

Total No. of Questions : 5]

SEAT No :

P 2269

[5333]-102

[Total No. of Pages :2

M.Sc.

COMPUTER SCIENCE

**CS - 102 : Advanced Networking
(2011 Pattern) (Semester-I)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

Q1) Answer all of the following:

[8×2=16]

- a) Explain Digital Signature.
- b) What is cryptography?
- c) Define plain text and cipher text.
- d) The value of HLEN in an IP diagram is 7. How many option bytes are present.
- e) What is virus? State the phases of a virus life-time.
- f) State how SHTTP is different from SLL.
- g) Which are the key participant in SET.
- h) How to create strong password.

Q2) Attempt any four of the following:

[4×4=16]

- a) Explain different strategies of transition from IPV4 to IPV6.
- b) What is frame Relay? Discuss its advantages.
- c) Explain various applications of multimedia.
- d) Considering the problem of recovering from host crashes. If the interval between writing and sending an acknowledgement or vice versa, can be made relatively small, what are the two best sender-receiver strategies for minimizing the chance of a protocol failure?
- e) Explain various types of certificate.

P.T.O.

Q3) Attempt any four of the following: **[4×4=16]**

- a) Explain BGP in Brief?
- b) Explain key transformation & expansion permutation process in DES.
- c) What is attack? Explain active and passive attacks.
- d) Explain AM & ESP protocol used in IP Sec.
- e) List two different technologies used to connect two remote devices in point to point WAN. Explain any one in details.

Q4) Attempt any four of the following: **[4×4=16]**

- a) Explain SIP IS there any drawback to prevent using SIP for video? Justify.
- b) Given two prime numbers $P = 17$ & $Q = 29$ find out N , E , D in an RSA encryption process.
- c) Write a short note on “Attacks: A technical view”.
- d) What are typical contents of a digital certificate?
- e) What is transposition? Explain various transposition techniques.

Q5) Attempt any four of the following: **[4×4=16]**

- a) Explain How 3-D secure protocol is used to provide security to the credit card on the Internet.
- b) Explain the need & working of password based authentication?
- c) Explain structure of router.
- d) Explain the steps in various round of AES.
- e) Explain three protocol scenarios for connection establishment using three way handshake.



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

P2259

[5333]-11

M.Sc.

COMPUTER SCIENCE

**CS - 101 : Principles of Programming Languages
(2011 Pattern) (Semester - I)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

Q1) Attempt all of the following.

[8×2=16]

- a) Define following.
 - i) applicative evaluation
 - ii) normal order evaluation
- b) Why prolog variables are typeless?
- c) What is an iterator? List any 2 languages supporting iteration.
- d) Define multithreading
- e) What is “this” in C++? Explain.
- f) What could be the output of following lisp terms
 - i) (length '(1 2 3))
 - ii) (length (append a a))
- g) Why short circuit evaluation is used?
- h) What is an abstract class?

Q2) Attempt any four from the following.

[4×4=16]

- a) Explain how an IDE differs from a collection of command - line tools.
- b) Explain exception handling with the help of suitable example.
- c) Differentiate between initialization and assignment in C++ with suitable example.

P.T.O.

- d) What makes a programming language successful?
- e) What is subroutine closure? How it is implemented?

Q3) Attempt any four from the following. **[4×4=16]**

- a) What is semaphor? Why Semaphor is used?
- b) Explain the concept of tail recursion with suitable example.
- c) What is descriptor? Give descriptor for static string. Limited dynamic string and dynamic string.
- d) Explain Remote procedure call.
- e) Differentiate between type equivalence and type compatibility.

Q4) Attempt any four of the following. **[4×4=16]**

- a) Explain static chain and displays in detail.
- b) Describe 4 common parameter passing modes.
- c) Explain dope vector with its purposes.
- d) What is vtab'e? How it is used.
- e) Explain discriminated and free union with the help of suitable diagram.

Q5) Attempt any four of the following. **[4×4=16]**

- a) Write a prolog program to find factorial of given number.
- b) Explain back tracking in prolog.
- c) Explain any four lisp primitives with example.
- d) Write a lisp function to take two positive non - zero integers x and y. and raises x to the y. power.
- e) List any four differences between 'C' and prolog.



Total No. of Questions : 4]

SEAT No :

P 2260

[5333]-12

[Total No. of Pages :2

M.Sc.

COMPUTER SCIENCE

**CS - 11: 102 : Object Oriented Software Engineering
(2008 Pattern) (Old Pattern) (Semester-I)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

Q1) Attempt all of the following:

[8×2=16]

- a) What is qualifier? Explain with suitable examples?
- b) Define alpha testing?
- c) What are components of deployment diagram?
- d) What is realization?
- e) Explain structural things.
- f) Define actor.
- g) What is inception?
- h) What is meant by driver module?

Q2) Attempt any four of the following:

[4×4=16]

- a) Explain Elaboration with key ideas and best practices.
- b) Discuss the components of sequence diagram.
- c) Explain integration testing with its type.
- d) Explain iterative development cycles of unified process.
- e) How to finalize the object definition?

P.T.O.

Q3) Attempt any four of the following:

[4×8=32]

- a) Draw activity diagram for supermarket management system.
- b) Draw use case diagram for college library management system.
- c) Draw collaboration diagram for loan Banking system.
- d) Prepare a class diagram for Newspaper advertising agency. Consider at least three classes. define appropriate relationship, association with multiplicity.
- e) Draw sequence diagram for university Examination form filling.

Q4) Attempt any four of the following:

[4×4=16]

- a) Write a short note on “Object Oriented Design: Booch Method”.
- b) Explain grouping elements of UML.
- c) Write a note on Jacobson method.
- d) Discuss the component of collaboration diagram.
- e) Explain Cord and Yourdon methods.



Total No. of Questions : 5]

SEAT No :

P 2261

[Total No. of Pages : 4

[5333]-13

M.Sc.

COMPUTER SCIENCE

CS-103: Distributed Database Concepts

(2008 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *All questions carry equal marks.*
- 3) *Figures to the right indicate full marks.*
- 4) *Draw proper diagrams wherever necessary.*

Q1) Attempt any eight of the following :

[8×2=16]

- a) Degree of fragmentation affects the performance of the execution of the query. Comment.
- b) Define -
 - i) Response time
 - ii) Total time
- c) What are global directory issues in DDBMS?
- d) Define -
 - i) One copy equivalence
 - ii) Reliability
- e) What is meant by search space?
- f) Explain -
 - i) Total site failure
 - ii) Partial site failure
- g) DDBMS makes distribution of data transparent to the user. Comment.
- h) Top-down design approach is suitable when a DDB system is being designed from scratch. Comment.

P.T.O.

- i) Explain the terms:
 - i) Type incorrect queries
 - ii) Semantically incorrect queries.
- j) What are different ways to deal with deadlock?

Q2) Attempt any Four of the following : [4×4=16]

- a) What information is necessary to decide allocation of a fragment to various sites?
- b) What is the function of query processor? What are the additional tasks which a query processor of DDBMS need to perform?
- c) Explain in-place update recovery.
- d) Explain any four problem areas of DDBMS.
- e) What different search strategies are used by query optimizer? Explain any one of them in detail.

Q3) Solve any four of the following : [4×4=16]

- a) Consider the following relation PROJ (Pro, Pname, Location, Budget)
 Let $P_{PROJ} = \{Budget < 500000, Budget \geq 500000\}$
 Perform the horizontal fragmentation of PROJ based on this set of simple predicates.
- b) Consider the following query
 Select I_name, S_name
 from Item, Supplier, Item_Supp
 where Item.I_no = Item_Supp.Ino
 and Supplier.S_no = Item_Supp.S_no
 and Item.Qty > 500
 and Supplier.City = "Pune"
 Draw an operator tree and optimize it.

- c) Consider a query that refers to the join of three relations
 $\text{Emp} \bowtie \text{Asg} \bowtie \text{Proj}$.

These three relations reside at three different sites.

$$\text{Size}(\text{Emp}) = 400$$

$$\text{Size}(\text{Proj}) = 200$$

$$\text{Size}(\text{Asg}) = 350$$

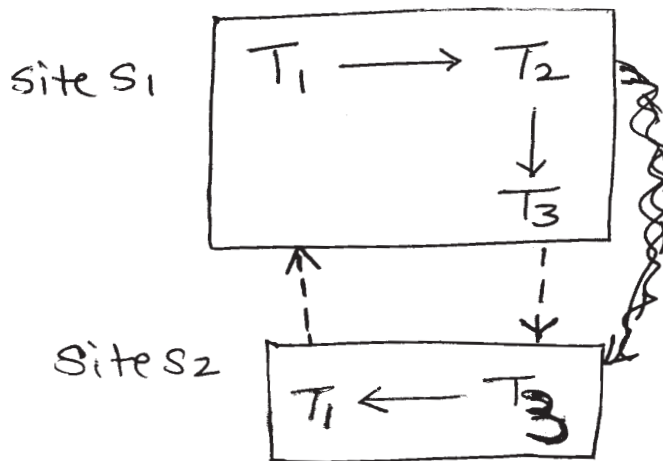
$$\text{Size}(\text{Emp} \bowtie \text{Asg}) = 500$$

$$\text{Size}(\text{Proj} \bowtie \text{Asg}) = 200$$

Find out all possible execution strategies to compute the join of the three relations along with cost incurred in computing join.

Find out the best strategy amongst all strategies.

- d) Consider the following Distributed wait - for-graph.



Detect the deadlock using distributed deadlock detection algorithm.
 Explain each step.

- e) Consider data item X . Let $RTs(X) = 15$ and $WTs(X) = 12$.

A pair $\langle R_i(X), Ts \rangle$ denotes read request of transaction T_i with timestamp Ts on data item X .

A pair $\langle W_i(X), Ts \rangle$ denotes write request of transaction T_i with timestamp Ts on data item X .

Indicate the behaviour of basic time-stamp method for the following sequence of requests.

$$\langle R_1(X), 16 \rangle, \langle R_2(X), 20 \rangle, \langle W_1(X), 16 \rangle$$

$$\langle R_3(X), 18 \rangle, \langle W_4(X), 17 \rangle, \langle R_4(X), 17 \rangle$$

Q4) Attempt any four of the following : [4×4=16]

- a) What are the three characteristics that decide the architecture of DDBMS? Explain each one in brief.
- b) Explain the process of query optimization.
- c) Write note on:
- Multiversion Timestamp Ordering Protocol.
- d) Consider the following two relations.
Project (p_no, d_no, budget, p_head)
Dept (d_no, d_name, d_loc)
Project relation is fragmented as
$$\text{Project}_1 = \sigma_{\text{budget} < 100000} (\text{Project})$$
$$\text{Project}_2 = \sigma_{\text{budget} \geq 100000} (\text{Project})$$
Dept is fragmented as
$$\text{Dept}_1 = \sigma_{\text{d_loc} = \text{"Pune"}} (\text{Dept})$$
$$\text{Dept}_2 = \sigma_{\text{d_loc} \neq \text{"Pune"}} (\text{Dept})$$
Draw a join graph of Project \bowtie Dept. Is the graph simple? If not, how to make it simple?
- e) Explain Distributed 2PL by showing how the messages are transferred.

Q5) Attempt any four of the following: [4×4=16]

- a) Draw a diagram showing all the layers of query processor. Also show the input and output of each layer.
- b) Write note on
- Classification of concurrency control mechanisms based on synchronization primitives.
- c) What is Fix/Flush decision? Explain the behaviour of abort, commit and recover under this decision strategy.
- d) How coordinator's timeout is handled in Termination Protocol?
- e) What are the rules for checking the correctness of fragmentation? Discuss the correctness rules with respect to vertical fragmentation.

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Total No. of Questions : 5]

SEAT No. :

P2262

[5333]-14

[Total No. of Pages : 3

M.Sc.

COMPUTER SCIENCE

**CS - 104 : Design and Analysis of Algorithms
(2011 Pattern) (Semester - I)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

Q1) Answer any Eight of the following:

[16]

- a) What are the different sorting algorithms used in divide and conquer strategy.
- b) Justify : $3n^2 + 2n + 4 = O(n^2)$.
- c) Define principle of optimality.
- d) State the application of BFS and DFS.
- e) Define Hamiltonian cycle.
- f) Define NP Hard and NP-complete class of problems.
- g) What is Tower of Hanoi problem.
- h) State Horner's Rule.
- i) Prove that there is no solution to 2-queen's problem.
- j) LIFO and FIFO Branch bound methods are rigid. Justify.

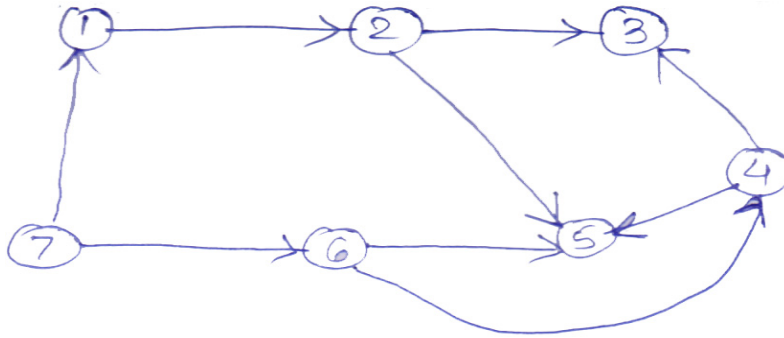
Q2) Answer any four of the following:

[16]

- a) Write a recursive algorithm to compute powerset of s where s is a set of n elements and powerset of s is set of all possible subset of s .
- b) Explain Strassen's Matrix multiplication.
- c) Find optimal solution for following job sequencing instance.
 $n = 5, p = (20, 10, 1, 15, 5), w = (2, 1, 3, 2, 3)$
- d) Consider the string editing problem of transforming $x = ababa$ to $y = abba$. Find minimum cost that transforms x to y also find minimum cost edit sequences.

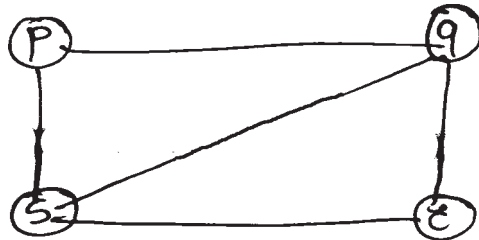
P.T.O.

e) Sort the following graph using topological sort method.



Q3) Answer any four of the following: **[16]**

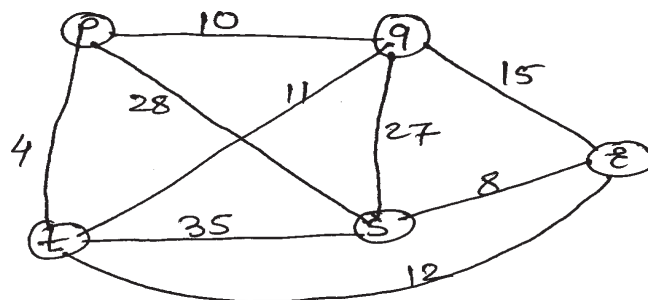
a) Find out all possible solutions for the following graph coloring problem using 3 color.



- b) Consider the knapsack instance $n = 4$, $p = (10, 10, 12, 18)$ $w = (2, 4, 6, 9)$, $m = 15$ using LCBB search, construct fixed-sized state space tree.
- c) Explain the techniques Algebraic transformation and Inverse Transformation.
- d) Order the following functions in ascending order of their growth rate: e^n , $2n^n$, $n!$, $\log_e(n^2)$, n^3 .
- e) State cook's theorem and explain its significance.

Q4) Answer any two of the following: **[16]**

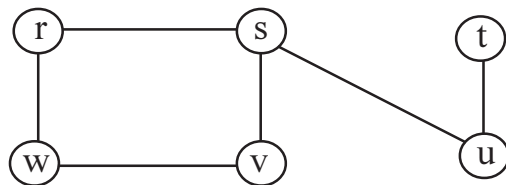
- a) Write an algorithm to sort n elements using quick sort algorithm in ascending order. Discuss the best case and worst case time complexity of it.
- b) Find the minimum cost spanning tree using prim's and Kruskal's algorithms.



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

Q5) Answer any two of the following: **[16]**

- a) Find BFS and DFS using the following graph. Starting with node s and the vertices are visited in numerical order.



- b) Give the bounding function for backtracking solution to sum of subset problem.

Let $n = 5, w = \{1, 3, 4, 6, 7\}, m = 10$

Draw state space tree using variable sized tuple and find all solutions.

- c) Consider the following Travelling salesperson problem instance and find the optimal cost and tour using LCBB.

$$\begin{bmatrix}
 \infty & 20 & 30 & 10 \\
 15 & \infty & 16 & 4 \\
 3 & 5 & \infty & 2 \\
 19 & 6 & 18 & \infty
 \end{bmatrix}$$


Total No. of Questions : 8]

SEAT No. :

[Total No. of Pages : 3

P2270

[5333] - 201

M.Sc.

COMPUTER SCIENCE

CS-201: Digital Image Processing

(2011 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Attempt any four from the remaining.*
- 3) *Draw a diagram wherever necessary.*
- 4) *Figures to the right indicates full marks.*

Q1) Attempt all of the following:

[8×2=16]

- a) State any two methods of generating signature.
- b) State the two basic properties of intensity values on which segmentation algorithms are based.
- c) Define reflection of a set and translation a set by point 'Z'.
- d) What is spatial filtering and Gamma correction?
- e) Harmonic mean filters work well with what type of noise?
- f) What is the difference between an edge and a boundry.
- g) Give the equations for the following:
 - i) Convolution.
 - ii) Correlation
- h) Define segmentation in HSI colour space.

P.T.O.

- Q2)** a) How is image smoothing achieved using ideal low pass filters and butter worth low pass filter? [8]
- b) What is inverse filtering? State the use of inverse filtering. [4]
- c) How are Gaussian high-pass filter used in image sharpening? [4]
- Q3)** a) Explain how degradation function and statistical characteristics of noise in restoration process are carried out using wiener filtering? [8]
- b) Define the following: [4]
- i) Rayleigh noise
- ii) Gaussian noise
- iii) Gamma noise
- iv) Exponential noise
- c) Withe example explain the concept of distance measure for pixel. [4]
- Q4)** a) What is sampling and quantization? Explain its concept with necessary diagram. [8]
- b) State boundary descriptors and explain any one of them. [4]
- c) Derive equation for power spectrum in DFT. [4]
- Q5)** a) Explain the following properties of 2D discrete fourier. [8]
- i) Translation
- ii) Rotation
- iii) Distributive
- iv) Separability
- b) Explain the basics of intensity thresholding. [4]
- c) What do you understand by segmentation? Give different methods of segmentation. [4]

- Q6)** a) What is region based segmentation? Explain it in detail. [8]
b) Write a note on following: [4]
i) Shape numbers
ii) Fourier descriptors
c) Give logic operations involving binary images. [4]
- Q7)** a) Explain HSI colour model in detail. [8]
b) What is opening and closing with reference to morphological image. [4]
c) What is digital image processing? [4]
- Q8)** a) Define and explain erosion and dilation. [8]
b) Compare RGB colour model and CMY colour model. [4]
c) Explain the role of radio band in imaging. [4]

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Total No. of Questions :5]

SEAT No. :

P2271

[5333]-202

[Total No. of Pages : 4

M.S.c.

COMPUTER SCIENCE

**CS-202 : Advanced Operating System
(2011 Pattern) (Semester-II)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

Q1) Attempt ALL of the following :

[8×2=16]

- a) Give syntax of mmap.
- b) Write equivalent of kill (getpid (), SIGINT
- c) What is broken link?
- d) What is Kernel Processor Control Region (KPCR)?
- e) What is kill () and raise () functions?
- f) What is processor ID?
- g) State difference between fork () and vfork () functions.
- h) What is mkdir () and rmdir ()?

Q2) State whether the following statements are true or false. Justify (Any 8)

[8×2=16]

- a) The idle process is actually a process that gets run.
- b) At kernel level, support for protected process is twofold.
- c) In linux the files are usually accessed via file names.
- d) Kernel keeps the inode locked across the execution of the system call.
- e) We can set only one of the two times values with the utime function.
- f) Process can exercise crude control of their scheduling priority by using nice () system call.
- g) Getuid () and setuid () functions are available in signal. h file.
- h) Sig 1 and Sig 2 are user defined signals.
- i) Process 0 and process 1 exists through the lifetime of system.

P.T.O.

Q3) Attempt any four of the following :

[4×4=16]

- a) What is data segment? How to manage it?
- b) Give the components of register context in brief.
- c) How file sharing is done in UNIX operating system?
- d) What is kernel? Describe the three major tasks of kernel.
- e) Draw and discuss data structure after two processes open files.

Q4) Attempt any four of the following :

[4×4=16]

- a) Explain the behaviour of 'C' program.

```
main ()
{
    int status;
    if (fork () == 0)
        execl ("bin/data", "date", 0)
    wait (& status);
}
```

- b) Explain the behaviour of 'C' program char string {} = "hello",

```
main () {
    Char buf [1024];
    Char * CP1, *P2;
    int fds [2];
    CP1 = string;
    CP2 = buf;
    while (*CP1)
        *CP2 ++ = * CP1 ++ ;
    Pipe (fds);
    for (; ; ) {
        Write (fds [1], buf, 6);
        Write (fds [0], buf, 6); }
}
```

- c) Explain behaviour of following C program.

```
# include <signal. h>
main (int argc, char * argv [] )
{
    Char buf [256];
    if (argc != 1)
        Signal (SIG_CLD, SIG_IGN);
    While (read (0, buf, 256) )
        if (fork () == 0)
            exit (0);
}
```

- d) What will happen when the following program is executed?

```
main ()
{
Char * endpt;
Char * sbrk ();
int brk ();
endpt = sbrk (0);
printf ("endpt = % ud after sbrk \n", (int) endpt);
While (endpt - -)
{
if (brk (endpt == -1) )
{
Printf ("brk of % ud failed \n", endpt);
exit ();
}
}
}
```

- e) Explain the behaviour of 'C' program? Char str 1 [] = " linux";

```
main ()
{
int Fd [2];
Char str 2 [10];
Pipe (fd);
if (fork () == 0)
write (fd [1], str 1, 5);
else
read (fd [0], str 2, 5);
}
```

Q5) Attempt any four of the following :

[4×4=16]

- a) Write a C program to catch SIGUSR 1 and SIGUSR 2.
- b) Write a C program which takes multiple files as command-line arguments and print their inode numbers.
- c) Write a C program to handle two-way communication between parent and child using pipe.
- d) Write a C program which print the type of file where the filename is accepted through command line.
- e) Write a C program to create daemon.



Total No. of Questions :5]

SEAT No. :

[Total No. of Pages :3

P2272

[5333] - 203

M.Sc.

COMPUTER SCIENCE

CS - 203 : Data Mining and Data Warehousing

(2011 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks :80

Instructions to the candidates:

- 1) *Neat diagrams must be drawn whenever necessary.*
- 2) *Figures to the right indicate full marks.*
- 3) *All Questions are compulsory.*

Q1) Attempt any eight of the following:

[8 × 2 = 16]

- a) Define Data Mining.
- b) What do you mean by pattern matching?
- c) State Apriori property.
- d) What is decision tree?
- e) What is prediction?
- f) Define Boot strap.
- g) What is outlier?
- h) What is inference?
- i) What do you mean by active learning?
- j) State the different tree pruning methods.

Q2) Attempt any four of following :

[4 × 4 = 16]

- a) Explain architecture of data warehouse with neat and clean diagram.
- b) What are social implications of data mining?
- c) Briefly explain CART Technique.
- d) What are different issues faced by decision tree algorithms?
- e) Write a short note on graph mining.

P.T.O.

Q3) Attempt any two of the following:

[2 × 8 = 16]

- a) Consider the following transaction table and generate the candidate item sets and frequent item sets, where the minimum support count = 3

TID	Items
1	Bread, Milk
2	Bread, Diaper, Beer, Eggs
3	Milk, Diaper, Beer, Coke
4	Bread, Milk, Diaper, Beer
5	Bread, Milk, Diaper, Coke

Apply Apriori algorithm to find frequent item set.

- b) Consider the following dataset. Using Naive Bayesian classifier determine whether tuple X belongs to which class

C1 : buys _ Computer = 'Yes'

C2 : buys _ Computer = 'No'

Age	Income	Student	Credit rating	Buys _ Computer
<=30	high	no	fair	no
<=30	high	no	excellent	no
31..40	high	no	fair	yes
>40	medium	no	fair	yes
>40	low	yes	fair	yes
>40	low	yes	excellent	no
31..40	low	yes	excellent	yes
<=30	medium	no	fair	no
<=30	low	yes	fair	yes
>40	medium	yes	fair	yes
<=30	medium	yes	excellent	yes
31..40	medium	no	excellent	yes
31..40	high	yes	fair	yes
>40	medium	no	excellent	no

c) Consider the following dataset

$D = \{2, 4, 10, 12, 3, 20, 30, 11, 25\}$

No. of clusters = 02

By using above data set apply K-means clustering algorithm and find two clusters.

Q4) Attempt any Four of the following:

[4 × 4 = 16]

- a) How to handle noisy data?
- b) Define the following
 - i) Precision
 - ii) Recall
 - iii) F-measure
 - iv) Confusion matrix
- c) Explain hierarchical clustering with example.
- d) Briefly explain Web Mining.
- e) Write any four applications of data mining.

Q5) Attempt any Four of the following:

[4 × 4 = 16]

- a) Differentiate between OLTP and OLAP.
- b) Briefly explain linear regression with example.
- c) Explain the steps of data preprocessing.
- d) Write a short note on Expectation Maximization (EM) algorithm.
- e) Construct an F-P Tree for the following data.

TID	Items Bought
1	f, a, c, d, g, i, m, p
2	a, b, c, f, l, m, o
3	b, f, h, j, o
4	b, c, k, s, p
5	a, f, c, e, l, p, m, n

Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

P2263

[5333] - 21

M.Sc. - I

COMPUTER SCIENCE

CS-201: Advanced Networking Concepts

(2008 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicates full marks.*

Q1) Attempt all of the following:

[8×2=16]

- a) List the applications of TFTP.
- b) Define remote procedure call.
- c) IP is best delivery protocol. Justify.
- d) Define marshaling.
- e) Define the role of relay agent in BOOTP.
- f) What is hidden terminal problem faced in wireless LAN.
- g) Discuss the learning process of bridge.
- h) What are multiple times used by TCP?

Q2) Attempt any four of the following:

[4×4=16]

- a) Explain SNMP protocol in detail.
- b) Compare the headers of IPv4 and IPv6 datagrams.
- c) Discuss the need & architecture of ATM network.
- d) Explain any two ICMP query messages.
- e) Explain various UDP applications.

P.T.O.

Q3) Attempt any four of the following:

[4×4=16]

- a) Discuss any two scenarios of email architecture.
- b) Explain the problems posed with RPC.
- c) Why do we need RRQ or WRQ message in TFTP but not in FTP?
- d) Discuss the symmetric & asymmetric connection release of transport layer.
- e) Explain the function & object attributes of SMI.

Q4) Attempt any four of the following:

[4×4=16]

- a) Explain Tomlinson's solution for transport connection establishment.
- b) Explain all headers used in HTTP.
- c) Explain ATM architecture.
- d) Differentiate distance vector routing with link state routing.
- e) In transport protocol, explain how connections are managed while they are in use.

Q5) Attempt any four of the following:

[4×4=16]

- a) How crash recovery is handled in transport layer?
- b) Discuss response message in DNS.
- c) Discuss the "tracking the callee" procedure used in SIP.
- d) Can the calculated sending time, receiving time or round trip time have a negative value? Why or why not? Give example.
- e) Explain H.323 architecture & its protocols.

EEE

Total No. of Questions :5]

SEAT No. :

[Total No. of Pages : 3

P2264

[5333]-22

M.Sc.

COMPUTER SCIENCE

202 : Unix Internals

(2008 Pattern) (Semester-II)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

Q1) Attempt ALL of the following :

[8×2=16]

- a) Give any two reasons by which the kernel swaps a process out, if it needs space in memory.
- b) List all operations in sequence performed by the kernel for fork system call.
- c) What is nice? What is the formula for calculating priority of a process which has already executed nice?
- d) What is demand zero and demand fill?
- e) What is the syntax of read system call and explain its parameters?
- f) Which system call can be used in following situations? Give and explain its syntax.
 - i) When a user wants to change a current directory of a process?
 - ii) If a user wants to simulate the usual file system hierarchy and run processes there.
- g) What is magic no? What is its purpose?
- h) Give syntax of the system call used to send signal to other processes in the system.

P.T.O.

Q2) State whether the following statements are True or False. Justify your answer (any four) : **[4×4=16]**

- a) Zombie processes are never swapped.
- b) There can never be any free inodes in incore free-inode list whose number is less than the remembered inode.
- c) If the process is waiting to read an unnamed pipe and there are no more writer processes, there will never be a writer process.
- d) A process can access its u-area when it executes in kernel mode but not when it executes in user mode.
- e) Shared memory is one of the interprocess communication mechanism.

Q3) Attempt any four of the following : **[4×4=16]**

- a) Write the sequence of operations performed by the Kernel while closing pipes.
- b) Write a race condition for a free buffer in algorithm getblk and explain.
- c) Explain Link system call.
- d) Write any four components which the system level context consists.
- e) Calculate block number and byte offset into block for inode number 539. Assuming that block 2 is beginning of the inode list, each disk inode is of 64 bytes and one disk block is of 1 kB.

Q4) Attempt any four of the following : **[4×4=16]**

- a) Write a program to make parent wait for more than one child.
- b) Write a program for reading and writing a named pipe.
- c) Write the behaviour of the following program.

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

- d) Write the output of the following program with explanation.

```
main ()
{
  int i = 0;
  for (i = 0; i < 2; i++)
  {
    fork ();
    printf (“\n I am process at I = %d\n”, i);
  }
  if (fork () == 0)
    printf (“\n this is a child process”);
}
```

- e) Write a program that prints the owner, file type, access permission and access time of files supplied as parameter. (Accept directory name from user)

Q5) Attempt any four of the following :

[4×4=16]

- What are the advantages and disadvantages of buffer cache?
- What do you mean by tie-breaker rule? Explain.
- Under which circumstances, the entries for sticky-bit text regions are removed by the kernel.
- Describe an image of an executable file.
- Explain how fork system call executed in demand paging?



Total No. of Questions :5]

SEAT No. :

[Total No. of Pages :3

P2265

[5333] - 23

M.Sc. - I

COMPUTER SCIENCE

CS - 203 : Software Architecture

(2008 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks :80

Instructions to the candidates:

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

Q1) Attempt the Following

[8 × 2 = 16]

- a) Give the Features of webwork framework
- b) What makes a pattern
- c) Define Architectural styles
- d) What are the Features of “velocity” Framework?
- e) State the advantage of Iterative development life cycle
- f) “Abstract factory defines an interface for creating an object, but let subclass decide which class to instantiate”. Justify.
- g) What are types of responsibilities
- h) State types of UML Diagrams with example

Q2) Attempt the following (Any four)

[4 × 4 = 16]

- a) How pattern meets the objectives of software Architecture.
- b) Write short note on “Allocation” structure.
- c) Are there benefits of Iterative Development? How long should an Iteration be? what is an Iteration time boxing.

P.T.O.

- d) What are categories of Pattern?
- e) Write short note on Interpreter Architectural style.

Q3) Attempt the following (Any four)

[4 × 4 = 16]

- a) With the help of example, illustrate indirection GRASP.
- b) Credit card company wants to send bills to its customer for monthly transaction. A bill generator module should allow user to generate different types of bills for silver card, gold card & platinum card. Selection of type of bill is based on card type and month.

A new bill is generated by creating it. Bill generator module makes necessary additions and probably print or email it.

Select appropriate Design pattern to address the problem and how it is applied. Give an appropriate class diagram containing relevant classes to illustrate use of design pattern.

- c) What are the participants of decorator design pattern?
- d) Give structure and participants of Adapter Design Pattern.
- e) With the help of example, illustrate controller YRASP.

Q4) Attempt the following (Any four)

[4 × 4 = 16]

- a) Write short note on MVC model
- b) Explain with example how low coupling can be achieved using design patterns.
- c) “Framework organizes patterns at a lower level”. Justify.
- d) What are the consequences and implementations issues of state Design pattern?
- e) Why we need validator framework.

Q5) Attempt any four of the following

[4 × 4 = 16]

- a) Write a short note on RMI.
- b) With the help of diagram, explain middle tier of struts framework.
- c) Write a short note on sitemesh framework.
- d) An online banking application form contain information such as Account No, Name, Date of Birth, Email Address & mobile No; Mobile No is optional field. Apply validation framework for the above application.
- e) What are the different approaches for component based development?



Total No. of Questions :5]

SEAT No. :

P2273

[Total No. of Pages :3

[5333] - 301

M.Sc. (Computer Science)

CS - 301 : SOFTWARE METRICS AND PROJECT MANAGEMENT

(2011 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks :80

Instructions to the candidates:

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

Q1) Attempt all of the following:

[8 × 2 = 16]

- a) Define
 - i) fault and
 - ii) failure.
- b) What is CCB?
- c) State major stakeholder of a project.
- d) List the processes involved in project quality management.
- e) What is GQM?
- f) What is NPV and ROI?
- g) Define
 - i) CPIF
 - ii) CPFF
- h) “Integration management is considered as heart of the project management”. Justify.

P.T.O.

Q2) Attempt any Four of the following:

[4 × 4 = 16]

- a) What is CMM? Explain all the phases used in CMM model.
- b) Write a note on cost estimation tools and techniques.
- c) What is project? Discuss project life cycle.
- d) Write a note on organizational work breakdown structure.
- e) Explain framework of project management with diagram.

Q3) Attempt any FOUR of the following:

[4 × 4 = 16]

- a) What do you mean by resource loading and resource levelling and provide an example of when you would use each technique?
- b) Explain in detail scope creep.
- c) Explain the process involved in Communication Management.
- d) Briefly Explain “How” of metric plan.
- e) Write a short note on Conflict Management.

Q4) Attempt any FOUR of the following:

[4 × 4 = 16]

- a) What is a metric plan? What are the different changes considered while revisiting the plan?
- b) “Effective project manager must be a good team leader”. Justify.
- c) Describe project execution tools & techniques.
- d) What are the different areas for identification of risk?
- e) Explain importance of good time management.

Q5) Attempt any FOUR of the following:

[4 × 4 = 16]

- a) What are the three main categories of output of quality control.
- b) Write a short note on overall change control.
- c) Explain any four activities involved in software measurement.
- d) Discuss internal attributes of a software product.
- e) Explain the tools and techniques used for Quality Control.



Total No. of Questions : 5]

SEAT No :

P 2274

[5333]-302

[Total No. of Pages :2

M.Sc.

COMPUTER SCIENCE

**CS - 302 : Mobile Computing
(2011 Pattern) (Semester-III)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *All questions carry equal marks.*
- 3) *Neat diagrams must be drawn whenever necessary.*
- 4) *Figures to the right indicate full marks.*

Q1) Attempt all of the following:

[8×2=16]

- a) Define mobile communication.
- b) Define spread spectrum.
- c) Explain Reverse tunneling issues.
- d) Advantages of snooping - TCP.
- e) Explain Far and Near Terminal.
- f) Explain BTS, BSS.
- g) List four J2ME profiles.
- h) What is WML.

Q2) Attempt any four of the following:

[4×4=16]

- a) What are advantages and disadvantages of CDMA?
- b) Explain Hard and Soft Handover in UMTS.
- c) Which are the components of GSM? Explain their purpose?
- d) Discuss various application areas of Mobile communication?
- e) Explain functions of transport Layer in Wireless protocol?

P.T.O.

Q3) Attempt any four of the following:

[4×4=16]

- a) Explain Lifecycle of Android.
- b) Discuss WAP Architecture in detail.
- c) Discuss GPRS.
- d) Explain TDMA in detail.
- e) Explain Dynamic Source Routing.

Q4) Attempt any four of the following:

[4×4=16]

- a) Explain any one method used for congestion control in mobile transport layer?
- b) Explain working of IP-in-IP Encapsulation?
- c) Differentiate between IPv₄ and IPv₆.
- d) Write short note on cellular system.
- e) Explain use of MID let.

Q5) Attempt any four of the following:

[4×4=16]

- a) What is MMS Architecture. Differentiate between SMS and MMS?
- b) Describe Direct Sequence Spread Spectrum?
- c) Explain I-TCP in detail.
- d) Describe Tunneling and Encapsulation.
- e) What is SDMA? Explain.



Total No. of Questions : 5]

SEAT No :

P 2275

[Total No. of Pages :4

[5333]-303

M.Sc.

COMPUTER SCIENCE

(CS-303) : Soft Computing
(2011 Pattern) (Semester-III)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) All questions are Compulsory.
- 2) Figures to the right indicate full marks.
- 3) Draw the diagrams wherever necessary.
- 4) Simple calculator is allowed.

Q1) Attempt all of the following :

[16]

- a) Explain Tolerance and Equivalence relation.
- b) What are the salient properties of Neural Network? Explain.
- c) Explain any two genetic operators on schema.
- d) Define union operations of fuzzy sets with an appropriate example.
- e) Give advantages of Genetic Algorithm.
- f) Two fuzzy sets representing a car and a truck image are given below:

$$\text{Fuzzy set for car} = \frac{0.5}{\text{truck}} + \frac{0.4}{\text{motorcycle}} + \frac{0.3}{\text{boat}} + \frac{0.9}{\text{car}} + \frac{0.9}{\text{house}}$$

$$\text{Fuzzy set for truck} = \frac{1}{\text{truck}} + \frac{0.1}{\text{motorcycle}} + \frac{0.4}{\text{boat}} + \frac{0.4}{\text{car}} + \frac{0.2}{\text{house}}$$

Find - a) $\text{Car} \cap \text{Truck}$

b) $\text{Car} \cup \text{Truck}$

- g) Write any four applications of Neural Network.
- h) What is concentration in Linguistic hedges.

P.T.O.

Q2) Attempt Any Four of the following :

[16]

- Explain fuzzy set operations.
- What are the features of membership functions.
- What is difference between supervised learning and unsupervised learning.
- What are the types of Architectures of Neural Network? Explain.
- How Genetic Algorithms are different from traditional methods.

Q3) Attempt Any Four of the following :

[16]

- Suppose we have a universe of integers, $Y = \{1, 2, 3, 4, 5\}$. We define following linguistic terms as a mapping onto Y.

$$\text{"Small"} = \left[\frac{1}{1} + \frac{0.8}{2} + \frac{0.6}{3} + \frac{0.4}{4} + \frac{0.2}{5} \right]$$

$$\text{"Large"} = \left[\frac{0.2}{1} + \frac{0.4}{2} + \frac{0.6}{3} + \frac{0.8}{4} + \frac{1}{5} \right]$$

Then construct a phrase

alpha = "not very small and not very very Large".

- \tilde{R}_1 is given as follows

$$\tilde{R}_1 = \begin{matrix} & \begin{matrix} x_1 & x_2 & x_3 & x_4 & x_5 \end{matrix} \\ \begin{matrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{matrix} & \begin{bmatrix} 1 & 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 \end{bmatrix} \end{matrix}$$

Find equivalence relation.

- Let $X = \{x_1, x_2\}$, $Y = \{y_1, y_2\}$ and $Z = \{z_1, z_2, z_3\}$ consider the following fuzzy relations:

$$R = \begin{matrix} & y_1 & y_2 \\ \begin{matrix} x_1 \\ x_2 \end{matrix} & \begin{bmatrix} 0.7 & 0.5 \\ 0.8 & 0.4 \end{bmatrix} \end{matrix} \text{ and } S = \begin{matrix} & z_1 & z_2 & z_3 \\ \begin{matrix} y_1 \\ y_2 \end{matrix} & \begin{bmatrix} 0.9 & 0.6 & 0.2 \\ 0.1 & 0.7 & 0.5 \end{bmatrix} \end{matrix}$$

Find max - min composition.

d) Two universe of discourse are as follows:

$$X = \{1, 2, 3, 4\} \text{ and } Y = \{1, 2, 3, 4, 5, 6\}$$

If $A = \{2, 3\}$ on universe X.

$B = \{3, 4\}$ on universe Y.

Crisp sets A and B can be written using Zadeh's notation as follows.

$$A = \frac{0}{1} + \frac{1}{2} + \frac{1}{3} + \frac{0}{4}$$

$$B = \frac{0}{1} + \frac{0}{2} + \frac{1}{3} + \frac{1}{4} + \frac{0}{5} + \frac{0}{6}$$

Find the relation R describing the implication.

If A, Then B.

e) Consider fuzzy relation matrix R.

$$\begin{bmatrix} 1 & 0.8 & 0 & 0.1 & 0.2 \\ 0.8 & 1 & 0.4 & 0 & 0.9 \\ 0 & 0.4 & 1 & 0 & 0 \\ 0.1 & 0 & 0 & 1 & 0.5 \\ 0.2 & 0.9 & 0 & 0.5 & 1 \end{bmatrix}$$

Perform λ - cut operations for the values of $\lambda = 1, 0.8, 0.5, 0.3$,

Q4) Attempt Any Two of the following :

[16]

- Explain MSE error surface and its geometry.
- What are the applications of Fuzzy logic.
- Universe X = [0, 50, 100, 150, 200], Y = [0, 50, 100, 150, 200]

$$W = \text{weak stimulus} = \frac{1}{0} + \frac{0.9}{50} + \frac{0.3}{100} + \frac{0}{150} + \frac{0}{200} \subset X$$

$$M = \text{medium stimulus} = \frac{0}{0} + \frac{0.4}{50} + \frac{1}{100} + \frac{0.4}{150} + \frac{0}{200} \subset Y$$

$$S = \text{severe response} = \frac{0}{0} + \frac{0}{50} + \frac{0.5}{100} + \frac{0.9}{150} + \frac{1}{200} \subset Y$$

Construct the proposition -

If “weak stimulus” Then not “severe response”.

Q5) Answer any two of the following:

[16]

- Explain the basic genetic algorithm,
Maximize $f(x) = 2x$ over $\{0, 1, 2, \dots, 31\}$
with initial x values of $(12, 23, 8, 16)$
- Explain properties of TLN.
- Explain Zadeh’s extension principle and

$$\underline{I} = \text{“approximately 3”} = \left\{ \frac{0.2}{2} + \frac{1}{3} + \frac{0.2}{4} \right\}$$

$$\underline{J} = \text{“approximately 2”} = \left\{ \frac{0.1}{1} + \frac{1}{2} + \frac{0.1}{3} \right\}$$

Calculate fuzzy number “approximately 6”.

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Total No. of Questions :5]

SEAT No. :

[Total No. of Pages :3

P2266

[5333] - 31

M.Sc. (Computer Science)

CS - 301 : SOFTWARE METRICS AND PROJECT MANAGEMENT

(2008 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks :80

Instructions to the candidates:

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

Q1) Attempt the following:

[8 × 2 = 16]

- a) State any two attributes of project.
- b) Define: tangible cost & sunk cost.
- c) What is metric plan.
- d) Define fault & failure in software.
- e) Define MTTF & MTBF.
- f) Define internal & external attributes.
- g) Define project risk management.
- h) What is the output of scope definition process.

Q2) Attempt any Four of the following:

[4 × 4 = 16]

- a) Explain different approaches to developed WBS?
- b) Explain the main process involve in scope management.

P.T.O.

- c) Write a note on configuration management.
- d) What is project integration management. Explain the main process involve in project integration management.
- e) What is PDM? Explain four types of relationships between activities used in PDM.

Q3) Attempt any FOUR of the following: **[4 × 4 = 16]**

- a) Explain process involves in procurement management.
- b) Write a note on quality control.
- c) Explain the process involve in communication management.
- d) Which are the different areas for identification of risk.
- e) Explain types of cost estimation in detail.

Q4) Attempt any FOUR of the following: **[4 × 4 = 16]**

- a) What is software & hardware reliability.
- b) Explain how the productivity can measure.
- c) Explain the activities involve in software metrics.
- d) Write a note on types of contract.
- e) Explain expert Judgement method.

Q5) Attempt any FOUR of the following:

[4 × 4 = 16]

- a) What are the different modularization criteria. Explain any one in detail.
- b) Write steps involve in planning of data collection.
- c) What is measurement? What is metric? State the importance of measurement.
- d) Explain McCalis software quality model in detail.
- e) Explain the key process areas in CMM.



Total No. of Questions : 5]

SEAT No :

P 2267

[5333]-32

[Total No. of Pages :2

M.Sc.

COMPUTER SCIENCE

CS23 - 302 : Mobile Computing

(2008 Pattern) (Semester-III) (Old & New)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw figure wherever necessary.*

Q1) Answer all of the following:

[8×2=16]

- a) State the types of bearer services in GSM.
- b) How are guard spaces assigned in TDMA and FDMA.
- c) What are the advantages of T-TCP?
- d) What is meant by Time Division duplex?
- e) State the difference between Display and Displayable.
- f) Define user mobility and device portability.
- g) List any four J2ME profiles.
- h) State the advantage of minimal encapsulation.

Q2) Attempt any four of the following:

[4×4=16]

- a) Write a note on Network Switching sub system.
- b) Explain the requirements of mobile IP.
- c) Explain the spread spectrum mechanism.
- d) Differentiate between the various wireless TCP mechanisms.
- e) Write a note on MACA.

P.T.O.

Q3) Attempt any four of the following: [4×4=16]

- a) What is the purpose of WSP. List the general features offered by WSP.
- b) Explain the architecture of SMS.
- c) Write a short note on Agent advertisement.
- d) State the advantages and disadvantages of fast retransmit/fact recovery.
- e) Explain the J2ME architecture.

Q4) Attempt any four of the following: [4×4=16]

- a) Write a note on Push Access Protocol.
- b) Explain any 4 configuration parameters to adapt TCP to wireless environment.
- c) Explain the procedure of handover in GSM.
- d) Explain the features of Palm OS and Windows CE.
- e) Explain how DSR handles routing in mobile IP.

Q5) Attempt any four of the following: [4×4=16]

- a) Write a short note on PRMA.
- b) Explain the logical model underlying WAE.
- c) Explain hierarchical ad-hoc routing.
- d) What is the role of GPRS support nodes? What are their types?
- e) Write a note on reverse tunneling.



Total No. of Questions : 5]

SEAT No :

P 2268

[Total No. of Pages :2

[5333]-33

M.Sc.

COMPUTER SCIENCE

**CS - 23-303 : Information Systems Security
(2008 Pattern) (Semester-III)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *All questions are Compulsory.*
- 2) *All questions carry equal marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*

Q1) Attempt all of the following :

[8×2=16]

- a) Explain the model of Network security.
- b) How challenge Response tokens are used for authentication?
- c) What is self-signed digital signature?
- d) What is Honey Pot ?
- e) Write any four requirements of a message digcot.
- f) What is key wrapping?
- g) What would be the transformation of a message using Rail Fence technique “this is MSc Computer Science Department”.
- h) What is phishing?

Q2) Attempt any four of the following :

[4×4=16]

- a) Given two prime numbers $P = 13$ & $Q = 11$. find out NE & D in an RSA encryption process.
- b) Explain the working of 3-D secure protocol.
- c) Explain the working of Kerberos.
- d) How IPsec does key management?
- e) What is firewall? Explain the limitations of firewall.

P.T.O.

Q3) Attempt any four of the following : **[4×4=16]**

- a) List the authentication tokens types. Describe any one in detail.
- b) Explain subkeys generation process of blowfish algorithm.
- c) Discuss the working of secure hash algorithm
- d) Apply play fair cipher on plain text “Msc Computer Science” & use keyword as “Department”.
- e) Explain steganography with example.

Q4) Attempt any four of the following : **[4×4=16]**

- a) Explain the different steps used for every round of IDEA.
- b) How DSA is used for digital signatures?
- c) Explain X.800 security mechanisms.
- d) Discuss various steps used in verifications of digital certificate.
- e) When is Demilitarized zone required? How is it unplemented?

Q5) Answer any four of the following: **[4×4=16]**

- a) Explain the working of PEM.
- b) Explain VPN architecture in detail.
- c) A and B want to establish a secret key using Doffie Hellman Key exchange protocol. assuming the values as $N = 7$, $g = 17$, $X = 13$, $y = 9$. Find out the values of A_1 B_1 K_1 and K_2 .
- d) Discuss the working of handshake protocol used in SSL.
- e) Why internet work security is called facinating & complex?

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