

Total No. of Questions : 8]

SEAT No. :

**P1641**

[Total No. of Pages : 2

**[5440]-1001**

**M.Sc. (Semester - I)**

**COMPUTER SCIENCE**

**CS - 101 : Principles of Programming Languages**

**(2013 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

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

**Q1)** Attempt all questions.

- a) Explain enumeration-controlled loops with suitable example. [4]
- b) Explain different times at which binding decisions can be made. [4]
- c) Give any two tasks performed by a preprocessor. [2]

**Q2)** Attempt all questions.

- a) What is dangling pointer? Explain two solutions of dangling pointer problem? [4]
- b) Define [4]
  - i) Aliases
  - ii) Scope Rules
  - iii) Parametric Polymorphism.
  - iv) Association list
- c) "Short-circuit evaluation can save time". Justify true or false. [2]

**Q3)** Attempt all questions :

- a) Write a prolog program to find sum of first n numbers [4]  
e.g.  $n = 5 \quad 1 + 2 + 3 + 4 + 5$   
sum = 15
- b) What are the design issues of array? Explain various categories of array based on binding to storage. [4]
- c) Differentiate between declarative languages and imperative languages. [2]

**P.T.O.**

**Q4)** Attempt all questions.

- a) Explain various parameter passing modes with suitable example. [4]
- b) Explain the difference between applicative and normal order evaluation of an expression. Under what circumstances in each desirable? [4]
- c) Define boxing and unboxing in Java? [2]

**Q5)** Attempt all questions.

- a) Explain replicated inheritance with suitable example. [4]
- b) Define Monitor? What are the advantages of Monitor over semaphore? [4]
- c) Give the use of following predicates of LISP. [2]
  - i) EQL
  - ii) MEMBER

**Q6)** Attempt all questions.

- a) What is task? Give three characteristics of tasks that distinguish it from a subprograms. [4]
- b) Explain the difference between initialization and assignment in C++ with suitable examples. [4]
- c) What are the advantages of Garbage collection? [2]

**Q7)** Attempt all questions.

- a) Find O/P of [5]
  - i) (first (rest (first' ((a b) (c d))))
  - ii) (cadadr'(pq) (r s) (t u)).
  - iii) (list ' (a b c) ' ( ) )
  - iv) (append ' (a b)' ( ) )
  - v) (listp 'a)
- b) Describe the shallow access method of implementing dynamic scoping [5]

**Q8)** Attempt all questions.

- a) Consider following sentences :  
Mammals have 4 legs and no arms or 2 arms and 2 legs. A cow is a mammal. A cow has no arms.  
Write a prolog program to represent these sentences. Can we prove that cow has 4 legs? Why or why not? [5]
- b) Explain discriminated and free unions with the help of suitable diagram. [5]



Total No. of Questions : 8]

SEAT No. :

P1642

[Total No. of Pages : 2

**[5440]-1002**  
**M.Sc. (Semester - I)**  
**COMPUTER SCIENCE**  
**CS - 102 : Advanced Networking**  
**(2013 Pattern)**

*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) Differentiate between distance vector and link state routing. **[4]**
- b) Explain all headers used in HTTP. **[4]**
- c) Define marshalling. **[2]**

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

- a) Transfer following message using playfair cipher technique. **[4]**  
Message : ATTACK TOMORROW.  
Keyword : CIPMER
- b) Explain IPv4 to IPv6 transition. **[4]**
- c) Explain Electronic Money. **[2]**

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

- a) Explain in short Real Time Interactitve Video. **[4]**
- b) What is attack? Explain active and passive attacks. **[4]**
- c) What is Kerberos? State the parties involved in it. **[2]**

**P.T.O.**

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

- a) What is frame relay? Discuss its advantages. [4]
- b) What is digital certificate? Also explain steps involved in the creation of digital certificates. [4]
- c) What are the key participants in SET. [2]

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

- a) List the different technologies used in point to point WAN. Explain any one in detail. [4]
- b) Given two prime numbers  $p = 7$ ,  $q = 17$ . Find  $N$ ,  $E$  and  $D$  in RSA encryption process. [4]
- c) What is virus? What is virus lifetime. [2]

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

- a) What is demilitarized zone (DMZ)? How is it implemented. [4]
- b) Consider the following routing table for router  $R_1$ . [4]

Mask	Network Address	Next Hop	Interface
/27	202.14.17.224	-	$M_1$
/26	145.23.12.192	-	$M_3$
/24	145.23.12.0	-	$M_0$
default	default	130.56.12.5	$M_2$

- 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 221.45.12.204
- c) Define the protocol DHCP. [2]

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

- a) Explain security handshake pitfalls in detail. [5]
- b) Explain concept and use of firewall. [5]

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

- a) How Bellman-Ford algorithm is used to find shortest path. [5]
- b) Explain ATM architecture. [5]



**[5440]-1003**  
**M.Sc. (Semester - I)**  
**COMPUTER SCIENCE**  
**CS - 103 : Distributed Database Concepts**  
**(2013 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Attempt any five out of eight questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *All questions carry equal marks.*
- 4) *Assume suitable data if necessary.*

**Q1)** Answer the following :

- a) Explain client-server Reference Architecture. [4]
- b) Explain correctness rules of fragmentation. [4]
- c) What is the role of distributed query processor? [2]

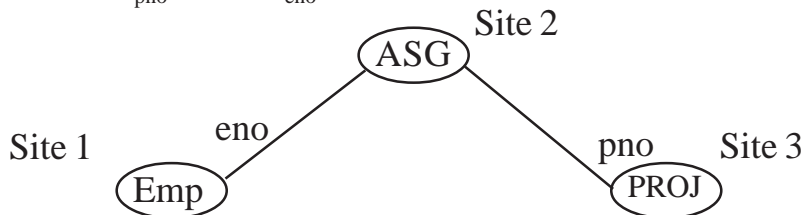
**Q2)** Answer the following :

- a) Optimize the query using centralized INGRES query optimization algorithm. Illustrate successive detachments and substitution. [4]

Select m.mname  
from movies m, Tapes t  
where m.mno = t. mno  
and t.numrentals = 100  
and m.title = "Sholay"

- b) Consider the join graph given below. [4]

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



**P.T.O.**

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

Size (Emp) = 100, Size (ASG) = 200, Size (PROJ) = 300,  
Size (Emp ⋈ ASG) = 300, Size (ASG ⋈ PROJ) = 200.

- c) Define [2]
- Reliability
  - Availability

**Q3)** Answer the following :

- Write a note on Distributed cost model. [4]
- Explain top-down design process for designing distributed databases. [4]
- List the steps of query decomposition. [2]

**Q4)** Answer the following :

- Consider Emp and PAY are horizontally fragmented as [4]  
 $Emp_1 = \sigma_{title} = \text{"Elect.eng"} (Emp)$   
 $Emp_2 = \sigma_{title} = \text{"System Analyst"} (Emp)$   
 $Emp_3 = \sigma_{title} = \text{"Mech.eng"} (Emp)$   
 $Emp_4 = \sigma_{title} = \text{"Programmer"} (Emp)$   
 $Pay_1 = \sigma_{sal} \geq 30000 (PAY)$   
 $Pay_2 = \sigma_{sal} < 30000 (PAY)$   
Draw the join graph  $Emp \bowtie_{title} PAY$ . Is this graph simple or partitioned?
- Check whether the following schedules are serializable or not using DAG. [4]  
 $S_1 : R_i(x), W_i(x), R_j(x), W_j(x)$   
 $S_2 : R_j(y), W_j(x), R_i(x), W_i(x)$
- Define a semijoin program for a join between two relations R and S, on attribute A. [2]

**Q5)** Answer the following :

- Consider the following tables [4]  
Emp (eno, ename, title)  
ASG (eno, pno, dur, resp)  
Suppose Emp relation is horizontally fragmented as follows :  
 $Emp_1 = \sigma_{eno \leq e3} (Emp)$   
 $Emp_2 = \sigma_{eno > e3} (Emp)$

Suppose ASG relation is horizontally fragmented as follows :

$$\text{Asg}_1 = \sigma_{\text{eno} \leq e3} (\text{ASG})$$

$$\text{Asg}_2 = \sigma_{e3 < \text{eno} \leq e5} (\text{ASG})$$

$$\text{Asg}_3 = \sigma_{\text{eno} > e5} (\text{ASG})$$

Transform the following query into a reduced query on fragments.

Select ename, resp

from ASG,Emp

where ASG.eno = Emp.eno

and ASG.pno = "P1".

- b) Write a note on voting based protocols. [4]
- c) State the wound - wait rule used in deadlock avoidance. [2]

**Q6)** Answer the following :

- a) Simplify the query by eliminating redundancy using idempotency rules  
Select title [4]  
from Emp  
where (not (title = "Programmer")  
and (title = "Programmer"  
or title = "elect.eng")  
and not (title = "elect.eng"))  
or ename = "Anil"
- b) Write a note on workflows. [4]
- c) State the global commit rule used in 2PC. [2]

**Q7)** Answer the following :

- a) Explain centralized and linear 2PC protocol. [5]
- b) Write a note on layers of query processing. [5]

**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  $ref(q_k) = 1$  for all  $q_k$ . Apply clustering algorithm and obtain vertical partitions of the relation. [5]

$$\begin{array}{c} A_1 A_2 A_3 A_4 \\ q_1 \begin{bmatrix} 1 & 1 & 1 & 0 \end{bmatrix} \\ q_2 \begin{bmatrix} 0 & 1 & 1 & 0 \end{bmatrix} \\ q_3 \begin{bmatrix} 0 & 0 & 1 & 1 \end{bmatrix} \end{array}$$

(a)

$$\begin{array}{c} S_1 S_2 \\ q_1 \begin{bmatrix} 5 & 20 \end{bmatrix} \\ q_2 \begin{bmatrix} 25 & 8 \end{bmatrix} \\ q_3 \begin{bmatrix} 30 & 6 \end{bmatrix} \end{array}$$

(b)

- b) Write a note on distributed deadlock detection. [5]





Total No. of Questions : 8]

SEAT No. :

P1644

[Total No. of Pages : 3

[5440]-1004

M.Sc. (Computer Science) (Semester - I)

CS - 104 : DESIGN AND ANALYSIS OF ALGORITHMS

(2013 Pattern)

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

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

**Q1)** a) Define Asymptotic notation? What are types of Asymptotic notation?  
Explain any one with example. [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) What are the limitations of Merge sort? [2]

**Q2)** a) Discuss the time complexity of binary search algorithm in the best case and worst case. [4]

b) Consider the following instance for job sequencing with deadlines problem where  $n = 4$ ,

$$(P_1, P_2, P_3, P_4) = (100, 10, 15, 27)$$

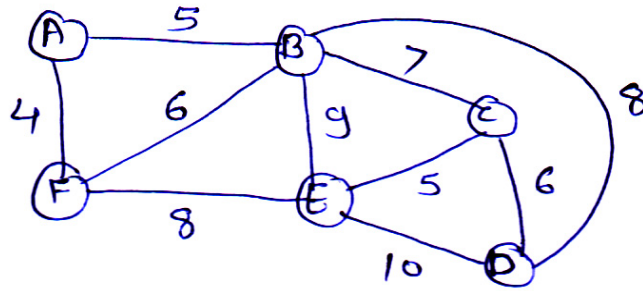
$$(d_1, d_2, d_3, d_4) = (2, 1, 2, 1)$$

Give Solution obtained using greedy method that uses set representation.[4]

c) Define Time complexity and space complexity. [2]

**P.T.O.**

- Q3) a)** What is minimum spanning tree? Show step of kruskal's algorithm to obtain spanning tree. [4]



- b) Write a non-deterministic algorithm to solve knapsack problem. [4]  
 c) Which two bounding function associated with every node in LCBB. [2]

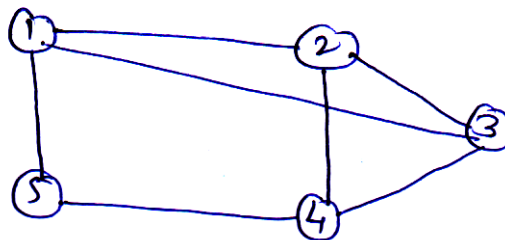
- Q4) a)** Solve the following 0/1 knapsack instance by LCBB  $n = 4, (P_1, P_2, P_3, P_4) = (10, 10, 12, 18) (w_1, w_2, w_3, w_4) = (2, 4, 6, 9)$  and  $m = 15$ . [4]

- b) Use strassen's algorithm to compute the matrix product of following matrices giving each computation step. [4]

$$A = \begin{bmatrix} 4 & 3 \\ 5 & 6 \end{bmatrix} \quad B = \begin{bmatrix} 3 & -2 \\ -4 & 2 \end{bmatrix}$$

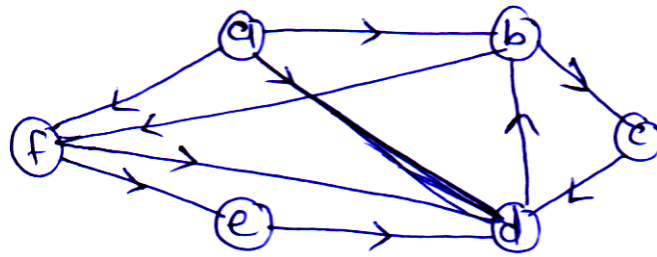
- c) Explain AVL tree. [2]

- Q5) a)** Find all hamiltonian cycles that are present in following graph. [4]



- b) Write an algorithm to find Fourier transform using divide and conquer strategy. [4]  
 c) What is Brute - force Approach? [2]

- Q6) a)** What is strongly connected component? Find the strongly connected components of the following graph. (Start from vertex a) [4]

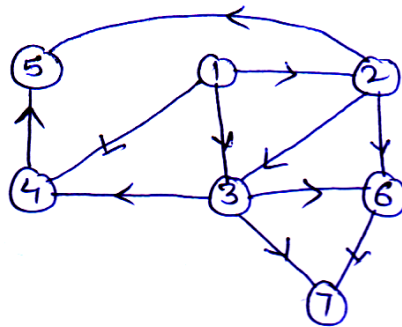


- b) Order the following function in ascending order of the growth rate and justify.

$e^n, n^n, n^2, 4^2, \log 3^n, \log^n, n!$  [4]

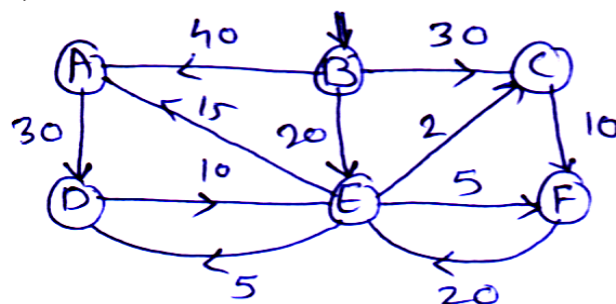
- c) Explain optimal merge patterns? [2]

- Q7) a)** Test whether the following diagram is DAG. If yes, apply topological sort to produce ordering of vertices, start from vertex 1. [5]



- b) What is the best way to multiply a chain of matrices having dimension  $13 \times 5, 5 \times 89, 89 \times 3$  and  $3 \times 34$  using dynamic programming. [5]

- Q8) a)** Explain Dijkstra's algorithm. Apply the algorithm on the directed graph given below, where B is the source. [5]



- b) What is sum of subset problem? Let weights given are  $w = \{5, 6, 10, 11, 14, 15\}$  and  $m = 15$ . Draw the state space tree for the above problem and find all subsets that sums to 25. [5]

▽▽▽▽

Total No. of Questions : 8]

SEAT No. :

**P1645**

[Total No. of Pages : 2

**[5440]-1005**

**M.Sc. (Computer Science) (Semester - I)**  
**CS - 105 : NETWORK PROGRAMMING**  
**(2013 Pattern)**

*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.*
- 4) *Neat diagrams must be drawn whenever necessary.*

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

- a) How Wrapper Functions are useful? Write a wrapper function for socket system call. **[4]**
- b) Explain bind function. **[4]**
- c) What is a Socket? **[2]**

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

- a) Discuss Crashing and Rebooting of Server. **[4]**
- b) Determine Outgoing interface with UDP, TCP and UDP Echo Server using select. **[4]**
- c) Difference between statefull and stateless server. **[2]**

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

- a) Explain IPv6 socket functions. **[4]**
- b) Explain TCP Echo Server [Revisited Again]. **[4]**
- c) Write a simple Daytime Client Program. **[2]**

**P.T.O.**

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

- a) Explain Byte Manipulation function. [4]
- b) Explain the concept of SIP PIPE. Explain the Scenario when it is raised. [4]
- c) Explain dg-cli function. [2]

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

- a) Explain the syntax of select (). [4]
- b) Determine Outgoing Interface with UDP. [4]
- c) Explain Error Handling. [2]

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

- a) Explain lack of flow control in UDP. [4]
- b) Explain concurrent server. [4]
- c) Explain str-echo function. [2]

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

- a) List out functions given by socket. [5]
- b) Differentiate between TCP & UDP. [5]

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

- a) Explain Signal Driven and Asynchronous I/O mode. [5]
- b) Discuss TCP socket options. [5]



Total No. of Questions : 8]

SEAT No. :

**P1646**

[Total No. of Pages : 2

**[5440]-2001**

**M.Sc. (Computer Science) (Semester - II)**  
**CS - 201 : DIGITAL IMAGE PROCESSING**  
**(2013 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Solve any five questions.*
- 2) *All questions carry equal marks.*
- 3) *Draw neat diagrams wherever necessary.*
- 4) *Figures to the right indicate full marks.*

**Q1) Attempt All**

- a) Give any two noise models along with their probability density functions and the systems in which they are found. **[4]**
- b) Define 'City-block' and 'chess board' distance between any two points of a digital image. **[4]**
- c) What is Structuring element? Draw any two Standard shapes. **[2]**

**Q2) Attempt All.**

- a) Define mixed adjacency. Explain how it eliminates ambiguity that often arises with 8 adjacency. **[4]**
- b) Write a short note on MPP algorithm. **[4]**
- c) Mention two ways of estimating degradation function. **[2]**

**Q3) Attempt All.**

- a) Write a short note on 'Hit-or-Miss' transform. **[4]**
- b) Write short note on 'Chain nodes'. **[4]**
- c) What is nearest neighbour interpolation? **[2]**

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

**Q4) Attempt All.**

- a) Write a short note on contrast stretching. [4]
- b) Explain the concept of image Sampling and quantization. [4]
- c) Define 2-D ideal low pass filter. [2]

**Q5) Attempt All.**

- a) Write a short note on High Pass Filter in frequency domain. [4]
- b) Explain erosion and dilation with the help of diagram. Show that erosion and dilation are duals of each other. [4]
- c) Give Co-ordinates of  $N_4(P)$  and  $N_8(P)$  if point 'P' is (80, 85) position. [2]

**Q6) Attempt All.**

- a) Write the equations of Geometric mean filter and Harmonic mean filter. [4]
- b) Explain the steps in processing an image in frequency domain. [4]
- c) State 3 fundamental steps performed in edge detection. [2]

**Q7) Attempt All.**

- a) Given a 3 bit image of size  $64 \times 64$  Pixels having intensity distribution as shown in the table below, where intensity levels are in the range 0-7. Apply histogram equalization technique and find transfer function which relates input image intensity level to output image intensity. [5]

Intensity level	No. of Pixel
$r_0 = 0$	790
$r_1 = 1$	1023
$r_2 = 2$	850
$r_3 = 3$	656
$r_4 = 4$	329
$r_5 = 5$	245
$r_6 = 6$	122
$r_7 = 7$	81

- b) Write a note on Butterworth high pass filter in frequency domain. [5]

**Q8) Attempt All.**

- a) Write iterative algorithm used for global thresholding. [5]
- b) Define 'Opening' and 'Closing' operations. In what way do they differ from each other. [5]



Total No. of Questions : 8]

SEAT No. :

P1647

[Total No. of Pages : 2

[5440]-2002

M.Sc. (Computer Science) (Semester - II)

CS - 202 : ADVANCED OPERATING SYSTEM

(2013 Pattern)

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Attempt any five questions.*
- 2) *Draw neat diagrams wherever necessary.*

- Q1)** a) Explain different types of files with respect to Linux o.s. [4]  
b) Explain the working of read v() and write v() system call. [4]  
c) What is ACL? [2]
- Q2)** a) Explain first scenario of buffer allocation. [4]  
b) Under which circumstances the process is swapped out. [4]  
c) What is difference between Zombie and Orphan process. [2]
- Q3)** a) Explain process state Transition diagram. [4]  
b) Explain values for 'Param' defined in <malloc.h> supported by Linux. [4]  
c) Write fields of Inode. [2]
- Q4)** a) What are the common sections of Process. Explain. [4]  
b) Write a program to read data from standard I/P and write it directly to user defined file-using 'C' program. [4]  
c) What is sticky bit. [2]

**P.T.O.**



- Q5) a)** What will happen when following program is executed? [4]
- ```

→ main ( )
{
char *end pt;
char *sbrk;
int brk ( );
end pt = sbrk (0);
printf (“endpt = % ud after sbrk\n”, (int endpt));
while (endpt --)
{
if (brk (endpt == - 1)
{
printf (“brk of % ud failed\n” endpt);
exit ( );
}
}
}

```
- b) Explain thread scheduling scenarios in windows o.s. [4]
- c) Explain major and minor no. [2]
- Q6) a)** Explain wait ( ), waitpid ( ), waitid ( ), wait 3 ( ) and wait4 ( ) system call. [4]
- b) Write a ‘C’ program in which parent and child share a file access. [4]
- c) Explain nice ( ) system call. [2]
- Q7) a)** Explain kill ( ) and raise ( ) function. [5]
- b) What is anonymous memory mapping? State its disadvantages. [5]
- Q8) a)** Explain open system call with diagram. [5]
- b) Write a note on context of a process. [5]



Total No. of Questions : 8]

SEAT No. :

P1648

[Total No. of Pages : 2

[5440]-2003

M.Sc. (Computer Science) (Semester - II)

**CS - 203 : DATA MINING AND DATA WAREHOUSING  
(2013 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

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

- Q1)** a) Discuss social implications of data mining. [4]  
b) Explain star schema with example. [4]  
c) Define support and confidence in data mining. [2]

- Q2)** a) Discuss the precision and recall methods with example. [4]  
b) Write a short note on CART. [4]  
c) Classification is supervised learning technique comment. [2]

- Q3)** a) The following table consists of training data construct a decision tree based on this data using the basic algorithm of decision tree induction. Classify the records by “Play Golf” attribute. [4]

| Out look | Temp | Humidity | Windy | Play Golf |
|----------|------|----------|-------|-----------|
| Rainy    | Hot  | High     | False | No        |
| Rainy    | Hot  | High     | True  | No        |
| Overcast | Hot  | High     | False | Yes       |
| Sunny    | Mild | High     | False | Yes       |
| Sunny    | Cool | Normal   | False | Yes       |
| Sunny    | Cool | Normal   | True  | No        |
| Overcast | Cool | Normal   | True  | Yes       |
| Rainy    | Mild | High     | False | No        |
| Rainy    | Cool | Normal   | False | Yes       |
| Sunny    | Mild | Normal   | False | Yes       |
| Rainy    | Mild | Normal   | True  | Yes       |

**P.T.O.**

- b) Explain the working of k-means algorithm? [4]
- c) Write any two challenges of text mining. [2]

**Q4)** a) Consider the following transactional table and generate the candidate itemset and frequent itemsets using Apriory algorithm, where support count is 2. [4]

| TID | List of Items              |
|-----|----------------------------|
| 1   | Bread, Butter, Sugar       |
| 2   | Bread, Butter, Milk, Sugar |
| 3   | Bread, Butter, Milk        |
| 4   | Bread, Butter, Sugar       |
| 5   | Butter, Sugar              |
| 6   | Butter, Sugar              |
| 7   | Bread, Milk                |
| 8   | Butter, Milk               |
| 9   | Bread, Milk                |

- b) Write a note on linear regression. [4]
- c) Define confusion matrix. [2]

**Q5)** a) Write a note on hierarchical clustering. [4]  
 b) Differentiate between text mining and web mining. [4]  
 c) What do you understand by noisy data. [2]

**Q6)** a) Write a short note on naive Bayesian classifier. [4]  
 b) Explain major issues in data mining. [4]  
 c) Write any two features of Graph Mining. [2]

**Q7)** a) What is overfitting? Explain with example. [5]  
 b) Write a note on mining frequent itemset using vertical data format. [5]

**Q8)** a) Explain the major steps of decision tree classification. [5]  
 b) Explain the KDD process in detail. [5]



Total No. of Questions : 8]

SEAT No. :

**P1649**

[Total No. of Pages : 2

**[5440]-2004**

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

**CS - 205 : PROGRAMMING WITH DOTNET**

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

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

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

- Q1)** a) What is validation? Explain various validation controls. [4]  
b) Explain array in detail with example. [4]  
c) What is MVC model in ASP. Net. [2]
- Q2)** a) What are the access modifiers supported by C#. Net. [4]  
b) Write a short note on XCOPY deployment. [4]  
c) What is clipping? [2]
- Q3)** a) Explain with example event handling in C#. [4]  
b) Differentiate between connected and disconnected architecture of ADO. Net. [4]  
c) What are different types of .Net Assemblies. [2]
- Q4)** a) Explain any four common controls with properties in windows Programming. [4]  
b) Explain file handling in C#. [4]  
c) What are the advantages of published website. [2]

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

- Q5)** a) Explain Data Reader and Data Adapter. [4]  
b) What are the characteristics of Web Services. [4]  
c) Write any two features of .Net Assembly. [2]
- Q6)** a) What is CLR? Explain CLR components. [4]  
b) Explain the architecture of windows Installer. [4]  
c) Write any two methods of web client class. [2]
- Q7)** a) Explain postback event handling in ASP. Net. [5]  
b) Write a program to merge two files into third file. [5]
- Q8)** a) Write a program that determines selection of Radio Button. [5]  
b) Write a menu driven program in C# for armstrong no, prime no. and perfect no. [5]



Total No. of Questions : 8]

SEAT No. :

P1650

[Total No. of Pages : 3

**[5440]-2005**  
**M.Sc. - I (Computer Science)**  
**CS - 206 : ARTIFICIAL INTELLIGENCE**  
**(2013 Pattern) (Semester - II)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

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

- Q1)** a) What are the frames? Explain with examples. [4]  
b) Explain Mean-Ends Analysis algorithm. [4]  
c) Distinguish between knowledge and data. [2]
- Q2)** a) Explain Learning by taking advice. [4]  
b) Give state space representation of "Water jug problem".  
Where there are 2 jugs of 4L and 3L respectively we want 2L water in 4L jug. [4]  
c) Comment In A\* algorithm, if h' rarely overestimates h then A\* is admissible. [2]
- Q3)** a) Explain the algorithm to convert WFF to CNF. [4]  
b) Write short note on Conceptual Dependency. [CD] [4]  
c) State any two A.I techniques. [2]
- Q4)** a) Consider the following 3 FOPL statements using resolution prove. FIDO WILL DIE. [4]  
i)  $\forall x : \text{dog}(x) \rightarrow \text{animal}(x)$   
ii) Dog (FIDO)  
iii)  $\forall y : \text{animal}(y) \rightarrow \text{die}(y)$

**P.T.O.**

b) Represent the following sentence into the appropriate semantic network diagram.

" I own a black color car". [4]

c) What are the advantages of breadth first search? [2]

**Q5)** a) What are Scripts? Explain its all components with a suitable example. [4]

b) Write a short note on rote learning. [4]

c) Translate the following FOPL statement to English.

$\forall x : \text{IsABunny}(x) \wedge \text{IsAStudent}(x) \wedge \text{Is taking AI}(x) \Rightarrow \text{Is cute}(x) \wedge \text{Is cool}(x)$ . [2]

**Q6)** a) State 4 Components using which problem can be well formatted. [4]

b) What is probability axioms? Explain Baye's rule with a suitable example. [4]

c) What is CYC? [2]

**Q7)** a) Give the following equation :

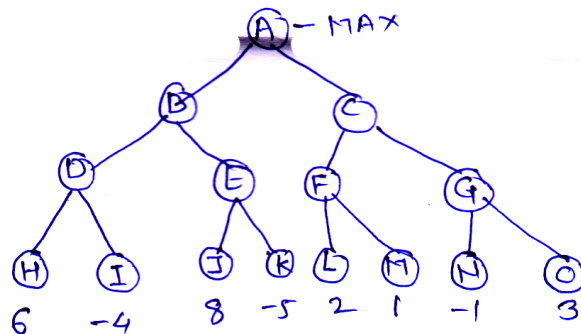
$$\begin{array}{r} \text{SEND} \\ + \text{MORE} \\ \hline = \text{MONEY} \end{array}$$

The aim is to assign each letter a unique integer in the range 0-9 so that the sum is correct.

This problem can be defined as a Constraint Satisfaction Problem (CSP) in terms of variables (V), domains (D) and constraints (C).

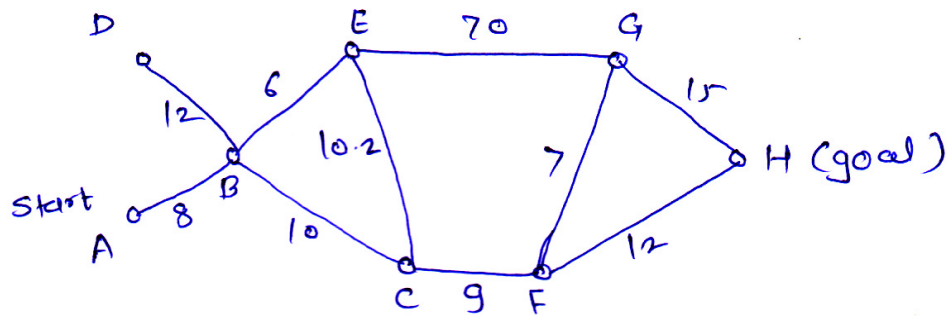
State the initial solution, initial constraints. Describe any one step of reducing the domain and creating additional constraints. [5]

b) Apply alpha-beta pruning algorithm to the following search tree. [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 between 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) Describe the unification algorithm why is it useful to generate the most general unifier possible by this algorithm? [5]

▽▽▽▽



Total No. of Questions : 8]

SEAT No. :

P1651

[Total No. of Pages : 2

**[5440]-2006**  
**M.Sc. (Computer Science) (Semester - II)**  
**CS - 207 : ADVANCE DESIGN AND ANALYSIS OF**  
**ALGORITHMS**  
**(2013 Pattern)**

*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.*
- 4) *Neat diagrams must be drawn whenever necessary.*

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

- a) Write a note on splay trees. [4]
- b) Write a note on steiner trees problem. [4]
- c) Write any two applications of suffix trees. [2]

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

- a) Explain the working of Knuth-Morris-Pratt algorithm. [4]
- b) Explain in brief cutting plane method. [4]
- c) Write application of Fibonacci heaps. [2]

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

- a) Explain the types of enumeration methods. [4]
- b) How to solve TSP using complete enumeration. [4]
- c) What is patricia trees. [2]

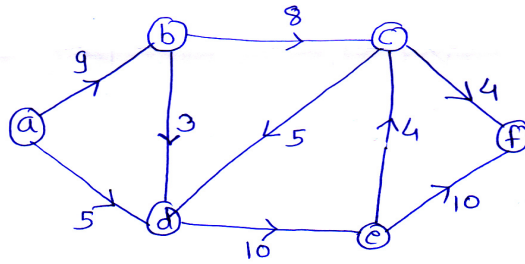
**Q4)** Attempt all of the following :

- a) Write a note on Convex optimization. [4]
- b) Explain strength & weaknesses of dynamic trees. [4]
- c) Define Intractable problem. [2]

**P.T.O.**

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

- a) Find out maximum flow through the network. [4]



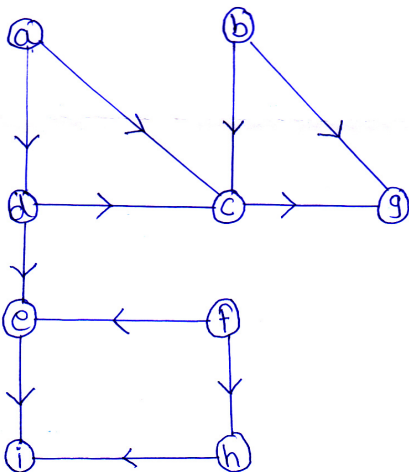
- b) What is Group steiner trees? [4]  
 c) Give any one application of suffix trees. [2]

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

- a) Discuss any significant use of Approximation algorithm. [4]  
 b) Where do we use proximal point method? Explain in detail. [4]  
 c) What are the application of string searching? [2]

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

- a) Find Topological Sort for given graph : [5]



- b) Compare and contrast Rabin-Karp method and Boyer-Moore algorithm. [5]

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

- a) Write a note on Simplex Method. [5]  
 b) Explain discrete optimization. [5]



Total No. of Questions : 8]

SEAT No. :

**P1652**

[Total No. of Pages : 2

**[5440]-3001**  
**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 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 Maslows theory in Human Resource Management. **[4]**
- b) Explain any four basic modes for handling conflict in communication management. **[4]**
- c) Define ROI and NPV. **[2]**

**Q2)** Attempt the following :

- a) Write short note on GQM. **[4]**
- b) Explain the different types of contracts. **[4]**
- c) Define **[2]**
  - i) fault
  - ii) failure

**Q3)** Attempt the following :

- a) Define risk Identification? Explain various risk categories. **[4]**
- b) Write a short note on Stakeholder Analysis. **[4]**
- c) List any four qualities required for Project Manager. **[2]**

**P.T.O.**

**Q4)** Attempt the following :

- a) Explain TSP in detail. [4]
- b) Given the following information

$$BCWS = 2,10,000, BCWP = 1,80,000, ACWP = 2,40,000$$

Find Cost Performance Index (CPI) and Schedule Performance Index (SPI) for above information. [4]

- c) List the content of risk register. [2]

**Q5)** Attempt the following :

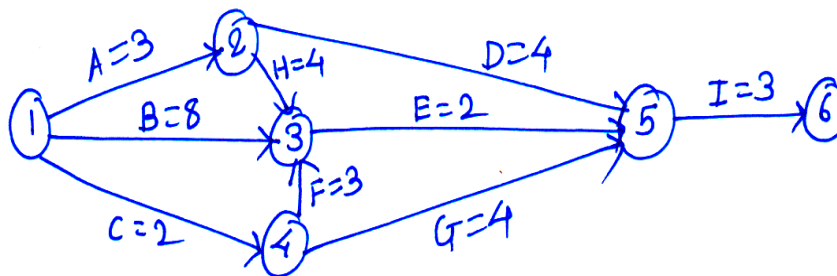
- a) Explain roles and responsibilities of measurement team. [4]
- b) Explain in brief reliability growth problem. [4]
- c) Define quality according to ISO. [2]

**Q6)** Attempt the following :

- a) Write a short note on Bohem software quality Model. [4]
- b) Write a short note on simulation. [4]
- c) Define Earned value management. [2]

**Q7)** Attempt the following :

- a) Define critical path Analysis. Solve the following for critical path Analysis. [5]



- b) What is project management? Explain project integration management. [5]

**Q8)** Attempt the following :

- a) Write a note on COST of quality in Project Quality Management. [5]
- b) Define project charter. Design project charter for college management system. [5]



Total No. of Questions : 8]

SEAT No. :

**P1653**

[Total No. of Pages : 2

**[5440]-3002**  
**M.Sc. (Computer Science)**  
**CS - 302 : MOBILE COMPUTING**  
**(2013 Pattern) (Semester - III)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) Attempt any five 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) Differentiate between FDMA and CDMA [4]
- b) What are the limitations of Mobile Computing? [4]
- c) What is GPRS? [2]

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

- a) What is flooding? How it is beneficial in Mobile IP? What are its limitations? [4]
- b) Explain WAP push architecture. [4]
- c) What do you mean by Co-COA? [2]

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

- a) Explain routing problem in Mobile IP. [4]
- b) Describe Mobile & wireless devices with examples. [4]
- c) Explain agent discovery mechanism. [2]

**P.T.O.**

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

- a) Explain fast Retransmit/Recovery with its advantages & disadvantages. [4]
- b) What are primary goals of GSM? [4]
- c) Explain advantages of Indirect - TCP. [2]

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

- a) Draw & describe system architecture of GSM system. [4]
- b) Which additional messages are required in optimized mobile IP? [4]
- c) Define short-term Fading. [2]

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

- a) What is direct sequence spread spectrum technology? Explain how it works in the CDMA technology? [4]
- b) Explain hierarchical Mobile IPV6 with its advantages & disadvantages. [4]
- c) What is encapsulation? [2]

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

- a) Explain UMTS handover in details. [5]
- b) Explain in details working of M. TCP. [5]

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

- a) What are the advantages & disadvantages of snooping TCP? [5]
- b) Differentiate between GPS & GPRS. [5]



Total No. of Questions : 8]

SEAT No. :

P1654

[Total No. of Pages : 3

[5440]-3003

M.Sc. (Computer Science) (Semester - III)

CS - 303 : SOFT COMPUTING

(2013 Pattern)

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

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

Q1) Attempt the following :

- a) Define Artificial Neural Network. Explain components of ANN. [4]
- b) For the following two fuzzy sets find its union and intersection. [4]

$$\tilde{A} = \left\{ \frac{0.15}{\text{Winter}} + \frac{0.33}{\text{Spring}} + \frac{0.52}{\text{Summer}} + \frac{0.25}{\text{Fall}} \right\}$$

$$\tilde{B} = \left\{ \frac{0.1}{\text{Winter}} + \frac{0.55}{\text{Spring}} + \frac{0.9}{\text{Summer}} + \frac{0.2}{\text{Fall}} \right\}$$

- c) Define Architectures of ANN. [2]

Q2) Attempt the following :

- a) Write a note on pattern space and weight space. [4]
- b) For the given fuzzy relation matrix R, Determine  $\lambda$  - cut relations for  $\lambda$ - values on  $R \lambda = 0.1, 0.3, 0.9$ . [4]

$$\tilde{R} = \begin{bmatrix} 0 & 0.2 & 0.4 \\ 0.3 & 0.7 & 0.1 \\ 0.8 & 0.9 & 1.0 \end{bmatrix}$$

- c) Write Advantages of Genetic Algorithms. [2]

P.T.O.

**Q3)** Attempt the following :

- a) Using Genetic Algorithm maximize  $f(x) = x^2 + 1$  with initial  $x$  values of (12, 25, 5, 19). Show crossover operation. [4]
- b) Explain Fuzzy systems - (Rule Based) [4]
- c) Explain term Error correction Rule and Gradient Rule. [2]

**Q4)** Attempt the following :

- a) Determine the relation 'if  $x$  then  $y$ ' for given fuzzy sets. [4]

$$X = \left\{ \frac{0}{a} + \frac{0.2}{b} + \frac{1}{c} + \frac{1}{d} \right\} \quad Y = \left\{ \frac{0}{e} + \frac{0.3}{f} + \frac{0.8}{g} + \frac{1}{h} \right\}$$

- b) Explain Perceptron Learning Algorithm. [4]
- c) What is intensification? [2]

**Q5)** Attempt the following :

- a) Consider the following fuzzy sets [4]

$$LT = \left\{ \frac{1}{40} + \frac{0.7}{50} + \frac{0.5}{60} + \frac{0.3}{70} + \frac{0}{80} \right\}$$

$$HT = \left\{ \frac{0}{40} + \frac{0.2}{50} + \frac{0.4}{60} + \frac{0.7}{70} + \frac{1.0}{80} \right\}$$

Find membership functions

- i) Temperature not very low
  - ii) Temperature not very high
  - iii) Temperature not very low and not very high
- b) Define GA. Give basic outline of GA. [4]
  - c) What is defuzzification. [2]

**Q6)** Attempt the following :

- a) Write short note on membership functions of fuzzy sets. [5]
- b) Discuss Strengths and Limitations of Genetic Algorithm. [5]



**Q7)** Attempt the following :

- a) Define What is Learning - supervised and unsupervised. [5]
- b) State reasons how GA are different from traditional Algorithm. [5]

**Q8)** Attempt the following :

- a) Simulate the execution of perceptron learning algorithm for each epoch on the following inputs (1, 0, 0) (1, 0, 1) (1, 1, 0) (1, 1, 1) with weight vector (0, 0, 0) and  $n = 1$ . What is the final weight vector? [4]
- b) Using Zadeh's extension principle calculate fuzzy number 'approximately 12' for given fuzzy sets - [4]

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

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

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



Total No. of Questions : 8]

SEAT No. :

**P1655**

[Total No. of Pages : 2

**[5440]-3004**

**M.Sc. (Computer Science) (Semester - III)**

**CS - 305 : WEB SERVICES**

**(2013 Pattern)**

*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 full marks.*
- 4) All questions carry equal marks.*

**Q1)** Answer the following :

- a) Explain the difference between web services and web Applications. [4]
- b) Explain SOA. [4]
- c) What is REST full services? [2]

**Q2)** Answer the following :

- a) Explain the characteristics of web services. [4]
- b) What is Quality of service (QOS)? Explain. [4]
- c) What are standards and technologies available for implementing web services? [2]

**Q3)** Answer the following :

- a) How errors are handled using SOAP faults, give an example for adding fault in XML of SOAP message. [4]
- b) What are Advantages and disadvantages of SOAP? [4]
- c) Explain concept of platform as a service (Paas) [2]

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

**Q4)** Answer the following :

- a) Explain web services life cycle. [4]
- b) What is WSDL? Explain structure of a WSDL. [4]
- c) Explain Limitations of WSDL. [2]

**Q5)** Answer the following :

- a) What is UDDI? Explain UDDI Registries. [4]
- b) Explain publishing API of UDDI. [4]
- c) Explain searching information to a UDDI Registry. [2]

**Q6)** Answer the following :

- a) Explain limitations of UDDI. [4]
- b) What is cloud computing? Explain. [4]
- c) Explain public and private cloud. [2]

**Q7)** Answer the following :

- a) Explain concepts of Saas. [5]
- b) Explain concepts of Iaas along with Amazon EC2. [5]

**Q8)** Answer the following :

- a) What is virtualization? Give the role of virtualization in cloud computing paradigm. [5]
- b) Explain KVM and Xen. [5]



Total No. of Questions : 8]

SEAT No. :

**P1656**

[Total No. of Pages : 2

**[5440]-3005**

**M.Sc. (Computer Science) (Semester - III)**

**CS - 306 : DATABASE AND SYSTEM ADMINISTRATION  
(2013 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) Attempt any five questions out of eight questions.*
- 2) Figures to the right indicates full marks.*
- 3) Draw neat and labelled diagrams wherever necessary.*

**Q1)** Attempt all the questions.

- a) How MYSQL uses disk space? [4]
- b) What are different types of table maintenance operations? [4]
- c) Write down different steps of MYSQL installation. [2]

**Q2)** Attempt all the questions.

- a) What are responsibilities of System Administrator? [4]
- b) What are types of Linux File system? [4]
- c) What is the key buffer and buffer pool? [2]

**Q3)** Attempt all the questions.

- a) Explain the working of INNODB Storage Engine. [4]
- b) Write a short note on SQL Parser? [4]
- c) Explain MYSQL terminator character. [2]

**P.T.O.**

**Q4)** Attempt all the questions.

- a) Explain different types of communication protocols used in MYSQL. [4]
- b) What is Locking? Explain implicit & explicit table locking in detail. [4]
- c) Write a short note on FEDERATED storage engine. [2]

**Q5)** Attempt all the questions.

- a) Write down different Linux distribution. [4]
- b) Explain the MERGE storage Engine. [4]
- c) Write down commands for copying & moving directories in Linux operating system. [2]

**Q6)** Attempt all the questions.

- a) Explain MYSQL Architecture with diagram. [5]
- b) Explain FSCK and disk check commands with it's options. [5]

**Q7)** Attempt all the questions.

- a) Explain extended file system in Linux. [5]
- b) Explain internetworking with windows (samba). [5]

**Q8)** Attempt all the questions.

- a) How to invoke client program in MYSQL? [4]
- b) What are different file manipulation commands used in Linux operating system? [4]
- c) What is advisory Locking? [2]



Total No. of Questions : 8]

SEAT No. :

**P1657**

[Total No. of Pages : 2

**[5440]-3006**

**M.Sc. (Computer Science) (Semester - III)**  
**CS - 307 : FUNCTIONAL PROGRAMMING**  
**(2013 Pattern) (Elective)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Neat diagrams must be drawn wherever necessary.*
- 2) *Figures to the right indicates full marks.*
- 3) *All questions carry equal marks.*
- 4) *You are advised to attempt not more than 5 questions.*
- 5) *Assume suitable data, if necessary.*

**Q1) Attempt All :**

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

- a) Give disadvantages of functional programming.
- b) Explain normal order  $\beta$  (beta) reduction.
- c) Write 2 properties of dictionary keys.

**Q2) Attempt All :**

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

- a) What is function composition?
- b) Differentiate normal order reduction versus applicative order reduction.
- c) How file pathnames are splitted?

**Q3) Attempt All :**

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

- a) What do you mean by graph reduction?
- b) When to use Python script? Python program?
- c) Give examples of lambda expressions.

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

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

- a) What are the key features of Python?
- b) What is the difference between list and tuples in Python?
- c) What is the difference between deep and shallow copy?

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

- a) Write a Python function to demonstrate the use of variable number of arguments.
- b) Give syntax for array slice in python.
- c) What is a lazy evaluation?

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

- a) How files are created using Python?
- b) What do you mean by list comprehensions?
- c) Explain OOP in python.

**Q7) Attempt All :** **[5 + 5 = 10]**

- a) When is it suitable to choose a dynamically typed language?
- b) With the help of examples, state the benefits of Lambda notation.

**Q8) Attempt All :** **[5 + 5 = 10]**

- a) Define parametric polymorphism with the help of an example.
- b) Write a note on currying.



Total No. of Questions : 8]

SEAT No. :

**P1658**

[Total No. of Pages : 2

**[5440]-3007**

**M.Sc. (Computer Science) (Semester - III)**

**CS - 308 : BUSINESS INTELLIGENCE**

**(2013 Pattern)**

*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) List the applications of text mining and explain any one of them in detail. [4]  
b) List ethical issues of BI. [4]  
c) Give two applications of BI. [2]
- Q2)** a) Explain six sigma in Performance management methodology. [4]  
b) Describe the need of BI integration. [4]  
c) “Scalability is the major issue in Data warehousing” Comment. [2]
- Q3)** a) Explain in detail the alternative Datawarehouse architectures. [4]  
b) What is on-demand BI? Give its major benefits. [4]  
c) Define : Meta – data. [2]
- Q4)** a) List the components and explain the Business Pressures responses support model. [4]  
b) Explain the elements of Artificial Neural Networks. [4]  
c) Define : BPM. [2]
- Q5)** a) What is web content mining? How does it differ from text mining? [4]  
b) Explain the steps in closed loop model of Act and adjust process of BPM. [4]  
c) Define : Gini Index [2]

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



- Q6)** a) Explain any two steps in CRISP-DM process. [4]  
b) What are hubs and authorities? What is the HITS algorithm. [4]  
c) What is a strategic map? [2]

- Q7)** a) Explain data visualization? Explain how does the selection of a particular display widgets used with particular metrics affect the visualization of data? [5]  
b) Explain the need of BI integration. [5]

- Q8)** a) Consider the case study of a leading MNC company which delivers globally consistent and transparent management information. The company provides detailed consistent views of performance across functions such as finance, marketing, sales and supply logistics. The company is undergoing transformation to become more effective and agile and to seize opportunities for rapid growth. The architecture should give a solution for strategic initiative in MIS and business intelligence. The benefits should include consistency, flexibility, accommodation and adaptability.

Design and analyse the alternative data warehouse architecture for the above case study and justify your answer. [5]

- b) Consider the following case study to combine Data marts into a single enterprise data warehouse. In January 2006, Indian-oil company planned to Consolidate its 862 data marts around the country into a single EDW. Indian-oil took this approach to gain a superior sense of its own business and to determine how Best to serve its customers. There was a thirst of analytical data inside the company that had unfortunately led to creation of many data marts. Indian oil started to Consolidate the data in the data mart into a new data warehouse and all the disparate data marts are eliminated
- i) How EDW can provide internal and customer information in effective analytical approach?
- ii) What are the efforts need to be applied in EDW approach to that the above case can be achieved?

[5]



Total No. of Questions : 8]

SEAT No. :

**P1659**

[Total No. of Pages : 2

**[5440]-4001**  
**M.Sc.(Computer Science)**  
**CS-402 : PARALLEL COMPUTING (Elective)**  
**(2013-Pattern) (Semester - IV)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) Neat diagrams must be drawn wherever necessary.*
- 2) Figures to the right indicates full marks.*
- 3) All questions carry equal marks.*
- 4) Your are advised to attempt not more than 5 questions.*
- 5) Assume suitable data, if necessary.*

**Q1)** Attempt all:

**[4+4+2]**

- a) Explain Bulk Synchronous Parallel (BSP) model in detail.
- b) What do you mean by strand? Give example.
- c) Write a short note on master/worker paradigm in PVM.

**Q2)** Attempt all:

**[4+4+2]**

- a) Give OpenMP work-sharing constructs.
- b) What is data-intensive computing?
- c) Give PRAM model of parallel computation.

**Q3)** Attempt all:

**[4+4+2]**

- a) What is the use of workshare construct in OpenMP?
- b) Differentiate: Control and Data Approach.
- c) How to compute average using MPI Scatter and MPI Gather?

**Q4)** Attempt all:

**[4+4+2]**

- a) What is the use of MPI Allreduce?
- b) How debugging is done in cluster programs?
- c) Write a short note on Explicit Parallelism.

**P.T.O.**

**Q5) Attempt all:** **[4+4+2]**

- a) What is the role of PVM daemon?
- b) Explain SINGLE and MASTER construct in detail.
- c) What do you mean by continuation in the context of Cilk++ programming?

**Q6) Attempt all:** **[4+4+2]**

- a) Write a MPI program Computing standard deviation.
- b) What do you mean by Critical and Atomic constructs?
- c) Give syntax of cilk for.

**Q7) Attempt all.**

- a) Write a note on CC-NUMA. **[5+5]**
- b) Give Task Parallelism Tools in Cilk++.

**Q8) Attempt ALL:** **[5+5]**

- a) Explain SIMD-Enabled Functions.
- b) Write a note on Partitioning and Divide and Conquer Strategies.



Total No. of Questions : 8]

SEAT No. :

**P1660**

[Total No. of Pages : 2

**[5440]-4002**  
**M.Sc.(Computer Science)**  
**CS - 403 : EMBEDDED SYSTEM**  
**(2013 Pattern) (Semester - IV)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

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

- Q1)** a) Define buffer? Explain circular buffer with neat - diagram. [4]  
b) How is a real time performance derived from a non-real time system?[4]  
c) Define maskable and non- maskable interrupts. [2]
- Q2)** a) Explain the pre-emptive and non-pre-emptive kernel. [4]  
b) Explain DRAM memory cell with neat diagram. [4]  
c) What is flash memory. [2]
- Q3)** a) What are different types of addressing modes of 8051? Explain any one with suitable example. [4]  
b) Write short note on Run-time libraries. [4]  
c) List different software tools required for designing an embedded system. [2]
- Q4)** a) Briefly explain the time slice mechanism for multitasking operating system. [4]  
b) Write short note on JTAG. [4]  
c) Define page and segment. [2]
- Q5)** a) Explain the low level language simulation. [4]  
b) List various forms of memories used in embedded systems. What are the functions of memories. [4]  
c) Define real time clock (RTC) [2]

**P.T.O.**

- Q6)** a) How do functions differ from ISRS, task, threads and processes. [4]  
b) Discuss the problems with real time without a RTOS. [4]  
c) Give any four examples of medium scale embedded system. [2]
- Q7)** a) Draw a block diagram of generic timer/ counter section in a microcontroller and explain the function of each block in brief. [5]  
b) Explain the priority levels for RTOS architecture. [5]
- Q8)** a) What are the advantages and disadvantages of buffer exchange? [5]  
b) Explain the 'Serial Lines' and ' From disk' method of down loading the code to the target board. [5]



Total No. of Questions : 8]

SEAT No. :

**P1661**

[Total No. of Pages : 2

**[5440]-4003**

**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 indicate full marks.*

**Q1)** Answer the following:

- a) Explain IEEE 1012 standard in detail. **[4]**
- b) Explain stages of contract review. **[4]**
- c) Explain verification. **[2]**

**Q2)** Answer the following:

- a) What is software quality? Explain activities involved in software quality control section. **[4]**
- b) What are different SQA infrastructure components? Explain staff training in detail. **[4]**
- c) Explain Release and version. **[2]**

**Q3)** Answer the following:

- a) Explain cause-effect diagram with example. **[4]**
- b) Write a short note on Quality cost. **[4]**
- c) Explain procedures. **[2]**

**Q4)** Attempt the following:

- a) Explain unit and Integration Testing. **[4]**
- b) Explain Mc Call's quality model. **[4]**
- c) Explain quality Assurance. **[2]**

**P.T.O.**

**Q5)** Attempt the following:

- a) Write a short note on CASE Tools. [4]
- b) Write a short note on Documentation control. [4]
- c) What is CMM. [2]

**Q6)** Answer the following:

- a) Explain in detail software configuration management. [5]
- b) Write short note on reviews and it's type. [5]

**Q7)** Answer the following:

- a) What is difference between pareto diagram and scatter diagram. [5]
- b) Write difference between white box testing and Black box testing. [5]

**Q8)** Answer the following:

- a) List out the contents of procedures. [4]
- b) What are different process metrics. [4]
- c) Explain software Risk Items (SRI) [2]



Total No. of Questions : 8]

SEAT No. :

P1662

[Total No. of Pages : 2

**[5440]-4004**  
**M.Sc.(Computer Science)**  
**CS-405:MODELING & SIMULATION**  
**(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.*
- 4) *Assume suitable data if necessary.*

**Q1)** Attempt the following:

- a) Discuss the need for computing alternative systems. [4]
- b) Give the application areas of Simulation. [4]
- c) What are random variates? [2]

**Q2)** Attempt the following:

- a) Discuss the pros and cons of Simulation. [4]
- b) Discuss the importance of Output analysis. [3]
- c) Explain hybrid simulations. [3]

**Q3)** Attempt the following:

- a) What is a random variable and a distribution function? [4]
- b) Write a note on Report Generation after Simulation. [4]
- c) What is the importance of a simulation clock? [2]

**Q4)** Attempt the following:

- a) Explain graph or network transition based simulations. [4]
- b) Discuss the stages in Simulation. [4]
- c) State relevance of Modeling and Simulation. [2]

**Q5)** Attempt the following:

- a) Write a note on Queues and random noise. [4]
- b) Discuss some variance reduction techniques. [4]
- c) What is stepped and event based time? [2]

**P.T.O.**



**Q6)** Attempt the following:

- a) Discuss Mesh based simulations. [5]
- b) What is a generator and transducer? [3]
- c) What is a discrete event? [2]

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

- a) Discuss Transient and steady state behavior of stochastic systems. [5]
- b) Discuss Experimenting with actual system and a model of the system. [5]

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

**Multi - Teller Bank with Jockeying:**

A bank with five tellers opens its door at 10 A.M. and closes its doors at 5 P.M., but operates until all customers in the bank have been served by 5 P.M. 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  $n_j > n_j + 1$  for some other teller 'j' then the customer from the tail of queue 'j' jockey to the tail of queue 'i'. (If there are two or more such customers, the one from the closest, leftmost queue jockey). 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 need to find 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

