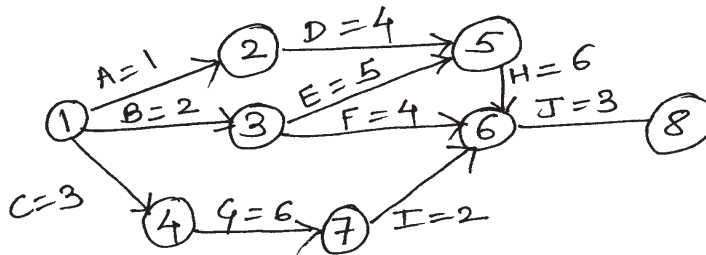
- a) Explain Maslows theory in Human resource management. [4]
- b) Explain Tools and techniques used for planning purchase and acquisition. [4]
- c) Define faults and failures. [2]

Q3) Attempt the following.

- a) Explain Bohem's Quality Model. [4]
- b) Explain Resource Leveling and Resource Loading. [4]
- c) Define statistical sampling in Quality management. [2]

Q4) Attempt the following

- a) Write a note on GQM. [4]
- b) Solve following for critical path analysis. [4]



- c) Define Productivity in software metric. [2]

P.T.O.

**Q5)** Attempt the following

- a) Explain role of data collection in software measurement with diagram. [4]
- b) Find CPI and SPI for following [4]  
Given Values: BCWS=250000  
BCWP=220000  
ACWP=280000
- c) List the phases of project life cycle. [2]

**Q6)** Attempt the following

- a) Explain levels of process maturity model. [4]
- b) Explain any four basic modes for handling conflict in communication management [4]
- c) Define EVM. [2]

**Q7)** Attempt the following

- a) What do you mean by WBS and solve WBS case study for College Admission System [5]
- b) Define Quality Assurance and explain tools and techniques used in quality assurance. [5]

**Q8)** Attempt the following

- a) What is Project Management and explain Project Integration Management. [5]
- b) Define Risk Identification and explain Negative risk Response in risk management. [5]

✓ ✓ ✓

Total No. of Questions : 8]

SEAT No. :

**P3289**

**[5037]-3002**

[Total No. of Pages : 2

**M.Sc.**

**COMPUTER SCIENCE**

**CS-302:Mobile Computing**

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

*Time : 3 Hours]*

*[Max. Marks : 50*

**Instruction:**

- 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) What are the supplementary services supported in GSM? [4]
- b) Explain DSSS in detail? [4]
- c) What is OVSF in UMTS? [2]

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

- a) "CDMA -CA" used in wireless LAN instead of "CSMA/CD", Comment and justify. [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) Which additional messages are required in optimized mobile IP. [4]
- c) What are the advantages of IPv6 in mobile IP? [2]

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

- a) Explain GPRS Architecture reference model. [4]
- b) How localization is achieved in GSM? [4]
- c) What is WAE? [2]

**P.T.O.**

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

- a) What is Hierarchical IPV6? What are its advantages and disadvantages? [4]
- b) What is reverse tunneling? Why it is needed? [4]
- c) What is MN and CN? [2]

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

- a) Explain different UI designing in Android. [4]
- b) What are the goals of mobile IP? [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) Explain UMTS Handover in detail? [5]

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

- a) What is Mobile TCP? What are its advantages and disadvantages? [5]
- b) How event handling is done in android operating system. [5]



Total No. of Questions : 8]

SEAT No. :

**P3290**

**[5037]-3003**

[Total No. of Pages : 4

**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 indicate full marks.*
- 4) *Use of simple calculator is allowed.*

**Q1)** Attempt the following:

- a) Define Artificial neural network. Discuss in brief the components of a neural network. [4]
- b) Consider two given fuzzy sets [4]

$$\underline{A} = \left\{ \frac{1}{2} + \frac{0.3}{4} + \frac{0.5}{6} + \frac{0.2}{8} \right\}$$

$$\underline{B} = \left\{ \frac{0.5}{2} + \frac{0.4}{4} + \frac{0.1}{6} + \frac{1}{8} \right\}$$

Find

- i)  $\underline{A} \cup \underline{B}$
- ii)  $\underline{B} | \underline{A}$
- c) Crossover operator creates better offsprings. Comment. [2]

**Q2)** Attempt the following:

- a) Differentiate between supervised & unsupervised learning. List any two networks of both supervised & unsupervised learning. [4]

**P.T.O.**

- b) Determine  $\lambda$  - cut relation for the  $\lambda$  - values  $\lambda = 0.2, 0.4, 0.7, 0.9$  on fuzzy relation matrix R. [4]

$$\tilde{R} = \begin{bmatrix} 0.2 & 0.5 & 0.7 & 1 & 0.9 \\ 0.3 & 0.5 & 0.7 & 1 & 0.8 \\ 0.4 & 0.6 & 0.8 & 0.9 & 0.4 \\ 0.9 & 1 & 0.8 & 0.6 & 0.4 \end{bmatrix}$$

- c) Define Fuzzy tolerance relation. [2]

**Q3)** Attempt the following:

- a) Using Genetic Algorithm maximize  $f(x) = x^2 - 1$  over  $\{0, 1, 2, \dots, 31\}$  with initial  $x$  values of (11, 29, 8, 17). Show one crossover and one mutation operation. [4]
- b) What are linguistic hedges? Explain dilation and concentration operations. [4]
- c) State the equation for Gaussian signal function. [2]

**Q4)** Attempt the following:

- a) Given the following fuzzy sets [4]

$$\tilde{A} = \text{young} = \left\{ \frac{1}{1} + \frac{0.8}{2} + \frac{0.6}{3} + \frac{0.4}{4} + \frac{0.2}{5} \right\}$$

$$\tilde{B} = \text{old} = \left\{ \frac{0.2}{1} + \frac{0.4}{2} + \frac{0.6}{3} + \frac{0.8}{4} + \frac{1}{5} \right\}$$

Find membership function for

- i)  $\tilde{A}$  slightly young and  $\tilde{B}$  very old.
- ii)  $\tilde{A}$  not very young and  $\tilde{B}$  very very old.
- b) Explain how  $\alpha$ -LMS reduces the linear error at the output of a neuron. [4]
- c) Define Intensification. [2]

**Q5)** Attempt the following:

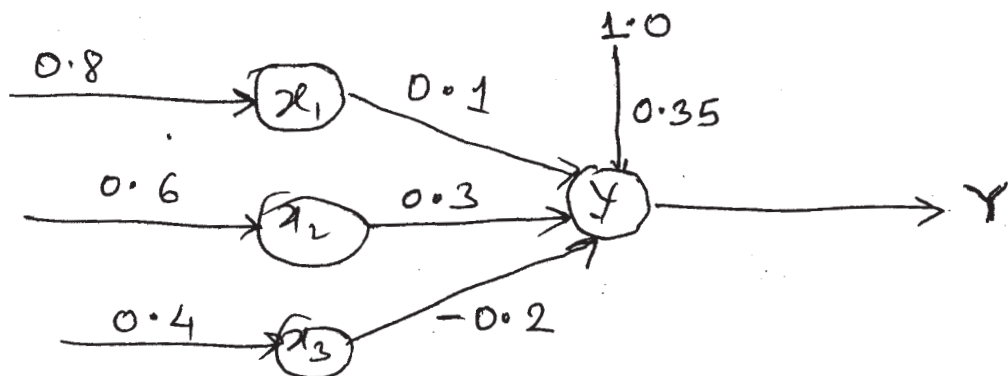
- a) Consider a fuzzy number  $\underline{1}$ , the normal convex membership function defined on integers  $\underline{1} = \left\{ \frac{0.5}{0} + \frac{1}{1} + \frac{0.5}{2} \right\}$ .

Perform addition of two fuzzy ( $\underline{1} + \underline{1}$ ) using Zadeh's extension principle. [4]

- b) Explain the following basic terminologies of genetic algorithm. [4]
- i) individuals
  - ii) genes
  - iii) fitness
  - iv) population
- c) Define convex fuzzy set. [2]

**Q6)** Attempt the following:

- a) Obtain the output of the neuron Y for the network shown in following figure using activation functions : binary sigmoidal and bipolar sigmoidal. [4]



- b) Differentiate between fuzzy sets and crisp sets. Explain operations of both. [4]
- c) Define bias. [2]

**Q7)** Attempt the following:

- a) Explain in brief the steepest descent search method. State the drawback of this method. [5]
- b) Using the inference approach, find the membership values for each of the triangular shapes (I, R, IR, E, T) for the triangle 120°, 50°, 10°. [5]

**Q8)** Attempt the following:

- a) Write a note on pattern space and weight space. [5]
- b) Consider the following fuzzy sets on universe  $x = \{a, b, c, d\}$  and  $y = \{a, b, c, d, e, f\}$  [5]

$$\tilde{A} = \left\{ \frac{0.6}{b} + \frac{1}{c} + \frac{0.2}{d} \right\}$$

$$\tilde{B} = \left\{ \frac{0.4}{b} + \frac{1}{c} + \frac{0.8}{d} + \frac{0.3}{e} \right\}$$

$$\tilde{C} = \left\{ \frac{0.3}{a} + \frac{0.5}{b} + \frac{0.6}{c} + \frac{0.6}{d} + \frac{0.5}{e} + \frac{0.3}{f} \right\}$$

Determine implication relation

If  $x$  is  $\tilde{A}$ , THEN  $y$  is  $\tilde{B}$  ELSE  $y$  is  $\tilde{C}$ .





Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :2

**P3291**

**[5037] - 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) Describe the concept of UDDI API for registering and finding service information. **[4]**
- b) Give an example XML code snippet for error handling in SOAP using fault element, also explain it. **[4]**
- c) What is multitenancy? **[2]**
- Q2)** a) Define and describe Web Service interface with its elements. **[4]**
- b) What is virtualisation? How does it relate to cloud computing? **[4]**
- c) What do you mean by wire protocol and transport protocol? **[2]**
- Q3)** a) What are Restful services? According to you when Restful services are best to use? Also give its advantages. **[4]**
- b) Consider an example, simple stock trading service that defines a single method for buying stock. The buy () method returns the cost of purchasing a specified quantity of a particular stock. Here is method declaration -  
Public float buy (int quantity, string symbol). Write a SOAP request for invoking the method. **[4]**
- c) How does one way operation differ from a request / response operation? **[2]**

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

- Q4)** a) Illustrate the steps involved in implementing web services with neat labelled diagram. [4]  
b) Write an example of document styled SOAP body. [4]  
c) What is QOS? [2]
- Q5)** a) Describe UDDI data structures with their interrelationships with neat labelled diagram. [4]  
b) Give the potential risks in cloud computing. [4]  
c) What is SOAP message path. [2]
- Q6)** a) Describe various ways used by Java developer to access a UDDI registry. [4]  
b) Describe various characteristics of cloud computing. [4]  
c) What is WS - I? [2]
- Q7)** a) Explain the structure of WSDL by writing an example. [5]  
b) Which type of service is provided by Amazon ECZ and Google APP Engine, explain these services. [5]
- Q8)** a) Draw and explain the architecture of web services. [5]  
b) Write in detail about SOAP intermediaries, also give an example. [5]



Total No. of Questions :8]

**P3292**

SEAT No. :

[Total No. of Pages :2

**[5037]-3005**

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

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

- a) Explain in brief how MYSQL uses memory. **[4]**
- b) Explain the working of INNO DB storage engine **[4]**
- c) What is the use of statement terminators in MYSQL? **[2]**

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

- a) What are the disk checking commands in LINUX Operating system?**[4]**
- b) Explain uses of locking tables in MYSQL. **[4]**
- c) Explain any two responsibilities of system Administrator. **[2]**

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

- a) What is MYSQL tier system? **[4]**
- b) What are the different types of file and directory permission in LINUX?**[4]**
- c) What is the key buffer and buffer pool? **[2]**

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

- a) Explain the MERGE storage engine, create one merge table? **[4]**
- b) What are the different servers used for networking? **[4]**
- c) Write down command for dump and reload data using MY SQL dump?**[2]**

**P.T.O.**

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

- a) How to use script files with MYSQL? [4]
- b) Explain MYSQL cluster as disaster prevention? [4]
- c) What is advisory Lock? [2]

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

- a) What are the different file manipulation commands under Linux? [5]
- b) Explain storage engine MYISAM. [5]

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

- a) Explain MYSQL Architecture with diagram. [5]
- b) What are the usage of ping, telnet & FTP program in LINUX operating system? [5]

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

- a) How MYSQL uses disk space? [4]
- b) Explain any four client commans used in MY SQL client program. [4]
- c) Give any two utility programs that can be used with MYISAM table?[2]



Total No. of Questions : 8]

SEAT No. :

**P3293**

**[5037]-3006**

[Total No. of Pages : 2

**M.Sc. - II (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) *All questions carry equal marks.*
- 3) *Figures to the right indicate full marks.*

- Q1)** a) Explain the principles of functional programming language. [4]  
b) What are different types of function arguments supported by python? Define each one of them. [4]  
c) Define mathematical function. Given a function  $f : X \rightarrow Y$ , what is the domain and range of the function? [2]
- Q2)** a) What are functional forms? Explain composition & construction with the help of examples. [4]  
b) Name two reduction strategies in lambda calculus. Give advantages & disadvantages of reduction strategies. [4]  
c) Can list be used as a key inside a dictionary? Why? [2]
- Q3)** a) Define tail Recursion. How can a non-tail recursive function be converted to a recursive one? [4]  
b) Define four categories of lambda terms. [4]  
c) Differentiate set & frozen set. [2]
- Q4)** a) Write a python program to display  
1 2 3 4 5  
1 2 3 4  
1 2 3  
1 2  
1 [4]  
b) Explain any two functional programming tools in python with examples. [4]  
c) What is duck typing? [2]

**P.T.O.**

- Q5)** a) Write python program to create a file student having student name and age and print student name having age greater than 20. [4]
- b) Reduce following lambda expressions. [4]
- i)  $((\lambda x. (xy)) (\lambda z.z))$
- ii)  $((\lambda x. ((\lambda y. (x y))X)) (\lambda z.w))$
- c) Give syntax of exception in pythan. [2]
- Q6)** a) Write a function to calculate fibbonaci number using yeild operator. Print fibbonacy numbers between 1 to 10 using this function. [4]
- b) Implement iterator protocol using python. [4]
- c) Write a regular expression that validates email. [2]
- Q7)** a) Write a python script that defines a class 'bank' with attributes cust/ name, account no. & balance. Define member function to withdraw & deposit money. [5]
- b) Explain lazy evaluation in python with example. [5]
- Q8)** a) What is substitution? Define substitution formally by recursion. Explain the role of substitution in expression evaluation with the help of an example. [5]
- b) Define  $\alpha$  - conversion,  $\beta$  reduction &  $\eta$  conversion. Parenthesize following lambda expression  $(\lambda n. \lambda f. \lambda x. f (n f x)) (\lambda g. \lambda y. gy)$  [5]

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Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :2

**P3294**

**[5037] - 3007**

**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) Give the steps involved in cyclical process Intelligence creation and use in BI governance. [4]  
b) What are the different type data warehouse architectures. Explain any 2 of them. [4]  
c) Give the differences between alerts and notifications in BI applications.[2]
- Q2)** a) Explain the characteristics of Data ware housing. [4]  
b) How decision making is automated. Explain its framework. [4]  
c) Give any 2 issues that need to be considered while choosing the best architecture for your application. [2]
- Q3)** a) What are the major tasks in strategic planning process? [4]  
b) How does ACT and ADJUST work in Business Intelligence? [4]  
c) Why do we need Web mining? [2]
- Q4)** a) Explain the way by which evaluation be conducted using Six Sigma. [4]  
b) Give the difference between classification and prediction process. [4]  
c) Define: BPM. [2]

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

- Q5)** a) Explain the CRISP DM Process. [4]  
 b) Explain Text mining. [4]  
 c) Define: Hub. [2]
- Q6)** a) Explain Web content and Web structure in mining. [4]  
 b) Explain the elements of Artificial Neural Network. [4]  
 c) What are the 2 types of Integration in BI? [2]
- Q7)** a) What are the major factors that effect the decision making process in BI implementation? [5]  
 b) Explain the process of Collaborative decision making. [5]
- Q8)** a) BP Lubricants established the Business Intelligence and Global Standards (BIGS) program following recent merger activity to deliver globally consistent and transparent management information. As well as timely business intelligence, BIGS provides detailed, consistent views of performance across functions such as finance, marketing, sales, and supply and logistics.  
 BP Lubricants is one of the world's largest oil and petrochemicals groups. Part of the BP pie group, BP Lubricants is an established leader in the global automotive lubricants market. Perhaps best known for its Castrol brand of oils, the business operates in over 100 countries and employs 10,000 people. Strategically, BP Lubricants is concentrating on further improving its customer focus and increasing its effectiveness in automotive markets. Following recent merger activity, the company is undergoing transformation to become more effective and agile and to seize opportunities for rapid growth.  
 Give a solution based on the best data warehousing architecture that you will suggest for the above case study. [5]
- b) Dole Food Company is the world's largest producer and marketer of high-quality fresh fruit and produce. The Fresh Fruit Division was experiencing major performance issues in several of its mission-critical applications, which greatly hindered the ability to deliver on the company's promise to deliver fresh products. The mission-critical applications that support the company's logistic functions include transportation, product tracking and traceability from the Dole farms to distribution centers in the U.S. The goal is to deliver fresh products. Explain the business strategy solution that you will offer to the above case study. [5]





Total No. of Questions :8]

SEAT No. :

**P3295**

**[5037]-4001**

[Total No. of Pages :2

**M.Sc.**

**COMPUTER SCIENCE**

**CS - 402: Parallel Computing(Elective)**

**(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 whenever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *All questions carry equal marks.*
- 5) *Assume suitable data, if necessary.*

- Q1)** a) How multithreading is done using Cilktt?  
b) Explain use of MPI in cluster computing.  
c) What do you mean by sieve of Eratosthenes?

**[4+4+2]**

- Q2)** a) Write various design paradigms of parallel computing.  
b) Explain CC-NUMA in detail.  
c) What is THREADPRIVATE directive in OpenMP?

**[4+4+2]**

- Q3)** a) Explain BSP model in detail.  
b) What is the purpose of TBB in multi cores programming?  
c) What do you mean by SMP?

**[4+4+2]**

**P.T.O.**

- Q4)** a) Write various data scope attribute clauses in OpenMP.  
b) Differentiate: PVM vs MPI.  
c) What is the use of task-group class in task based programming?
- [4+4+2]**

- Q5)** a) Write a PVM Program to demonstrate how to spawn processes & exchange messages.  
b) Differentiate SIMD vs MIMD.  
c) What do you mean by scalable memory allocator?
- [4+4+2]**

- Q6)** a) How directive binding is done in OpenMP?  
b) Explain virtual topologies in MPI.  
c) Differentiate: Device pointers vs. Host pointers.
- [4+4+2]**

- Q7)** a) Explain debugging process in cluster programs.  
b) How parallel loops are executed in OpenMP?
- [5+5]**

- Q8)** a) How Thread Synchronization is done in OpenMP?  
b) Explain Divide-and-Conquer strategies used in Clustering.
- [5+5]**



Total No. of Questions : 8]

SEAT No. :

**P3296**

**[5037]-4002**

[Total No. of Pages :2

**M.Sc.**

**(COMPUTER SCIENCE)**

**CS-403 : Embedded System**

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

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

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

- Q1)** a) What is embedded system? Explain their benefits. [4]  
b) What is system on chip? Explain. [4]  
c) What is interrupt? List different types of interrupts. [2]
- Q2)** a) Explain basic design of RTOS. [4]  
b) Explain segmented memory management scheme. [4]  
c) Describe flash memory. [2]
- Q3)** a) Draw DRAM cell diagram and Explain read and write cycle. [4]  
b) What is scheduler? Explain different types of scheduler. [4]  
c) What is linker buffer? [2]
- Q4)** a) Explain Linker and loader. [4]  
b) Explain Digital timer with neat diagram. [4]  
c) What is context switching? Explain. [2]
- Q5)** a) Explain parallel ports with neat diagram. [4]  
b) Write a note on Runtime libraries. [4]  
c) Describe [2]  
# pragma interrupt func2 and  
# pragma pure-function func2.

**P.T.O.**

- Q6)** a) What is Simulation? Explain high level Language simulation. [4]  
b) Explain JTAG Ports and Once. [4]  
c) Differentiate non-preemptive kernel and preemptive kernel. [2]
- Q7)** a) How a real time performance can be derive from a non real time system? [5]  
b) What are different types of addressing modes of 8051? Explain any two. [5]
- Q8)** a) Explain on-board debugger and symbolic debugger. [5]  
b) Explain any three examples of embedded system. [5]

✓ ✓ ✓

Total No. of Questions :8]

SEAT No. :

**P3297**

**[5037]-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 diagram & must be drawn whenever necessary.*
- 3) *Figures to the right side indicate full marks.*

**Q1)** Answer the following:

- a) Differentiate between software quality assurance Vs software quality control. **[4]**
- b) Explain the Mc Call's Quality Model. **[4]**
- c) Define verification. **[2]**

**Q2)** Answer the following:

- a) Explain SEI - CMM. **[4]**
- b) How inspection differs from walk through? Explain the formal review process in detail. **[4]**
- c) Which factors affects the quality of IT project. **[2]**

**Q3)** Answer the following:

- a) Explain software configuration management audit. **[4]**
- b) What are "Sources of corrective and preventive actions". **[2]**
- c) Explain the objectives of proposal draft review. **[4]**

**P.T.O.**

**Q4)** Answer the following:

- a) Explain process quality metrics. [4]
- b) Write a short note on scatter diagram with example. [4]
- c) Explain CASE TOOLS. [2]

**Q5)** Answer the following:

- a) Explain the various categories of quality cost. [4]
- b) Write a short note on software quality assurance. [4]
- c) What do you mean by version control? [2]

**Q6)** Answer the following:

- a) Write a short note on software testing explain any one testing method in detail. [4]
- b) Write a short note on templates. [4]
- c) List out the class of S/W development risks. [2]

**Q7)** Answer the following:

- a) Explain the software quality control. [5]
- b) Write a short note on 'Pareto Analysis'. [5]

**Q8)** Answer the following:

- a) Explain the features of IEEE 1012 standard. [5]
- b) Differentiate between testing and debugging. [5]



Total No. of Questions : 8]

SEAT No. :

**P3298**

**[5037]-4004**

[Total No. of Pages : 2

**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 wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Assume suitable data if necessary.*

**Q1)** Attempt the following:

- a) Write a note on queues and random noise. [4]
- b) Discuss the need for computing alternative systems. [4]
- c) What is validation at the behavioral level. [2]

**Q2)** Attempt the following:

- a) Discuss some variance reduction techniques. [4]
- b) Discuss the importance of Output analysis. [3]
- c) Explain types of simulations. [3]

**Q3)** Attempt the following:

- a) Write a note on generating random variates from various distributions. [4]
- b) List the entities of Framework for Modeling & Simulation. [2]
- c) Write a note on probability distributions and estimation. [4]

**Q4)** Attempt the following:

- a) Explain graph or network transition based simulations. [4]
- b) Discuss the application areas of simulation. [4]
- c) State relevance of Modeling and Simulation. [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]

**P.T.O.**

- Q6)** Attempt the following:
- a) Discuss Actor based simulations. [5]
  - b) What is a generator and transducer. [3]
  - c) What do you understand by "testing of hypothesis". [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 following Case Study and answer the following questions  
"Multi-Teller Bank with Jockeying"

A bank with five tellers opens its doors at 9 A.M. and closes its doors at 5 P.M., but operates until all customers in the bank by 5 P.M. have been served. Assume that the inter arrival times of customers are IID exponential random variables with mean 1 minute and that service times of customers are IID exponential random variables with mean 4.5 minutes.

Each teller has a separate queue. An arriving customer joins the shortest queue, choosing the leftmost shortest queue in case of ties. Let  $n_i$  be the total number of customers in front of teller 'i' (including customers in queue as well as the customer in service, if any) at a particular instant. If the completion of a customer's service at teller 'i' causes  $n_j > n_i + 1$  for some other teller 'j', then the customer from the tail of queue 'j' jockeys to the tail of queue 'i'. (If there are two or more such customers, the one from the closest, leftmost queue jockeys). If teller 'i' is idle, the jockeying customer begins service at teller 'i'.

The Bank's management is concerned with operating costs as well as the quality of service currently being provided to customers, and is thinking of changing the number of tellers. For each of the cases  $n = 4, 5, 6$  and 7 tellers, we use 'simlib' function to simulate the bank and estimate the expected time-average total number of customers in queue, the expected average delay in queue, and the expected maximum delay in queue. In all cases we assume that no customers are present when the bank opens.

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.

**x      x      x**