



[3680] – 1

M.C.A. (Semester – I) (Mgt. Faculty) Examination, 2009
IT – II : INFORMATION TECHNOLOGY AND PROGRAMMING
METHODOLOGIES (Old)
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

Note : i) Q.1 and Q.7 are compulsory.
*ii) Attempt **any four** from the remaining.*

1. a) Draw basic block diagram of digital computer and explain function of each component. 6
b) Solve the following : 9
 - i) $(20)_{10} \times (BAC)_{16} = ()_2$
 - ii) $(BABA)_{16} \div (18)_{10} = ()_{16}$
 - iii) $(27)_8 \times (89FC)_{16} = ()_8$
2. Explain memories of computer in detail. 10
3. What is a modem ? Explain its types with advantages and disadvantages. 10
4. a) Explain principles of language design in detail. 6
b) Differentiate between compiler and interpreter. 4
5. Draw Parse tree for the equation, $A := B + C \times A$ and explain whether it is ambiguous grammar or not. 10
6. a) Types of programming languages. 5
b) Explain universal gates with examples. 5
7. Short notes (**any 3**) : 15
 - a) Fire walls
 - b) Deadlock
 - c) Operating System
 - d) Binding.



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M.C.A. (Semester – I) (Management Faculty) Examination, 2009
IT – 11 : COMPUTER ORGANIZATION AND ARCHITECTURE
(2008 Pattern) (New)

Time: 3 Hours

Max. Marks: 70

Note : 1) *Q.No.1 and Q.No.7 are compulsory.*
2) *Attempt any four from the remaining.*
3) *Draw neat diagrams wherever necessary.*

1. a) Explain superscalar architecture in pentium processor. 8
b) Define parallel processing. Explain various types of parallel processing. 7
2. Define Flip-Flop. What are different types of flip-flop ? Discuss any two types with logic diagram and truth table. 10
3. Solve the following (**any four**) : 10
 - i) $(30)_{10} * (ABC)_{16} = (?)_2$
 - ii) $(101101)_2 - (10101)_2 = (?)_{10}$
 - iii) $(816)_8 = (?)_{16} = (?)_{10}$
 - iv) $(210)_{10} + (A1)_{16} = (?)_{10}$
 - v) $(89FC)_{16} \div (27)_8 = (?)_8$
4. Draw memory hierarchy and explain all types of memory. 10
5. What is interrupt ? Explain various types of interrupts with example. 10
6. What is pipelining ? Explain arithmetic pipelining in detail. 10
7. Write short notes on (**any three**) : 15
 - i) Compilers Vs Interpreter
 - ii) Decoders and Encoders
 - iii) Components of microprocessor
 - iv) I/O Ports
 - v) Logic Gates.



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M.C.A. (Semester – I) (Mgt. Faculty) Examination, 2009
IT 12 : C - PROGRAMMING
(2008 Pattern)
(New)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) *Question 1 compulsory.*
2) *Solve **any 5** questions from 2 to 7.*
3) *Assume suitable data **whenever** necessary.*

1. What will be the outputs ? Give explanation (**any five**) :

20

a) #define kMaxArraySize 100

```
int main(void)
{
    char myArray[kMaxArraySize];
    int i;
    for (i = 0; i < kMaxArraySize; i++)
        myArray[i] = 0;
    return 0;
}
```

b) int gNumber;

```
int main(void)
{
    int i;
    gNumber = 1;
    for (i = 1; i <= 10; i++)
    {
        gNumber = DoubleIt(gNumber);
        printf("Final value is %d", gNumber);
    }
}

int DoubleIt(int myVar)
{
    return 2*myVar;
}
```

P.T.O.



```
c) char myData = 7;
   FILE *fp ;
   fp = fopen("r", "My_File") ;
   fscanf("Here's a number %d", & myData) ;
   printf("%d", myData) ;

d) char s[20] ;
   strcpy (s, "Hello") ;
   if(strcmp(s, "Hello"))
       printf("The string are the same!") ;

e) switch (i)
   {
       case "hello" :
       case "goodbye" :
           printf("Greetings") ;
           break ;
       case default :
           printf("Boring") ;
   }

f) int main (void)
   {
       int num, i ;
       num = 5 ;
       for (i = 0 ; i < 20 ; i++)
       {
           AddOne (&num) ;
           printf("Final value is %d", num) ;
           return 0 ;
       }
       void AddOne (int *myVar)
       {
           (*myVar)++ ;
       }
```



2. a) Write a program to print the following pattern.

```
A   B C D       C B A
A   B C       C B A
A   B         B A
A               A
```

6

b) Write a program to accept a string and check that string is palindrome or not.

4

3. a) Write a program which accept the array of an integer and find GCD and LCM.

5

b) Write a program which print all ASCII value on the screen for a-z and A-Z.

5

4. a) Write a program using command line argument to find reverse of a given three digit number.

5

b) Write a program using recursive function to print factorial of a given number.

5

5. Write a program which accept a string and count number of lines, characters, spaces, numbers and special characters in a string.

10

6. Create a structure of employee in software company which contain name of employee, qualification, year of joining, total work experience and salary.

Display the information of employee which having maximum experience and inform of employee which having minimum salary.

10

7. Write a program that accept N*N matrix. Print the matrix in a circular form.

(e.g. A[3] [3] = { 1, 2, 3, 4, 5, 6, 7, 8, 9 } then your o/p is 1, 2, 3, 6, 9, 8, 7, 4, 5.

10



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M.C.A. (Semester – I) (Mgt. Faculty) Examination, 2009
BM – 11 : PRINCIPLES AND PRACTICES OF MANAGEMENT
AND ORGANIZATIONAL BEHAVIOUR
(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Question No. 1 is compulsory.
2) Attempt any three from the remaining.
3) Figures to the right indicate full marks.

1. a) Define Motivation. Explain any one theory of motivation in detail. 15
b) Explain meaning, need and scope of management. 10
2. Elaborate the contributions put forth by F.W. Taylor & Henri Fayol towards evolution of management thoughts. 15
3. Controlling is an important function of management explain the relevance of controlling and its process. 15
4. Team and group are govern by strategies for effective result explain the strategies that would help to manage group conflicts. 15
5. Planning is an intellectual process. Explain planning and various types of planning. 15
6. “Leaders are born not made”. -Comment and explain various styles of leadership.
7. Write short notes on (**any 3**) : 15
 - a) Decision making process.
 - b) Attitudes, values and beliefs.
 - c) Organizations structure.
 - d) Herzberg’s theory.
 - e) MBO.



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M.C.A. (Semester – I) (Mgt. Faculty) Examination, 2009
IT -13 : OPERATING SYSTEM CONCEPTS
(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 70

*Note. :1) Q. 1 and Q. 7 are **compulsory** questions.
2) Attempt **any four** from the Q. 2 to Q. 6.*

1. a) Discuss the significance of paging and segmentation. **10**
b) Describe swapping in details. **5**
 2. Explain how OS maintains and allocates free spaces in File System. **10**
 3. What is process scheduling ? Explain the various functions performed by the process scheduler. What are the features which a typical process scheduling policy should contain ? **10**
 4. What is Deadlock ? Explain about the Deadlock Avoidance. **10**
 5. What is Distributed OS ? Explain the various types of distributed system. **10**
 6. Explain Demand page memory management technique in detail. **10**
 7. Write short note on (**any three**) : **15**
 - a) Disk performance issues
 - b) Logical and physical memory
 - c) Directory Structure
 - d) Global OS
 - e) Virtual Machine.
-



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M.C.A. (Semester-I) (Mgt. Faculty) Examination, 2009
MT-11 : DISCRETE MATHEMATICS
(New) (2008 Pattern)

Time : 3 Hours

Max. Marks : 70

Instructions : i) Question No. 1 and 5 are **compulsory**.
ii) Solve **any 2** from the **remaining**.
iii) Figures to the **right** indicate **full** marks.

1. a) Using the following statements : 6

p : Ayush is rich

q : Ayush is happy

Write the following statements in symbolic form :

i) Ayush is rich but unhappy

ii) Ayush is poor but happy

iii) Ayush is neither rich nor happy

iv) Ayush is poor or he is both rich and unhappy.

b) Prove that $p \rightarrow (q \rightarrow r)$ and $(p \wedge \bar{r}) \rightarrow \bar{q}$ are logically equivalent. 5

c) For a set $A = \{1, 2, 3, 4, 5\}$, the relation matrix is

$$\begin{bmatrix} 1 & 1 & 1 & 1 & 1 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 \end{bmatrix}.$$

5

Draw its diagraph.

d) Draw all non isomorphic graphs on 2 and 3 vertices. 4

P.T.O.



2. a) Solve the following equations in $(\mathbb{Z}_{12}, +)$.

i) $[5] + X = [2],$

ii) $[7] + X = [5].$

5

b) Find the number of leaves in a full binary tree with n vertices.

c) Find the disjunctive normal form of $(q \rightarrow p) \wedge (\neg p \wedge q).$

5

3. a) Write the code words generated by H , where

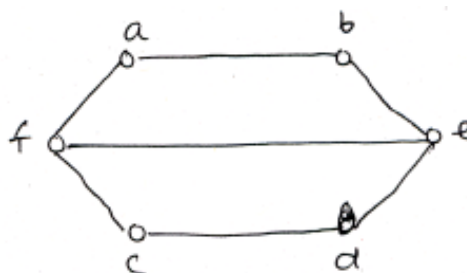
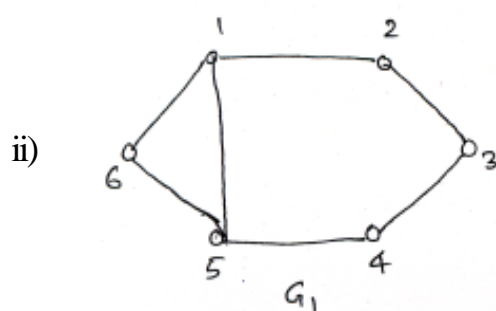
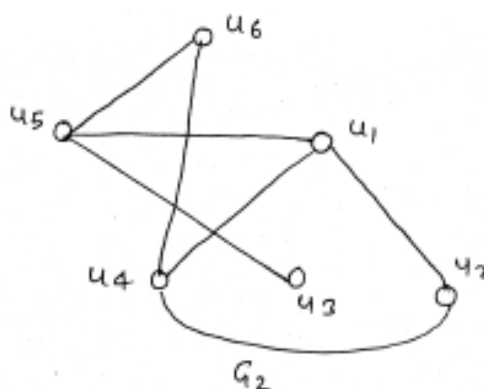
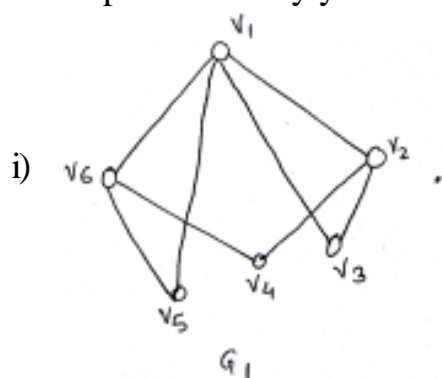
$$H = \begin{pmatrix} 1 & 0 & 1 & 1 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 & 0 \\ 0 & 1 & 1 & 1 & 0 & 0 & 1 \end{pmatrix}$$

If the received word is (0101000) , what is the transmitted word ?

7

b) Define isomorphism of graphs. Are the graphs shown in the following figure isomorphic ? Justify your answer.

8





4. a) Let Z be the set of integers and let aRb if b is a multiple of a . Determine which of the five properties are satisfied by R . **5**
- b) Is it possible to draw a tree with five vertices having degrees 1, 1, 2, 2, 4 ? Explain it. **5**
- c) Show that $(\forall x)(P(x) \rightarrow Q(x)) \wedge (\forall x)(Q(x) \rightarrow R(x)) \rightarrow (\forall x)(P(x) \rightarrow R(x))$. **5**
5. Define the following terms : **20**
- i) Hamming Code
 - ii) Non-Denumerable sets
 - iii) Rooted and Binary Trees
 - iv) Edge and vertex connectivity
 - v) Isomorphism
 - vi) Complete Bipartite Graph
 - vii) Directed graphs
 - viii) Eccentricity of a vertex
 - ix) Spanning tree
 - x) Matrix representation of a relation.



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M.C.A. (Semester – II) (Management Faculty) Examination, 2009
IT – 21 : DATA STRUCTURE USING ‘C’
(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Question No. 7 is **compulsory**.
2) Solve **any five** questions from 1 to 6.
3) Assume suitable data **whenever** necessary.
4) Draw suitable diagram **whenever** needed.
5) Figure at **right** hand indicate **full marks**.

1. a) Write a program for the addition of two polynomial using linked list. 7
b) A float array is defined as float array [100] [150] [50]. Find the address of cell array [75] [100] [45]. 3
2. a) Write a program for sorting a given linked list using any sorting algorithm. 7
b) Explain DEQueue ? 3
3. a) A graph is implemented by Adjacency matrix of N nodes. Write non recursive algorithm for Breadth first search. 7
b) Write the characteristics of B* tree. 3
4. a) Write a function for conversion from prefix expression to postfix expression. Trace out your algorithm for the following expression and show the content of the stack for each step.
* + A / ^ B ^ C D * * E - F G / H I J. (5+5)
5. a) Construct the AVL tree from the following elements.
40, 20, 10, 50, 90, 30, 60, 70, 95. 7
b) Write a function for left - right rotation. 3
6. a) Write a program for inorder traversal of a right- in threaded binary tree. 5
b) Draw a binary search tree for
23, 89, 34, 67, 99, 2, 55, 45, 78, 12, 56. Write preorder traversal for the tree. 5
7. Write a short notes. (**any four**) : (4× 5)
 - 1) Expression Tree
 - 2) B⁺ Tree
 - 3) ADT
 - 4) Priority queue
 - 5) Deletion of node from BST.



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M.C.A. (Semester – II) (Management Faculty) Examination, 2009
IT – 22 : DATABASE MANAGEMENT SYSTEM
(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) *Q. No. 1 is compulsory.*

2) *Solve **any 5** from the **remaining** questions.*

3) *State assumptions **wherever** necessary.*

1. An International Airline wants to monitor the information of flights, pilots and pilots staying in hotels during flight halt. Draw ERD and normalised file layout, considering following points. **20**
 - 1) Flight take-off locations (Airports) can be Mumbai, New Delhi, Bangalore.
 - 2) Two Pilots and one commander is allocated to one flight at a time during one schedule.
 - 3) Flight is flying on different routes.
 - 4) During the halt period, Pilot stays in specified hotels in that city, which are situated near to concerned Air-port.
 - 5) Different Hotels are registered with Airline.
2. Discuss Hierarchical Data Model in detail. **10**
3. Explain deadlock detection and prevention methods. **10**
4. Discuss failure classification and explain failure with non-volatile storage. **10**
5. Write short notes on (**any 2**) : **(5×2=10)**
 - a) Encryption and public key infrastructure.
 - b) Organization of records in files.
 - c) E.F. Codd rule.
 - d) Database users.
6. Explain cardinality of relationship in relational model with example. Also explain various types of keys. **10**
7. Explain the following : **(5×2=10)**
 - a) Views.
 - b) Select, Project, Join (Relational Algebra)
 - c) Integrity Rules.



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M.C.A. (Semester – II) (Mgt. Faculty) Examination, 2009
IT-23 : SOFTWARE ENGINEERING
(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) *Q. 1 and Q. 7 are compulsory.*
2) *Solve any 3 from Q. 2 to Q. 6.*
3) *Write assumptions wherever necessary.*

1. a) Soft Tools Pvt. Ltd. has issued an advertisement calling applications for various posts. After receiving applications scrutiny will be made and interview letters will be sent. Deserving candidates will be selected through interviews and will be appointed as regular employees.

Draw context level Data Flow Diagram and 1st Level Data Flow Diagram. **15**

b) Explain the format of Decision Tree with suitable example. **5**

2. Explain Water Fall Model in detail. **10**

3. Explain the structure of SRS. **10**

4. Explain the various features of CASE Tools. **10**

5. Explain the types of maintenance. **10**

6. Explain the Design issues while designing a user interface. **10**

7. Write short notes (**any 4**) : **(4×5=20)**

- a) Web Engineering
- b) Feasibility study
- c) Data Dictionary
- d) Program specifications
- e) RAD.



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M.C.A. (Semester – II) (Mgt. Faculty) Examination, 2009
BM 21 : SOFT SKILLS (2008 Pattern)
(New)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) *Q. No. 1 and Q. No. 8 are compulsory.*
2) *Solve **any four** from Q. No. 2 to Q. No. 7.*
3) *Figures to the **right** indicate **full** marks.*

1. Define Communication. Explain any four principles of communication giving suitable examples. **15**
2. Explain different electronic ways of communication used in today's business world. **10**
3. What are the different punctuation styles and formats that can be used to enhance the appearance of a letter ? **10**
4. Why written communication is important in business ? Explain with example. **10**
5. Write brief notes on the following meeting documents : **10**
 - 1) Notice
 - 2) Agenda
 - 3) Minutes
6. Explain Do's and Don'ts in detail of Group Discussion. **10**
7. Explain with example how self confidence is built through communication. **10**
8. Write short notes on **any three** : **15**
 - 1) Reading skills
 - 2) Presentation Techniques
 - 3) Voice Mail
 - 4) Note taking habit
 - 5) Managing Time.



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M.C.A. (Semester – II) (Mgt. Faculty) Examination, 2009
MT – 21 : PROBABILITY AND COMBINATORICS
(New) (2008 Pattern)

Time: 3 Hours

Max. Marks: 70

- Instructions :** i) Question No. 1 and question No. 4 are **compulsory**.
ii) Solve **any one** from question nos. 2 & 3 and **any one** from questions nos. 5 & 6.
iii) Figures to the **right** indicate **full** marks.

1. a) State and prove principles of Exclusion and Inclusion. 5
b) Solve the recurrence relation : $2a_n = 7a_{n-1} - 3a_{n-2}$; $a_0 = 2$ and $a_1 = 5$. 5
c) In how many ways can 10 persons be seated in a row ? If 3 of these are women, how many ways can 10 people be arranged so that no two women sit side by side ? 5
d) If 8 identical black boards are to be divided among 4 schools, how many divisions are possible ? 5
i) with no restriction ii) each school must get atleast 1 blackboard.
2. a) How many solutions are there to equation $x_1 + x_2 + x_3 = 17$ are non-negative integers with $x_1 < 4$, $x_2 < 3$ and $x_3 > 5$. 7
b) Prove : 8

i)
$$\binom{n}{1} + \binom{n}{3} + \dots = \binom{n}{0} + \binom{n}{2} + \dots = 2^{n-1}$$

ii)
$$\binom{n}{0}^2 + \binom{n}{1}^2 + \dots + \binom{n}{n}^2 = \binom{2n}{n}$$

P.T.O.



3. a) Determine the discrete numeric function of generating function, 8

$$A(z) = \frac{7z^2}{(1-2z)(1+3z)}$$

- b) State and prove multinomial theorem and hence find the coefficient of $x^2 y^4 z^3$ in the expansion of $(x - 2y + 3z)^9$. 7

4. a) Define i) Axiomatic probability ii) Conditional distribution iii) Joint probability distribution iv) Equally likely events. 8

- b) Let X and Y be two random variables each taking three values – 1, 0 and 1 and having the joint probability distribution.

Y \ X	-1	0	1
-1	0	0.1	0.1
0	0.2	0.2	0.2
1	0	0.1	0.1

- i) Show that X and Y have different expectations.
- ii) Prove that X and Y are uncorrelated.
- iii) Find var (X) and var (Y). 6
- c) Torch batteries of certain make have an average life of 50 hours and s.d. of 3 hours. How many batteries in an order of 1000 may be expected to last
- i) Longer than 55 hours
- ii) Less than 44 hours
- iii) Find approximately within what time 30% of the batteries may be expected to fail. 6



5. a) Obtain m.g.f. for the following p.d.f.

$$f(x) = \begin{cases} \frac{3}{4} \cdot x \cdot (2 - x) & ; 0 \leq x \leq 2 \\ 0 & ; \text{otherwise} \end{cases} \text{ and hence find } \mu'_1 \text{ and } \mu_2. \quad 7$$

- b) State Baye's theorem. In a bolt factory machines A, B and C manufacture respectively 25%, 35% and 40% of the total. Of their output 5, 4, 2 percent respectively are defective bolts. A bolt is drawn at random from the product and is found to be defective. What are the probabilities that it was manufactured by machines i) A, ii) B and iii) C ? 8

6. a) The joint p.d.f. of two r.v's X and Y is given below;

$$f(x, y) = \frac{9(1+x+y)}{2(1+x)^4(1+y)^4}, 0 \leq x < \infty, 0 \leq y < \infty$$

Find :

- i) Marginal distribution of X
 - ii) Marginal distribution of Y
 - iii) Conditional distribution of X/Y
 - iv) Conditional distribution of Y/X. 8
- b) Find mean and variance of negative binomial distribution. 7



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M.C.A. (Semester – II) (Mgt. Faculty) Examination, 2009
IT – 21 : DATA STRUCTURES AND FILES USING ‘C’
(2005 Pattern) (Old)

Time : 3 Hours

Max. Marks : 70

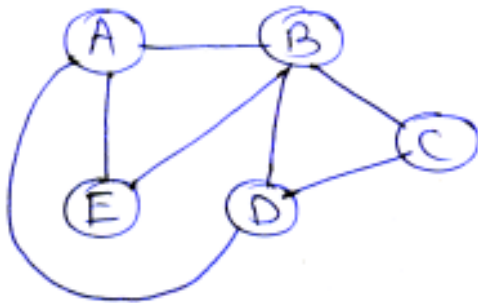
Note : 1) Q. No. 1 and Q. No. 9 are compulsory.
*2) Answer **any five** questions from the **remaining**.*
*3) Make assumptions **if required**.*

1. A) Evaluate the following postfix expression. Show the contents of stack at each step,
 $AB * C + DE - G / H +$
where $A = 1, B = 2, C = 3, D = 6, E = 4, G = 5, H = 7$. 8
B) Write a note on Threaded Binary Tree. 4
2. Write the following functions for circular singly linked list. 10
A) Insert a Node at given position
B) Delete a Node from given position.
3. A) Consider the following declaration
 $\text{int no}[200][100];$
Compute the row major and column major address of the member $\text{no}[135][85]$
where base address is 1000. 5
B) Write a function to print the contents of queue implemented as array, in reverse order. 5
4. Construct the Binary search tree for the following : (4+3+3)
55, 30, 90, 15, 63, 13, 85, 7, 25, 75
A) Write preorder traversal for the above tree.
B) Write post order traversal for the above tree.

P.T.O.



5. A) Write a function to sort an integer array using insertion sort. 5
 B) Explain various searching techniques. 5
6. Write the following functions for a Binary Search Tree. 10
 A) Count the no. of nodes having odd no.s.
 B) Print the smallest and largest no. from tree.
7. A) Sort the following numbers using quick sort
 47, 13, 15, 7, 25 5
 B) Write functions to add and delete elements from linear queue implemented as
 linked list. 5
8. A) Write a program to print transpose of 5×5 matrix. 5
 B) Write a function to merge two doubly linked list. 5
9. Consider the following graph.



- A) Generate DFS output. 2
- B) Generate BFS output. 2
- Consider starting vertex A.
- C) Write Adjacency Matrix. 2
- D) Write Adjacency list. 2



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M.C.A. (Semester – II) (Mgt. Faculty) Examination, 2009
IT-22 : OPERATING SYSTEMS CONCEPTS
(2005 Pattern) (Old)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) *Q. 1 and Q. 7 are compulsory and of 15 marks each.*
2) *Solve any four from remaining and each carrying 10 marks.*

1. a) What are different techniques used by OS for mapping the logical address to physical address ? Explain any two techniques in detail. **10**
b) Explain in detail various process operations done by OS. **5**
2. Define Synchronization. Explain IPC implementation in client-server system. **10**
3. Explain one page replacement and one frame allocation algorithm. **10**
4. What are necessary conditions for the occurrence of deadlock ? Explain Resource allocation algorithm with suitable example. **10**
5. a) Differentiate NFS and NTFS.
b) Differentiate pre-emptive and non-pre-emptive algorithm. **(5+5)**
6. Explain NOS architecture in detail. **10**
7. Write short notes on (**any 3**) : **15**
 - a) Fragmentation
 - b) RAID
 - c) Monitor
 - d) Abstract view of OS.



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M.C.A. (Semester – II) (Mgt. Faculty) Examination, 2009
IT-23 : INFORMATION SYSTEMS : ANALYSIS AND DESIGN
METHODOLOGIES
(2005 Pattern) (Old)

Time : 3 Hours

Max. Marks : 70

*Note : i) Q. No. 1 and Q.No. 6 are compulsory.
ii) Solve **any three** from remaining.*

1. a) 'XYZ' company wants to computerize their Payroll System. Employees give their personal details to Personnel Department. Accounts Department sends additional earnings and deductions list. Attendance of the employee is sent by the Time-Office. Pay slip is given to all the employees. Bank Statements are prepared and sent to the banks. Final list of various deductions such as Income Tax, Professional Tax, Provident Fund deductions etc. are sent to Accounts Department.
 - i) Draw Context level Data Flow Diagram. 5
 - ii) Draw First level Data Flow Diagram. 10
- b) Explain the fact finding methods in brief. 5
2. Explain the Basic Software Development Life Cycle. 10
3. Write and explain role and skills of System Analyst in detail. 10
4. Explain with proper example the Functional Decomposition Diagram. 10
5. Explain feasibility study and elaborate Cost-benefit analysis. 10
6. Write short notes on (**any four**) : 20
 - i) RAD.
 - ii) Structured English.
 - iii) Prototyping model.
 - iv) IS Audit.
 - v) Win-Win spiral model.



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M.C.A. (Semester – II) (Mgt. Faculty) Examination, 2009
IT-24 : DATABASE MANAGEMENT SYSTEM
(2005 Pattern) (Old)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) *Q. 1 is compulsory.*

2) *Solve **any 5** from remaining questions.*

3) *State assumptions **wherever** necessary.*

1. A well known IT company has organised a Industry-Academics meet at B'lore. For the meet following operations are done by company.

→ Company invites many colleges/Institutes.

→ From every college/Institute 2-3 participants are to be registered for the event. Participants are coming from every corner of the country.

→ For registered participants, pickup and drop facilities are provided, for which booking is done at various travel agents in every city/district.

→ Company has also made staying arrangements at 3 different hotels for around 100 participants.

→ Each room is allocated to two participants, considering genders.

Draw ERD and design normalized file layout. **20**

2. Compare the resolution of M : N relation in HDM and RDM. **10**

3. Explain log based recovery techniques. **10**

4. Explain the following : **(5×2=10)**

a) Cardinality of relationship

b) Data Independence

5. Explain Time-Stamp ordering techniques for concurrency control. **10**

P.T.O.



6. Short notes (**any 2**) :

(5×2=10)

- a) Knowledge base systems
- b) Data mining
- c) Security and privacy mechanism
- d) Database users

7. Explain the following (**any 5**) :

(2×5=10)

- a) Primary key
 - b) Orderby
 - c) User defined constraints - any one
 - d) Delete
 - e) Truncate
 - f) Join
-



[3680] – 25

M.C.A. (Semester – II) (Management Faculty) Examination, 2009
MT 21 : PROBABILITY AND COMBINATORICS
(Old) (2005 Pattern)

Time : 3 Hours

Max. Marks : 70

- N.B. :** 1) Question No. 1 is **compulsory**.
2) Attempt **any 2** from the remaining.
3) Figures to the **right** indicate **full** marks.
4) Use of calculator and statistical table is **allowed**.

1. a) State and prove principles of inclusion and exclusion. **6**
b) Determine the discrete numeric function of generating function. **6**

$$A(z) = \frac{7z^2}{(1-2z)(1+3z)}$$

- c) n persons are seated on n chairs at a round table. Find the probability that two specified persons are sitting next to each other. **6**
d) Find the mean and variance of Binomial distribution. **6**

- e) The probability that a construction job will be finished on time is $\frac{3}{5}$, the probability that there will be no strike is $\frac{2}{3}$, and the probability that the job will

be finished on time given that there are no strikes is $\frac{4}{5}$. i) What is the probability that the job will be finished on time and there will be no strikes ? ii) What is the probability that there will have been no strikes given that the job is finished on time ? **6**

2. a) In an intelligence test administered to 1000 children the average score is 42 and standard deviation 24
i) Find the number of children exceeding the score 60 and
ii) Find the number of children with score lying between 20 and 40. **8**

P.T.O.



b) Let $f(x,y) = \begin{cases} 8xy; & 0 < x < y < 1 \\ 0 & \text{elsewhere} \end{cases}$. **6**

- Find i) Marginal density functions of x and y
 ii) Conditional density functions of x given y
 iii) Covariance between x and y

c) Find the number of non negative integer solutions of the equation **6**

$$X_1 + X_2 + X_3 = 28$$

$$\text{such that } 3 \leq X_1 \leq 19, 4 \leq X_2 \leq 20, 5 \leq X_3 \leq 21$$

3. a) A continuous random variable X assumes values between 2 and 5 with p.d.f. **8**

$$f(x) = \begin{cases} K(1+x) & \text{for } 2 \leq x \leq 5 \\ 0 & \text{otherwise} \end{cases}$$

Find i) K ii) mean iii) variance

b) For the bivariate probability distribution of X and Y :

Y X	1	2	3	4	5	6
0	0	0	$\frac{1}{32}$	$\frac{2}{32}$	$\frac{2}{32}$	$\frac{3}{32}$
1	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
2	$\frac{1}{32}$	$\frac{1}{32}$	$\frac{1}{64}$	$\frac{1}{64}$	0	$\frac{2}{64}$

Find

- i) $P(X \leq 1, Y = 2)$ ii) $P(Y \leq 3)$ iii) $P(X < 3, Y \leq 4)$ **6**

c) Show that $\binom{r}{0}^2 + \binom{r}{1}^2 + \dots + \binom{r}{r}^2 = \binom{2r}{r}$. **6**



4. a) Solve the Recurrence Relation

8

$$a_{n+2} - 7a_{n+1} + 10a_n = 12.5^n$$

b) State multinomial theorem and hence find the coefficient of $x^4y^6z^6$ in the expansion of $(2x - 3y^2 + 4z^3)^9$.

6

c) Define

i) Conditional probability distribution

6

ii) Random variable

iii) Marginal probability distribution.



[3680] – 3

M.C.A. (Semester – I) (Management Faculty) Examination, 2009
IT-13 : COMPUTER ARCHITECTURE
(2005 Pattern) (Old)

Time : 3 Hours

Max. Marks : 70

Note : 1) *Q. 1 and Q. 7 are compulsory.*
2) *Solve any 4 questions from remaining.*
3) *Draw neat diagram whenever necessary.*

1. a) What are addressing mode ? Explain any four in detail. 9
b) Explain Instruction and Execution cycle. 6
2. Explain 64-bit architecture in detail. 10
3. What is pipelining ? Explain the instruction pipelining with time space diagram. 10
4. Compare ISA, EISA and PCI bus architectures and its characteristics. 10
5. Compare characteristics of RISC and CISC architecture. 10
6. Explain working of D to A converter with the help of appropriate diagram. 10
7. Write short note (**any three**) : 15
 - i) Handshaking
 - ii) Half adder
 - iii) I/O ports
 - iv) CPU performance
 - v) Arithmetic Co-processor.



[3680] – 301

M.C.A. (Semester – III) (Mgt. Faculty) Examination, 2009

IT-31 : WEB TECHNOLOGIES

(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 70

Note : 1) *Q. 1 and Q. 8 compulsory.*

2) *Solve **any five** questions from Q.2 to Q.7*

3) *Figures to the **right** indicate **full marks**.*

1. Explain Global. asa with example. **10**
2. Design λ ml to store patient information with following fields Patient Id, address, contactno, age, bloodgroup (with attribute A, AB...etc.).
 - a) Display the content of above document in Table format using XMLDSO.
 - b) Use external style sheet do display blood group in different colors. **10**
3. Design HTML form to accept conference registration details from participants Assume suitable structure and validate any four fields using javascript. **10**
4. Design ASP application to accept and store alumni registration details in database assume suitable fields. **10**
5. a) Explain error handling in VB script with example. **5**
b) Explain Array Objects. **5**
6. a) Explain <IFRAME> & tags in HTML. **5**
b) DOM parser. **5**
7. Design external CSS with following styles for table along with HTML. **10**
 - a) table border – thick
 - b) table header – centre – align, bold, green-color.
 - c) alternate rows with same colour.
8. Write short notes (**any 2**) : **10**
 - a) Date functions in VB Script.
 - b) DOM – in Java Script.
 - c) Steps to host web site.



[3680] – 302

**M.C.A. (Management Faculty) (Semester – III) Examination, 2009
(2008 Pattern)**

**IT-32 : DATA COMMUNICATION AND COMPUTER NETWORKS
(New)**

Time : 3 Hours

Max. Marks : 70

Instructions : 1) *Q. 1 and Q. 7 are compulsory.*
2) *Solve **any three** from the remaining.*
3) *Draw neat diagram **wherever** necessary.*

1. A) Explain HTTP Protocol, request header and responses. **10**
B) Explain cryptography, symmetric and asymmetric key signatures. **10**
2. Explain purpose of resource record in DNS. State SOA records with their purpose. **10**
3. Explain TCP connection operation with neat diagram. **10**
4. Explain Network Management Components in detail. **10**
5. Compare OSI reference model with TCP/IP protocol suite. **10**
6. Explain various transmission media with their advantages. **10**
7. Write short notes (**any four**) : **(4×5=20)**
 - i) P2P Network
 - ii) ATM Layers
 - iii) FTP
 - iv) IP Address classes
 - v) IPSec
 - vi) X.25.



[3680] – 303

M.C.A. (Management Faculty) (Semester – III) Examination, 2009
IT-33 : OBJECT ORIENTED PROGRAMMING USING C++ (New)
(2008 Pattern)

Time : 3 Hours

Max. Marks : 70

Note : 1) Question 1 and 8 are compulsory.
*2) Solve **any four** from question No. 2 to 7.*
*3) Figures to the **right** indicate **full** marks.*

1. I) Answer the following.

What will be the output of following program ?

10

a) `#include<iostream.h>`
`#include<iomanip.h>`
`#include<math.h>`
`void main()`
`{`
`int i=1350;`
`float f=302.250;`
`cout<<setiosflags(ios::showbase|ios::uppercase);`
`cout<<i<<endl;`
`cout.precision(4);`
`cout<<setiosflags(ios::showpoint|ios::scientific)<<f<<endl;`
`cout<<resetiosflags(ios::scientific);`
`cout<<setprecision(3)<<sqrt(2);`
`}`

b) `#include<iostream.h>`
`class outer`
`{`
`class inner`
`{`
`int data;`
`}i;`

P.T.O.



```
        public:
            void create()
            {
                i.data=100;
            }
            void display()
            {
                cout<<i.data;
            }
};
void main()
{
    outer obj;
    obj.create();
    obj.display();
}
c) #include<iostream.h>
void main()
{
    char s[]="program";
    int i;
    for(i=0;s[i];i++)
        cout<<"\n"<<s[i++]<<*(s+i);
}
d) #include<iostream.h>
class base
{
    private: int i;
};
class derived: public base
{
    private: int j;
};
void main()
```



```
{
    cout<<endl<<sizeof(derived)<<endl<<sizeof(base);
    derived dobj;
    base bobj;
    cout<<endl<<sizeof(dobj)<<endl<<sizeof(bobj);
};
e) #include<iostream.h>
void main()
{
    int a=10;
    while(1)
    {
        switch(a)
        {
            case 10: cout<<a++;
            case 11: cout<<a--;
            case 12: cout<<a++;
        }
    }
}
```

- II) What is friend function ? Write a program to exchange private values of two classes using friend function. **5**
2. a) Write a c++ program illustrating static member function. **5**
- b) How do you achieve the following ? **5**
- i) Conversion between objects and basic types.
 - ii) Conversion between objects of different classes.
Illustrate with the help of an example.
3. Define a class String. Overload **10**
- i) + operator to concat two strings
 - ii) [] operator to return ith character
- Include constructors and appropriate access functions.



4. a) What is virtual base class ? Explain with suitable example. **5**
b) What is Namespace ? Explain the nested namespaces with an example. **5**
5. a) Write a program to accept a number. Raise an exception if the number is prime. **5**
b) What is RTTI ? Explain with suitable example. **5**
6. What is the advantage of using a template class ? Write a class template VECTOR with a series of float values and perform the following operations. **10**
i) To create a vector
ii) To add two vectors
7. Design a class student having following data members. **10**
• Roll No
• Name
• Marks
- Write a menu driven program to do following task by using the concept of file I/O in C++
- i) Add a student record
ii) Display student record
iii) Modify student record
8. Write short notes on the following : **15**
a) User Defined Manipulators
b) Standard Template Library
c) New Style Casts.



M.C.A. (Management Faculty) (Semester – III) Examination, 2009
IT : 34 ADVANCED DATABASE MANAGEMENT SYSTEMS
(New) (2008 Pattern)

Time : 3 Hours

Max. Marks : 70

Note : 1) Question No. 7 is **compulsory**.
2) Solve **any five** questions from 1 to 6.
3) Figures at the **right** indicate marks.
4) Assume **any** suitable database example as a case study.

- | | |
|--|----------|
| 1. a) Compare RDBMS, OODBMS and ORDBMS | 6 |
| b) Explain in brief Parallel database architecture | 4 |
| 2. a) Explain various data mining models. | 6 |
| b) Operations on data cubes. | 4 |
| 3. a) What is data warehouse ? Explain data warehouse architecture in details. | 6 |
| b) Write note on Apriori algorithm. | 4 |
| 4. a) Explain various concurrency control approaches in DDBMS | 6 |
| b) Explain the challenges of managing databases on the Web. | 4 |
| 5. a) Explain lock manager in distributed databases. | 6 |
| b) What are mobile databases ? Explain with example. | 4 |
| 6. What is XML ? Explain various features of XML also explain the difference between XML and HTML. | 10 |
| 7. Write short note on (any four) : | (5×4=20) |
| a) K-means algorithm | |
| b) Data models for XML | |
| c) Descriptive data mining | |
| d) Multimedia Databases | |
| e) Machine learning. | |



[3680] – 305

M.C.A. (Management Faculty) (Semester – III) Examination, 2009
BM 31 : MANAGEMENT SUPPORT SYSTEMS & IS SECURITY
(New) (2008 Pattern)

Time : 3 Hours

Max. Marks : 70

Note : 1) Question No. 1 and 7 are **compulsory**.
2) Attempt **any four** from Q. 2 to Q. 6.
3) Figures to the **right** indicate marks.

1. Explain in detail the information requirements for marketing function using systems approach. **10**
2. Explain conceptual and physical view of MIS. **10**
3. Explain characteristics and limitations of Human information processing. **10**
4. Explain the various phases of Herbert Simon Model. Differentiate between DSS and MIS. **10**
5. Explain the basic concept of Expert systems and how Expert system is different from Conventional system ? **10**
6. Explain in detail about the security of Information Systems. **10**
7. Write short notes on **any four** : **(4×5=20)**
 - a) Negative feedback
 - b) Value of information
 - c) Sensitivity analysis
 - d) EIS
 - e) IS audit
 - f) Law of requisite variety.



[3680] – 31

M.C.A. (Semester – III) (Management Faculty) Examination, 2009
IT – 31 : WEB SUPPORTING TECHNOLOGIES
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

Note : 1) Q. 1 is compulsory.
*2) Solve **any four** questions from remaining.*
*3) Figures to **right** indicate full marks.*

1. Explain DTD with example. 10
2. a) Write a code for creating following external style sheet and use it in html.
 - i) Set 'double' border for table
 - ii) Set word spacing 5 pixels.
 - iii) Set hyperlink without underline
 - iv) Set top margine to 10 pixels. 8b) Explain document object model in detail. 7
3. a) Design HTML form for 'Election card'. Assume suitable fields. Write java script code for validating any four elements. 8
b) Explain error handling in VB script. 7
4. a) Write VB script code for transferring the contents of text box into list box with the help of button. The interface for the above will be as follows,
Name 8
b) Differentiate between XML and HTML. 7
5. a) Design XML and DTD for book Information for four elements. 8
b) Explain 3- tier architecture with diagram. 7
6. Write short notes on (**any 3**) : 15
 - a) SOAP
 - b) Array object in java script
 - c) Client side image mapping
 - d) Span tag and Meta tag.



[3680] – 32

M.C.A. (Semester – III) (Management Faculty) Examination, 2009
IT-32 : COMPUTER NETWORKS
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) *Q. 1 and Q. 7 are compulsory.*

2) *Solve **any three** from the **remaining**.*

3) *Draw neat diagrams **wherever** necessary.*

1. A) What is DNS ? Explain Resource Records and SOA Records in DNS. **10**
B) Explain HTTP Transaction in detail. **10**
2. What is Cryptography ? Explain symmetric and asymmetric key signatures. **10**
3. Explain in detail IP Addressing. **10**
4. Explain how different components are used in building LAN. **10**
5. Compare the following : **10**
 - a) Peer to Peer and Client Server Network.
 - b) Connectionless and connection oriented network.
6. What is MIME ? Explain its purpose and format in detail. **10**
7. Write short notes (**any four**) : **(4×5=20)**
 - i) Network and Transport Layer of OSI Model
 - ii) Hubs and Switches
 - iii) Wireless LAN
 - iv) VPN
 - v) TCP
 - vi) ATM Network



[3680] – 33

M.C.A. (Sem. – III) (Management Faculty) Examination, 2009
(BM-33) : MANAGEMENT SUPPORT SYSTEMS
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Question No. 1 and 6 are **compulsory**.
2) Attempt **any 3** from the remaining.

1. a) Explain in detail the information requirements for inventory control function using system approach. **15**
b) Explain the application of law of requisite variety with an example. **5**
2. “The Information requirements varies according to the level of Management”. Justify. **10**
3. Explain in detail all the phases of Herbert Simon Model. **10**
4. Define MIS. Discuss conceptual and physical view of MIS. **10**
5. Explain various characteristics of EIS. Distinguish between EIS and DSS. **10**
6. Write short notes (any 4) : **(4×5=20)**
 - a) Value of Information.
 - b) Heuristic Programming.
 - c) MIS Vs Data Processing.
 - d) Newell-Simon Model.
 - e) Organisation Structure.



[3680] – 34

M.C.A. (Semester – III) (Mgt. Faculty) Examination, 2009
IT-34 : OBJECT ORIENTED PROGRAMMING USING C++
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

Note : 1) Q. 1 is compulsory.

*2) Solve **any five** from Q. 2 to Q. 8.*

*3) Figures to **right** indicate **full** marks.*

1. Answer **any five** of the following :

20

Explain what will be the out put of following program :

A)

```
#include <iostream.h>
void main(void)
{ char str [] = "the boring stuff";
  char *p = "that's interesting";
  cout <<endl<<str;
  cout<<endl<<p;
  cout<<endl<<(void*)str;
  cout<<endl<<(void*)p;
}
```

B)

```
#include <iostream.h>
#include <iomanip.h>
void main(void)
{ int i = 650;
  float a = 425.123;
  cout<<setiosflags(ios::showbase|ios::uppercase);
  cout<<i<<endl;
  cout.precision(4);
  cout<<setiosflags(ios::showpoint)<<a;
}
```

P.T.O.



C)

```
#include <math.h>
#include <stdio.h>
int main(void)
{
    double number = 123.54;
    double down, up;
    down = floor(number);
    up = ceil (number);
    printf ("original number % 5.21f\n", number);
    printf("number rounded down % 5.21f\n", down);
    printf("number rounded up % 5.21f\n", up);

    return 0;
}
```

D)

```
#include <stdio.h>
#include <string.h>
#include <conio.h>
int main(void)
{
    char string[10];
    char * str1 = "computer";
    clrscr();
    strncpy(string, str1, 5);
    string[3] = '\0';
    printf("%s\n", string);
    return 0;
}
```

E) public class A

```
{ int x=4;
}
private class B :: class A
{ int x = 20;
  cout <<"x="<<x;
}
```

F) Explain >> operator in C++ with suitable example.



2. Explain the features of OOP using suitable C++ example. 10
3. A) Write a program to design a class for multiplication of two objects using Friend Function. 5
- B) Write a C++ program to overload the operator '+', which will be used to concat the two strings. 5
4. A) Write a program to demonstrate invocation of Constructor and Destructor. 5
- B) Write a C++ program to calculate area of circle. Use templates. 5
5. A) Explain Runtime Type Information (RTTI) with suitable example. 5
- B) Write a program to accept two numbers and perform basic mathematical operation on it. Handle the exception like zero_divide_error. 5
6. Write a C++ program that reads the data from FILE1.txt and copy every even alternate character to FILE2.txt. 10
7. A) Write a function power() to raise a number x to a power y. The function takes a double value for x and int value for y, and returns result. Use default value 2 for y to make the function to calculate squares when this argument is omitted. Write a main that gets the values of x and y from the user. 5
- B) Write a C++ program illustrating static member function. 5
8. Define a class to represent a Bank Account. Include the following : 10
- Data members :**
- | | |
|--------------------------|------------------|
| a) Name of the Depositor | b) Account No. |
| c) Type of Account | d) BalanceAmount |
- Member functions :**
- | | |
|----------------------------|---|
| a) To Assign initial value | b) To Deposit an amount |
| c) To Withdraw an amount | d) To display Name of Depositor and Balance |
- Define all member functions and main().
- Generate the saving account report slip as an output.



[3680] – 35

M.C.A. (Semester – III) (Mgt. Faculty) Examination, 2009
IT 36 : OBJECT ORIENTED ANALYSIS AND DESIGN
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) *Q. 1 is compulsory.*

2) *Solve **any five** from remaining questions.*

1. a) Develop a use case diagram and class for the dental clinic in the following scenario :

The receptionist keeps track of patient and head-of-household information. He/She will enter information about the patients and head of households. He/She will also keep track of office visits by the patients. Patient information is also entered and maintained by the office business manager. In addition, the business manager maintains the information about dental staff persons.

The business manager also prints the invoices. Patients invoices are printed monthly and sent to the head of household. Insurance invoices are printed weekly. When the invoices are printed, the business manager double checks a few invoices against information in the system to make sure it is being aggregated correctly. She also enters the payment information when it is received. Each dental staff is responsible for entering information about dental procedure.

15

- b) What is <<include>> and <<extend>> relationship used for ?

5

2. Draw an activity diagram for ATM showing following process :

10

- 1) Receive transaction
- 2) Search customer information request
- 3) Send to customer service
- 4) Process Transaction
- 5) Update account information
- 6) Notify customer.

3. Design state transition diagram for a washing machine.

P.T10



4. Customer wants to make a purchase of various items online. Valid customer can make a purchase online. System provides the catalog for item selection if needed. While ordering for products customer has to provide his personal details. Customer makes cash or card payment for his order. **10**
5. Compare object oriented analysis and design by Grady Booch and Jacobson. **10**
6. Discuss the characteristics of a good test plan. **10**
7. Short notes (**any 2**) : **(5×2=10)**
- a) RUP
 - b) Types of inheritance
 - c) Categories of patterns
 - d) CRC
-



[3680] – 4

M.C.A. (Semester – I) (Management Faculty) Examination, 2009
MT 11 : DISCRETE MATHEMATICS
(2005 Pattern) (Old)

Time : 3 Hours

Max. Marks : 70

Instructions : i) Question No. 1 is **compulsory**.
ii) Solve **any two** questions from the remaining.
iii) Figures to the **right** indicate **full** marks.

1. a) Show that $(Q \wedge (P \rightarrow Q) \rightarrow P)$ is tautology. **5**

b) Let P : It rains **4**

Q : The atmospheric humidity increases.

Write the following statements in symbolic form :

- i) Atmospheric humidity increases only if it rains.
 - ii) Sufficient condition for it to rain is that atmospheric humidity increases.
 - iii) Necessary condition for it to rain is that atmospheric humidity increases.
 - iv) Whenever atmospheric humidity increases it rains.
- c) Determine whether the operation $*$ defined on the following sets is the binary operation or not. **6**
- i) $A = I_+$ where $a * b = a - b$
 - ii) $A = I$ where $a * b = \min(a, b)$.
- d) Given $A = \{1, 2, 3, 4, 5\}$ and $B = \{1, 3, 5\}$. Let R be the relation from $A \rightarrow B$ defined by “ x is less than y ”. Write relation R , its matrix and draw its graph. **8**
- e) Show that the sum of degrees of all vertices in a graph is always even. **7**

P.T.O.



2. a) Construct Truth Tables for the following : 6
- i) $P \vee (P \wedge Q)$
 - ii) $(P \vee Q) \vee R$
 - iii) $(P \vee Q)$.
- b) Rewrite the following propositions using the symbols \exists and \forall : 4
- i) All elephants have trunks.
 - ii) Every clever student is successful.
- c) Obtain the Principal Disjunctive Normal Form (PDNF) for the following : 5
- $$\neg P \rightarrow (Q \leftrightarrow R) .$$
- d) Show the validity of the conclusion $\neg A \vee \neg D$ is valid from the premises $A \rightarrow (B \rightarrow C)$ and $D \rightarrow (B \wedge \neg C)$. 5
3. a) Let A be the set of positive factors of 36 and let \leq be the relation divides; i.e., $\leq = \{ \langle x, y \rangle \mid x, y \in A \text{ and } x \text{ divides } y \}$. Show that \leq is totally ordered on A. Also draw the Hasse diagram. 5
- b) Use Warshall's algorithm to find the transitive closure of the relation $R = \{ \langle 1, 2 \rangle, \langle 2, 3 \rangle, \langle 3, 4 \rangle, \langle 2, 1 \rangle \}$ on $A = \{ 1, 2, 3, 4 \}$. 5
- c) Let $R = \{ \langle 1, 2 \rangle, \langle 3, 4 \rangle, \langle 2, 2 \rangle \}$ and $S = \{ \langle 4, 2 \rangle, \langle 2, 5 \rangle, \langle 3, 1 \rangle, \langle 1, 3 \rangle \}$. Find $S \circ (S \circ R)$ and $(R \circ S) \circ R$. 5
- d) Let $A = \{ 1, 2, 3, 4, 5, 6, 7 \}$ and $R = \{ \langle x, y \rangle \mid x - y \text{ is divisible by } 3 \}$. Show that R is an equivalence relation. Draw the graph of R. 5
4. a) If $A = \{ 1, 2, 3, 4 \}$ and $B = \{ a, b, c, d \}$, determine if the following functions are one to one, onto or both. 6
- i) $f = \{ \langle 1, a \rangle, \langle 2, a \rangle, \langle 3, b \rangle, \langle 4, d \rangle \}$
 - ii) $g = \{ \langle 1, c \rangle, \langle 2, b \rangle, \langle 3, a \rangle, \langle 4, a \rangle \}$
 - iii) $h = \{ \langle 1, a \rangle, \langle 2, b \rangle, \langle 3, a \rangle, \langle 4, c \rangle \}$



b) Prove that the kernel of a homomorphism g from a group $\langle G, * \rangle$ to $\langle H, \Delta \rangle$ is a sub group of $\langle G, * \rangle$.

7

c) Write the code words generated by H , where

$$H = \begin{pmatrix} 1 & 0 & 1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 \end{pmatrix}$$

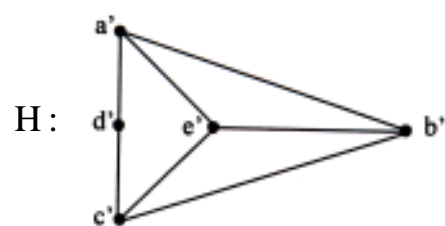
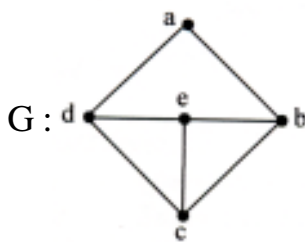
What is the minimum weight of the non zero code word in above code words ?

How many errors are detected by this group code ?

7

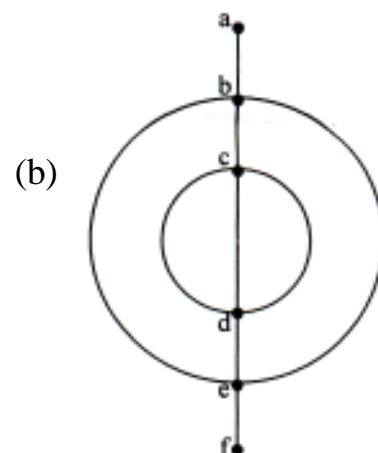
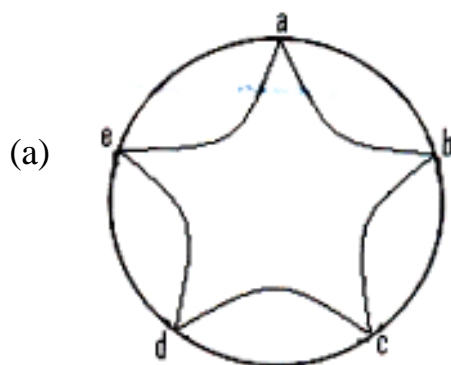
5. a) Show that the Graphs G and H are isomorphic.

6



b) Count the number of vertices, number of edges and number of region of each of the following planar graphs :

4





c) Show that the maximum number edges in a simple graph with n vertices is $n(n-1)/2$.

6

d) Draw the following graphs :

4

i) Two ternary trees with 9 leaves

ii) Two binary trees with 7 leaves.



[3680] – 401

M.C.A. (Semester – IV) (Mgt. Faculty) Examination, 2009
IT – 41 : JAVA PROGRAMMING
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) *Q. 1 is compulsory.*
2) *Solve any 6 from Q. 2 to 8.*

1. Answer the following : **10**
 - 1) URL class.
 - 2) What are different Thread Priorities ?
 - 3) Types of EJB.
 - 4) Explain Garbage collection utility.
 - 5) Write any 4 methods of Result set.
2. Design an Applet to accept details of food places from user, like Name of Restaurant, location, phone No., Type of food, famous food item and display them in proper format. **10**
3. Write a program to accept brand name from HTML page. Call a servlet program that will return details of different computer models of that brand. Table structure is – brandname, modelname, specification, price, image. **10**
4. Write a program to accept filename and a word from user. Count the occurrence of given word in file and display the total number using character stream. **10**
5. a) Write a Java Socket program that runs on Client and sends a message to server at port 2000. The program should display message returned by server. **10**
b) Write a Java Socket program that runs on server at port 2000, which accepts a message from client and sends the encrypted message to client. **10**

P.T.O.



6. Write RMI program to invoke Simple Interest calculation method from client side after accepting principle amount, rate of interest, number of years. **10**
 7. Write a JDBC program, to display city wise vendor details from vendor table. Assume suitable structure. **10**
 8. Write short note on **any 2** : **10**
 - a) Thread synchronization.
 - b) JDBC Drivers.
 - c) Servlet Life Cycle.
-



[3680] – 402

M.C.A. (Semester – IV) (Mgt. Faculty) Examination, 2009
BM 41 : SOFT SKILLS (2005 Pattern)

Time : 2 Hours

Max. Marks : 50

Instructions : a) *Q. 1 is compulsory.*

b) *Solve **any four** from Q. No. 2 to Q. No. 7.*

c) *All questions carry equal **ten (10)** marks.*

1. What are barriers of Business Communication and how to deal with these barriers explain in detail ? **10**
2. What are the qualities of a good Public Speaker ? **10**
3. What is the importance of listening and what are the barriers for effective listening ? **10**
4. What is the importance of an application letter ? Discuss the qualities of a well written application letter. **10**
5. Reports are one of the important tools of management. What are the components of a report ? **10**
6. What are the factors to be considered in the choice of media of communication ? **10**
7. Write short notes on **any two** : **10**
 - a) Time Management
 - b) Minutes of a meeting
 - c) Memo.



[3680] – 403

M.C.A. (Sem. – IV) (Mgt. Faculty) Examination, 2009
IT-43 : SOFTWARE ENGINEERING
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Q. 1 and 6 are compulsory.
2) Attempt any three from Q. 2 to Q. 5.

1. A group of companies is having warehouses located at various cities. The warehouse manager sends companywise, productwise, customerwise stock statement, pending orders and out standing amounts. Prepare software requirement specifications in detail. 20
 2. Explain about various types of documentation. 10
 3. Explain the role of CASE Tools throughout software development life cycle. 10
 4. a) Explain the method of estimating software maintenance cost. 5
b) Explain about legacy systems. 5
 5. Design a web based GUI form for online purchase of books with proper validation controls. 10
 6. Write short notes on (**any four**) : (4×5=20)
 - a) Agile process
 - b) Inspection process
 - c) Structured programming
 - d) Object oriented analysis
 - e) Skills of system analyst.
-



[3680] – 404

M.C.A. (Semester – IV) (Management Faculty) Examination, 2009
MT-41 : OPTIMIZATION TECHNIQUES
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

N.B. : 1) Q. No. 1 is compulsory.

*2) Attempt **any two** questions from Q. 2, 3 and 4.*

*3) Use of electronic calculator and statistical table is **allowed**.*

1. a) A project consisting 10 activities has the following characteristics.

9

Activity	Precedence	Time estimates (weeks)		
		Likely	Optimistic	Pessimistic
A	–	8	4	10
B	–	2	2	2
C	A,B	2	1	3
D	A	6	4	12
E	C, D	4	3	5
F	E	3	3	3
G	E	4	3	5
H	C,D	6	4	9
I	F,G	8	6	16
J	I,H	1	1	1

1) Construct an Arrow diagram for this project.

2) Determine the critical path and compute the project completion time.

3) What is the probability that the length of the critical path does not exceed 32 weeks ?

- b) Solve the following problem by using Gomory's cutting plane method.

9

$$\text{Max } Z = 3x_1 + 12x_2$$

Subject to constraints

$$2x_1 + 4x_2 \leq 7$$

$$5x_1 + 3x_2 \leq 15$$

and $x_1, x_2 \geq 0$ and are integers.

P.T.O.



- c) A departmental store has a single cashier. During the rush hours, customers arrive at a rate of 20 customers per hour. The cashier takes on an average 2.5 minutes per customer for processing.

6

- i) What is the average number of customers in the departmental store ?
- ii) What is the probability that the cashier is idle ?
- iii) What is the probability that the customer shall have to wait in the queue ?

- d) Solve the following assignment problem of minimizing total time for doing all the jobs.

6

Operator \ Job	O₁	O₂	O₃	O₄	O₅	O₆
1	6	2	7	6	9	4
2	2	5	8	2	3	7
3	5	8	6	3	8	5
4	2	7	9	4	9	6
5	6	7	8	5	0	8

2. a) Obtain the optimal solution for the given Transportation problem.

9

		Distribution Centre (Cost per unit in Rupees)				Availability (Units)
		1	2	3	4	
Factory	A	10	8	7	12	5000
	B	12	13	6	10	6000
	C	8	10	12	14	9000
Demand in unit		7000	5500	4500	3000	

- b) The following mortality rates have been observed for a special type of light bulbs.

6

Month	1	2	3	4	5
Percentage failing at the end of month	10	20	50	75	100



In an industrial unit there are 1000 special type of bulbs in use, and it costs Rs. 10 to replace an individual bulb which has burnt out. If all bulbs were replaced simultaneously it would cost Rs. 2.5 per bulb. It is proposed to replace all bulbs at fixed interval, whether or not they have burnt out, and to continue replacing burnt out bulbs as they fail. At what intervals of time the manager should replace all bulbs ?

c) Explain the following terms : 5

- i) Pessimistic time ii) Optimistic time
- iii) Most likely time iv) Float
- v) Slack.

3. a) Use two phase simplex method to solve : 9

$$\text{Minimize } Z = 60x_1 + 80x_2$$

Subject to

$$20x_1 + 30x_2 \geq 900$$

$$40x_1 + 30x_2 \geq 1200$$

$$\& x_1, x_2 \geq 0.$$

b) An aircraft uses rivets at an approximately constant rate of 5000 kg per year. The rivets costs Rs. 20 per kg and the company personnel estimate that it costs Rs. 200 to place an order, and the carrying cost of inventory is 10% per year.

- i) How frequently should orders for rivets be placed ?
- ii) What quantity should be ordered ?
- iii) What is the minimum yearly total cost ? 6

c) Obtain the dual problem of the following LPP. 5

$$\text{Min } Z = x_1 - 3x_2 - 2x_3$$

$$\text{Subject to } 3x_1 - x_2 + 2x_3 \leq 7$$

$$2x_1 - 4x_2 \geq 12$$

$$-4x_1 + 3x_2 + 8x_3 = 10$$

and $x_1, x_2 \geq 0$; x_3 unrestricted in sign.



4. a) Table below shows jobs, their normal time and cost and crash time and cost for a project.

9

Jobs	Normal		Crash	
	Time	Cost (Rs.)	Time	Cost
1 – 2	6	1400	4	1900
1 – 3	8	2000	5	2800
2 – 3	4	1100	2	1500
2 – 4	3	800	2	1400
3 – 4	Dummy	–	–	–
3 – 5	6	900	3	1600
4 – 6	10	2500	6	3500
5 – 6	3	500	2	800

Indirect cost for the project is Rs. 300 per day.

- Draw the network of the project.
 - What is the normal duration cost of the project ?
 - If relevant activities are crash systematically, what is the optimal project duration and cost ?
- b) Describe the elements of the queueing system.
- c) Express the following assignment problem as LPP.

6

5

		Job				
Person		1	2	3	4	5
	A	1	8	4	2	6
	B	4	0	9	5	5
	C	3	8	9	2	6
	D	4	3	1	0	3
	E	9	5	8	9	5



M.C.A. (Semester – IV) (Mgt. Faculty) Examination, 2009
BME – 2 : FOUNDATIONS OF DECISION PROCESSES
(2005 Pattern) (Elective)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Question No. 1 is **compulsory**.
2) Solve **any two** questions from the remaining.
3) Figures to the **right** indicate **full** marks.
4) Use of electronic calculator is **allowed**.

1. a) Explain various criterion Decision-making. **10**

b) A retailer purchases cherries every morning at Rs. 50 a box and sells for Rs. 80 a box. Any boxes remaining unsold at the end of the day can be disposed of the next day at a salvage value of Rs. 20 per box. Past sales have been ranged from 15 to 18 boxes per day. The following is the record of sales for past 120 days.

Boxes sold : 15 16 17 18

No. of Days : 12 24 48 36

How many boxes the retailer should purchase everyday to maximize the profit ? **10**

c) Customers arrive at a one-window drive according to a Poisson distribution with a mean of 10 minutes and service time per customer is exponential with a mean of 6 minutes. The space in front of the window can accommodate only 3 vehicles including the serviced one. Other vehicles have to wait outside this space.

Calculate :

i) Probability that an arriving customer can drive directly to the space in front of the window.

ii) Probability that an arriving customer will have to wait outside the directed space

iii) How long an arriving customer is expected to wait before getting the service ? **10**



2. a) Explain the various Queuing Models. 10

b) A investor has Rs. 10,000 to invest in common stock. His selection is between Companies A and B. He feels that for each of the investments, he has a 0.7 probability for doubling his money and 0.3 probability of losing half his money depending upon the company's stock rising or falling respectively. His choices are :

- i) Invest the entire money in A or B.
- ii) Invest Rs. 5,000 in one company and not invest in other.
- iii) Invest Rs. 5,000 in A and Rs. 5,000 in B.

If this utility values changes in assets are Rs. 10,000 = 1, Rs. 5,000 = 0.9, Rs. 2,500 = 0.7, Rs. 0 = 0.4, Rs. (-ve) 2,500 = 0.2, Rs. (-ve) 5,000 = 0.

What investment plan should he choose to maximize his expected utility ? Assume that the rise or fall of either stock is independent of the other. 10

3. a) Two firms are competing for business under the conditions so that one firm's gain is another firm's loss. Firm A's pay-off matrix is given below :

		Firm B		
		No Advertising	Medium Advertising	Heavy Advertising
Firm A	No Advertising	10	5	-2
	Medium Advertising	13	12	15
	Heavy Advertising	16	14	10

Suggest the optimum strategies for the two firms and the net outcome. 10



- b) A bakery keeps a stock of a popular brand of bread. Previous experience indicates the daily demand as given below :

Daily Demand	0	10	20	30	40	50
Probability	0.01	0.20	0.15	0.50	0.12	0.02

Consider the following sequence of random numbers :

48, 78, 19, 51, 56, 77, 15, 14, 68, 9.

Using the above sequence, simulate the demand for next 10 days.

- i) Estimate the daily average demand for the bread on the basis of simulated data.
- ii) Find out the stock situation if the owner of the bakery decides to make 30 breads everyday.

10

4. Write short notes on **any two** :

20

- a) Decision Tree.
- b) Concept of Dominance in Game Theory.
- c) Monte-Carlo Simulation.



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M.C.A. (Semester – IV) (Mgt. Faculty) Examination, 2009
BM E – 3 : INFORMATION SYSTEM AUDIT
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) *Que. 7 is compulsory and of 20 marks.*
2) *Solve any five from remaining.*

1. What are different standards and need of Information System Audit ? **10**
2. Describe BCP Architecture. **10**
3. What is e- commerce ?What are different controls applied in e- commerce ? **10**
4. Differentiate between logical control and physical control in Information System Audit. **10**
5. What are the long term and short term plans in Information System Organisation ? **10**
6. Write short note on **(any two) :** **10**
 - a) Auditor Role
 - b) Network Controls
 - c) Performance Indices
 - d) Evidence Collection Methods.
7. If you have been involved in the auditing process of Satyam Company, then prepare a report covering the following points. **20**
 - a) Audit Charter
 - b) Expected management controls along with its loopholes due to which company audit was failed.



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M.C.A. (Semester – IV) (Mgt. Faculty) Examination, 2009
BME – 5 : DECISION SUPPORT SYSTEMS
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) *Q. 1 & Q. 8 are compulsory. Out of the remaining attempt any 5 questions.*
2) *Full marks are indicated to the right of each question.*
3) *All question carry equal marks.*

1. Explain in detail all the phases of Herbert Simon Model. **10**
2. Discuss Supply chain management (SCM) and its benefits. **10**
3. How Expert Systems can be used for business decision making, differentiate from conventional systems ? **10**
4. Explain the various component of DSS by giving a schematic view of DSS. **10**
5. What are the various tools that are used for DSS development ? How would you choose a DSS development tool ? **10**
6. Will Businesses integrate EIS and DSS ? Explain the benefits / problems associated with this. **10**
7. How do transactional systems differ from data warehousing systems ? **10**
8. Write short notes (**Any Two**) : **10**
 - 1) ERP
 - 2) Data mining
 - 3) Geographical Information Systems (GIS)



[3680] – 410

M.C.A. (Semester – IV) (Mgt. Faculty) Examination, 2009
BME – 6 : INVESTMENT TECHNOLOGY
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

*Note : 1) Answer **any five** questions.
2) **All** questions carry **equal** marks.*

1. 'Mutual funds provide stability to share prices, safety for investors and resources to prospective entrepreneurs'. Discuss.
2. Explain in detail the different tools of information technology available to the investors in India.
3. What are venture capital funds ? What are the different stages in funding by these funds ?
4. Explain in details the Treynor Jenson measures used in portfolio theory.
5. Is fundamental analysis more important than technical analysis ? Explain in details.
6. What are the factors to be considered while building an investment portfolio ?
7. Write short notes on **any two** :
 - i) Usefulness of credit rating.
 - ii) Kinds of mutual funds.
 - iii) Concept of estimating earnings and risk.
 - iv) Martingle methods.
 - v) Capital market theory.



[3680] – 5

M.C.A. (Semester – I) (Management Faculty) Examination, 2009
BM-12 : PRINCIPLES OF MANAGEMENT FUNCTIONS AND
ORGANISATIONAL BEHAVIOUR (Old)
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

N.B. : 1) Q. 1 is compulsory.
2) Solve any three out of remaining.

1. a) Define Management. State the features and functions of Management. **15**
b) Explain transactional analysis in understanding the ego states. **10**
2. Discuss the contribution of Scientific Management in evolution of Management thought. **15**
3. What is Organisation ? Define principles of organisation and classify the different organisational structures. **15**
4. Define group dynamics. How effective teams play vital role in organisational effectiveness ? **15**
5. “Leader decides future of an Organisation”. Comment by enumerating the essential qualities of leader and theories of leadership. **15**
6. Write in short (**any 3**) : **15**
 - 1) Levels of Management
 - 2) Maslow’s Need Hierarchy theory
 - 3) Environmental factors for decision making
 - 4) Conflict management
 - 5) Systems approach



[3680] – 501

M.C.A. (Semester – V) (Mgt. Faculty) Backlog Examination, 2009
IT – 51 : SOFTWARE TESTING AND QUALITY ASSURANCE
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

Instructions: 1) *Q.1 and Q.6 are compulsory.*
2) *Attempt **any 3** from the remaining.*
3) *State assumptions if **any**.*
4) ***Draw** neat labeled diagrams **where** necessary.*
5) *Figures to **right** indicate marks.*

1. Draw a flow graph for a code that generates first 50 odd prime numbers. Also calculate the complexity of the code using Mc-Cabe's formula. 10
2. a) Explain branch, path, statement and decision coverage in structural Testing. Give suitable example for each. 8
b) Explain 'V' model with reference to its advantages over traditional Model. 7
3. a) 'Process acts as vehicle for software quality improvement': Comment. 8
b) Explain Regression testing with suitable example. 7
4. a) What is cleanroom software engineering ? 8
b) Write test case for functional testing of employee data entry screen that accepts unique emp-code, name, address, contact numbers and department code which can include A/B/C/D/E. None of the fields can be Null. 7
5. a) Compare functional Testing and Non-functional testing. 8
b) Write the 7-8 point checklist for testing non-functional aspects of a on-line Book purchase site. 7
6. Write short notes on (**any 3**) 15
 - i) CAST
 - ii) Domain Testing
 - iii) Software Inspection
 - iv) Security Testing.



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M.C.A. (Semester – V) (Management Faculty) Examination, 2009
IT-52: ADVANCED INTERNET TECHNOLOGY
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

Note: 1) Q. 1 is compulsory.

*2) Solve **any 3** questions from remaining.*

1. What is E-commerce ? Explain its architecture with its advantages and disadvantages. **10**
2. a) Write a perl code to display number of words in a given file. **10**
b) Explain JSP actions with example. **10**
3. a) Explain Server and Application objects in ASP. **10**
b) Write php code to accept and insert voter details from voter. After successful insertion, display voter details in proper format (Assume suitable structure). **10**
4. a) Write jsp code to display pending payment list of mobile customers along with total pending amount (assume suitable structure). **10**
b) Explain CGI architecture and various features of perl. **10**
5. a) Discuss with example cookies in PHP. **10**
b) Write ASP code to display companywise placement Report for the academic year 2009 (Assume suitable table structures). **10**



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M.C.A. (Semester – V) (Mgt. Faculty) Examination, 2009
IT – 53 : EMERGING TRENDS IN INFORMATION TECHNOLOGY
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Question 1 and Question 7 are **compulsory**.
2) Attempt **any four** questions from the **remaining**.

1. An IT Company has its Head Office at Delhi. It has 60 branches spread across Asia, Europe, America and Africa. All the branches and head office as well, are connected to each other through a sound and stable network. As a network consultant suggest a suitable BCP assuming the occurrence of threats to the branch offices and the head office in near future. **15**
2. What is Biometric identification in context to information security ? **10**
3. Explain E-Banking with one example and also explain the securities in E-Banking. **10**
4. What is E-Commerce ? Discuss its advantages and disadvantages. **10**
5. Define E-learning. Discuss the different models of E-learning. **10**
6. What is E-Governance ? Explain different models of E-Governance. **10**
7. Write short note on (**any 3**) : **15**
 - a) Embedded System.
 - b) E-Agriculture.
 - c) Electronic Clearing System.
 - d) Knowledge Management.
 - e) Content Management System.



[3680] – 504

M.C.A. (Semester – V) (Mgt. Faculty) Examination, 2009
BM – 51 : SOFTWARE PROJECT MANAGEMENT
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Answer **any five** questions from question no. 2 to question no. 7 and question no. 1 is **compulsory**.
2) Neat diagrams must be drawn **wherever** necessary.
3) Your answer should be **valued** as a whole.

1. A) Can we estimate cost of the S/W project without COCOMO ? Justify. **10**
- B) Answer the following question. Find out the PERT/CPM value for the given Activity. **10**

SR. No.	Activity	Dependency	Duration (in months)
1)	Identifying the subjects	Nil	3 Months
2)	Deciding the subject for each course.	1	2 Months
3)	Finalising the content of each subject and course.	2	3 Months
4)	Presentation by the subject expert.	2	2 Months
5)	Proof Reading	3, 4	2 Months
6)	Approving the syllabus	5	2 Months
7)	Uploading the syllabus on website.	6	2 Months

P.T.O.



2. What is mean by Risk management ? 10
3. What type of Role played by S/W tester in S/W development ? 10
4. a) What is mean by S/W Project Team ? 5
b) What are the characteristics of performance management in IT Team ? 5
5. How change management is managed in IT Project ? 10
6. Define Quality Assurance and Quality Standard with example. 10
7. Write short note on **(any two)** : 10
 - a) SPLC
 - b) MS - Project
 - c) FPA.



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M.C.A. (Semester – V) (Mgt. Faculty) Examination, 2009
ITE – 1 : DISTRIBUTED DATABASE MANAGEMENT SYSTEMS
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

Note : 1) Q. No. 7 is **compulsory**. Solve any 5 from the remaining.
2) State assumptions **wherever** necessary.
3) Draw **suitable** diagram when **needed**.
4) Give suitable examples **if required**.

1. Explain the reasons as to why organizations go for distributed database. **10**
2. Discuss distribution of catalogs in DDBMS. **10**
3. Explain role of coordinator and participant sites in execution of a query. **10**
4. Explain object caching, object clustering and object migration. **10**
5. Define transaction and explain the properties and states of transaction. **10**
6. Discuss various concurrency control method in distributed databases. **10**
7. Write short notes (**any 4**) : **(4×5=20)**
 - 1) Distributed Database Administrator.
 - 2) Problems in accessing distributed objects.
 - 3) Homogenous and Heterogenous DDBMS.
 - 4) Log for data recovery.
 - 5) Cold restart.



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M.C.A. (Semester – V) (Management Faculty) Examination, 2009

IT-2: ARTIFICIAL INTELLIGENCE

(Elective) (2005 Pattern)

Time : 3 Hours

Max. Marks : 70

- Instructions:**
- 1) Question No.1 is **compulsory**.
 - 2) Solve **any five** from Q No. 2 to Q.7.
 - 3) Figures to the **right** indicate **full** marks.
 - 4) Assume suitable data **wherever** necessary.
 - 5) **Draw** suitable diagrams **wherever** needed.

1. Answer the following Questions. (10×2)
 - a) What is state space representation in problem solving?
 - b) Define Breadth first search algorithm.
 - c) List the advantages and disadvantages of Depth first search algorithm?
 - d) What is problem decomposition?
 - e) List the drawbacks of a heuristic search technique.
 - f) Define Inheritable knowledge.
 - g) Explain mapping between facts and representations using suitable diagram.
 - h) What is inferential adequacy?
 - i) What is Isa hierarchy of attributes?
 - j) Define frame axioms.
2. a) Solve the Crypt-arithmetic – **EAT + THAT = APPLE**. (6+4)
b) Draw a semantic network for the following sentence :
John gave Mary the book.
3. Consider the following **set** of sentences: 10
 - i) Anyone passing his history exams and winning the lottery is happy.
 - ii) Anyone who studies or is lucky can pass all his exams.
 - iii) John did not study but he is lucky.
 - iv) Anyone who is lucky wins the lottery.

Answer the following question with the help of proof by resolution:
Is John happy?

P.T.O.



4. a) How “Parse tree” helps in understanding language with examples. (5+5)
b) What are frames? Give a sample frame of a Computer department of a college.
5. a) What are the qualities of a good knowledge representation system? (5+5)
b) Briefly list the issues involved in the design of general-purpose search technique.
6. a) Illustrate the minimax search for the tic-tac-toe game, with initial position. (5+5)
b) How Alpha-Beta method helps greatest pruning improvement in the above game?
7. Write short notes on (**any two**): (2×5)
 - a) Expert system.
 - b) List the advantages of strong slot and filler structures.
 - c) Fuzzy Logic.



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M.C.A. (Management Faculty) (Semester – V) Examination, 2009
(2005 Pattern) (Elective)
3-IT : NETWORK SECURITY

Time : 3 Hours

Max. Marks : 70

Note : 1) Q. 1 and Q. 6 are compulsory.
*2) Solve **any three** from remaining.*
*3) Give appropriate examples **wherever** necessary.*

1. a) Explain Data Encryption Standard (DES) and DES function with suitable example. **10**
b) Explain Secure Electronic Transaction (SET) internals and process. **10**
2. Explain various access control models. **10**
3. Explain IP Sec as IP encapsulating Security Protocol. **10**
4. Explain packet filtering firewall and packet analysis. **10**
5. Explain symmetric ciphers and block ciphers. **10**
6. Write short notes (**any four**) : **(4×5=20)**
 - a) Biometrics.
 - b) Secure Hash and Keys.
 - c) Kerberos Authentication.
 - d) MIME.
 - e) Digital Signature.
 - f) HRU & TAM.



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M.C.A. (Semester – V) (Mgt. Faculty) Examination, 2009
ITE 4 : MOBILE COMPUTING
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Question No. 1 and 6 are compulsory.
2) Attempt **any three** from the remaining questions (Q. 2-Q. 5).

1. a) Define the following terms (**any five**) : **10**
 - i) AMPS
 - ii) DCF
 - iii) CDMA
 - iv) PCF
 - v) GSM
 - vi) GPRS
- b) Explain the features of Wireless Network. **10**
2. The HLR is a centralized database which may become bottlenecked during heavy traffic. Explain. **10**
3. How can DHCP be used for mobility and support to Mobile- IP ? Explain. **10**
4. What are advantages and problems of forwarding mechanism in Ad-hoc networks regarding security, power saving and network stability ? Compare it with HIPER LAN. **10**
5. What is hidden node problem ? How it is resolved ? **10**
6. Write short notes (**any four**) : **20**
 - i) Indirect TCP
 - ii) Blue Tooth
 - iii) MAC
 - iv) HLR-VLR
 - v) DSSS
 - vi) BS-hand off



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M.C.A (Semester – V) (Mgt. Faculty) Examination, 2009
ITE6 : HUMAN COMPUTER INTERFACE
(2005 Pattern)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) *Q.1 is Compulsory.*
2) *Solve **any five** from remaining.*
3) *Figures to **right** indicate full marks.*

1. Usage of emails now a days became popular in business. Consider any website which provides email facility. Analyze its user interface and identify problems with current interface. Propose possible design changes you would like to make. Determine benefits of changes proposed. **20**
2. a) What are eight golden Rules of Interface Design ? Explain implementation of any one. **5**
b) Explain three pillars of User Interface Design. **5**
3. a) What are the stages of user centered interactive design methodology ? **5**
b) What are the legal issued associated with user interface design ? **5**
4. a) List and explain the steps of usability testing. **5**
b) What do you mean by virtual environment ? **5**
5. a) Explain guidelines for the design of effective error messages. **5**
b) What are the benefits and problems of voice recognition input ? **5**
6. a) Describe multimedia document searches in detail. **5**
b) Propose and discuss some ways the web may be made more accessible to the handicapped, either through browser design or web page deign. **5**
7. Write short note on **(any two) :** **10**
 - a) Characteristics of good web page design.
 - b) Problems with hypermedia.
 - c) Human factors during user interface design.
 - d) Norman's four principles of good design.



**M.C.A. (Semester – V) (Management Faculty) Examination, 2009
(2005 Pattern)**

IT-7 : PARALLEL COMPUTING

Time : 3 Hours

Max. Marks : 70

Instructions: 1) *Q.No. 7 is compulsory.*

2) *Solve any five from the remaining.*

1. Explain different types of parallelism. How processes are shared among multiple processors ? **10**
2. Explain self scheduling and indirect scheduling with example. **10**
3. Write a parallel program for travelling salesman problem. **10**
4. Explain various ways of loop splitting in parallel programming. What is spin lock ? **10**
5. Explain the backward dependency in the relation $x[i] = a[i] * x[i - 1] + y[i]$. How the positioning of creating child process (fork) is important ? **10**
6. Explain the operating systems support in multiprocessing. **10**
7. Write short notes on (**any four**) : **20**
 - a) Performance Tuning
 - b) Discrete event
 - c) Barrier
 - d) Tightly coupled system
 - e) Parallel programming under unix.



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M.C.A (Semester – V) (Mgt. Faculty) Examination, 2009
ITE-9: PROGRAMMING LANGUAGE PARADIGMS
(2005 Pattern)

Time :3 Hours

Total Marks : 70

*Note: 1) Figure to the **right** indicate **full** marks.
2) **Q. 1** is **compulsory**. Solve **any 5** from remaining.
3) **Draw** neat & labeled diagram **wherever** necessary.*

1. A) Explain various classes of Target Environment of language with its effects. **20**
B) Explain with example variations in sub program control.
2. Explain the following (**any 2**) : **10**
 - a) Structured Programming Design.
 - b) Object Oriented Programming.
 - c) Push down automata.
3. Explain the Attribute of Good Language. **10**
4. Explain the following (**any 1**) : **10**
 - a) Arithmetic and Non-arithmetic Expression.
 - b) Stack Based and Heap Based Storage Management.
5. Short notes (**any 2**) : **10**
 - a) Firmware computer
 - b) Parsing algorithm
 - c) Translator.
6. Explain the organization of conventional computer. **10**
7. Explain attributes of data control. **10**



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M.C.A. (Semester – III) (Mgt. Faculty) Examination, 2009
MT-31 : STATISTICAL COMPUTING
(2002 Pattern)

Time : 3 Hours

Max. Marks : 80

Instructions : 1) Solve *any four* questions.

2) Figures to the **right** indicate **full** marks.

3) Use of calculator and statistical table is **allowed**.

4) Graph paper will be supplied on **request**.

1. a) The Median and mode of the following wage distribution are known to be Rs. 33.5 and 34 respectively. Three frequency value from the table are, however missing. Find these missing value. 8

Wages in (Rs.) : 0 – 10 10 – 20 20 – 30 30 – 40 40 – 50 50 – 60 60 – 70

Frequencies : 4 16 x y z 6 4

- b) A Firm manufactures three products A, B and C. Time to Manufacture Product A is twice that for B and thrice for C and they are to be produced in the ratio 3:4:5. The relevant data is given below of the whole labour is engaged in manufacturing product A, 1600 units of this product can be produced. There is demand of at least 300, 250 and 200 units of products per unit is Rs. 50, Rs. 40 and Rs. 70 respectively. Formulate the problem as a LPP. 7

Raw material	Requirement per unit of product (kg.)			Total availability (kg.)
	A	B	C	
P	6	5	9	5000
Q	4	7	8	6000

- c) Solve the difference equation, given 5

$$Y_{x+2} - 5Y_{x+1} + 6Y_x = 5^x$$

P.T.O.



2. a) A student obtained the mean and standard deviation of 100 observations as 40 and 5.1 respectively. It was later found that one observation was wrongly copied as 50, the correct figure being 40. Find the correct mean and standard deviation. **8**
- b) Solve the following transportation problem to Maximize Profit. **7**

Origin	Profit (Rs.)/Unit Destination				Supply
	1	2	3	4	
A	42	27	24	35	200
B	46	37	32	32	60
C	40	40	30	32	140
Demand	80	40	120	60	

- c) Solve $Y_{x+2} - 2y_{x+1} + y_x = 9.2^x$ with $Y_0 = 2, Y_1 = 4$. **5**
3. a) Calculate $\sqrt[4]{21}$ correct upto 3 decimal places by Iterative method. **7**
- b) You are given the following data :

	X	Y
Arithmetic Mean	36	85
Standard Deviation	11	8

Correlation coefficient between X and Y = 0.66

- i) Find the two Regression Equations.
- ii) Estimate the value of X when Y = 75. **8**
- c) Suggest optimal assignment of the workers to jobs if the completion time (in hours) of different jobs by different workers is as given below: **5**

		Workers			
		W	X	Y	Z
Jobs	A	8	7	9	10
	B	7	9	9	8
	C	10	8	7	11
	D	10	6	8	7



4. a) The customer accounts at a certain departmentals. Store have an average balance of Rs. 480 and a standard deviation of Rs. 160. Assuming that the account balances are normally distributed.

- i) What proportion of the accounts is over Rs. 600 ?
- ii) What proportion of the accounts is between Rs. 400 and Rs. 600 ?
- iii) What proportion of the accounts is between Rs. 240 and Rs. 360 ?

8

- b) Determine an optimum solution to the following transportation problem by using MODI method.

7

	Destination				Availability
	D ₁	D ₂	D ₃	D ₄	
O ₁	5	3	6	2	19
O ₂	4	7	9	1	37
O ₃	3	4	7	5	34
Demand	16	18	31	25	

- c) Solve the differences equation given $(\Delta^2 - 3\Delta + 2)Y_x = 0$.

5

5. a) Solve given problem by using Graphical Method.

8

$$\min z = 20x_1 + 10x_2$$

$$\text{such that } x_1 + 2x_2 \leq 40$$

$$3x_1 + x_2 \geq 30$$

$$4x_1 + 3x_2 \geq 60$$

$$x_1, x_2 \geq 0.$$



- b) A manufacturer who produces medicine bottles. Finds that 0.1% of the bottles are defective. The bottles are packed in boxes containing 500 bottles. A drug manufacturer buys 100 boxes from the producer of bottles. Using Poisson distribution. Find how many boxes will contain .
- i) no defectives.
- ii) at least 2 defectives. 7
- c) Give the Geometrical Interpretation of Newton-Raphson Method. 5
6. a) Use Regula-Falsi method find the real root of the equation $3x^2 + 6x - 45 = 0$ correct upto 3 places of decimals. 8
- b) Calculate the Rank coefficient of correlation of the following data : 7
- | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|
| X: | 80 | 78 | 75 | 75 | 68 | 67 | 60 | 59 |
| Y: | 12 | 13 | 14 | 14 | 14 | 16 | 15 | 17 |
- c) Explain the Hungarian method of solving the assignment problem. 5



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M.C.A. (Semester – V) (Mgt. Faculty) Examination, 2009
MT51 – OPTIMIZATION TECHNIQUES
(2002 Pattern)

Time : 3 Hours

Max. Marks : 80

- Instructions :** i) Solve *any four*.
ii) Figures to the **right** indicate **full marks**.
iii) *Use of scientific calculators is allowed*.
iv) Graph sheets will be supplied on **demand**.

1. a) Solve by Big-M Method the following LPP : **10**
- Max: $Z = 2x_1 + 3x_2 + 4x_3$
- Sub To: $3x_1 + x_2 + 4x_3 \leq 600$, $2x_1 + 4x_2 + 2x_3 \geq 480$ and $2x_1 + 3x_2 + 3x_3 = 540$.
- $x_1, x_2, x_3 \geq 0$.
- b) Explain the various characteristics of Queuing Models. **10**
2. a) Find the Optimum solution to the transportation problem. **10**

		Warehouses					Available
		W1	W2	W3	W4	W5	
Factory	F1	7	6	4	5	9	40
	F2	8	5	6	7	8	30
	F3	6	8	9	6	5	20
	F4	5	7	7	8	6	10
Demand		30	30	15	20	5	100

- b) Explain the Policy of Group and Individual Replacement Models. **10**

P.T.O.



3. a) Solve the following Integer Programming Problem by Gomory's Cutting Plane Method : 10

$$\text{Max: } Z = 2x_1 + 3x_2$$

$$\text{Sub To: } -3x_1 + 7x_2 \leq 14, 7x_1 - 3x_2 \leq 14. \quad x_1, x_2 \geq 0 \text{ and are integers.}$$

- b) Explain the various Inventory Models. 10

4. a) The cost of a Machine is Rs. 6100 and its scrap value is Rs. 100. The maintenance costs found from the experience are as follows. When should the machine be replaced ? What is the average cost ? 10

Year	1	2	3	4	5	6	7	8
Maintenance Cost (Rs.)	100	250	400	600	900	1200	1600	2000

- b) A particular item has a demand of 9000 units per year. The cost of one procurement is Rs. 100 and the holding cost per unit is Rs. 2.40 per year. The replacement is instantaneous and no shortages are allowed. Determine : 10
- The economic lot size.
 - The number of orders per year.
 - The time between orders.
 - The total annual inventory cost.

5. a) A bank has only one typist. Since the typing work varies in length (number of pages), the typing rate is randomly distributed approximating a Poisson Distribution with mean service rate of 8 letters per hour. The letters arrive at a rate of 5 per hour during the entire 8-hour working day. Determine : 10
- Equipment Utilization.
 - The percent time that an arriving letter has to wait.
 - Average System Time.
 - Average idle time.



- b) Formulate and solve graphically the following LPP :

10

Mohan-Meakins Brevries Ltd. Has two bottling plants, one located at Solan and the other at Mohan Nagar. Each plant produces three drinks, Whisky, Beer and Fruit Juices named A, B and C respectively. The number of bottles produced per day are as follows :

	Solan plant	Mohan Nagar Plant
Whisky (A)	1500	1500
Beer (B)	3000	1000
Fruit Juices (C)	2000	5000

A market survey indicated that during the month of April, there will be a demand of 20000 bottles of whisky, 40000 bottles of beer and 44000 bottles of fruit juices. The operating costs per day for plants at Solan and Mohan Nagar are 600 and 400 monetary units. For how many days each plant be run in April so as to minimize the production cost, while still meeting the market demand ?

6. a) Draw the project network, find the critical path and the total, independent and free floats for the following data :

10

Activity	1-2	1-3	1-5	2-3	2-6	3-4	4-7	5-6	6-7
Duration	10	6	4	0	8	10	10	6	6

- b) Solve the following Assignment Problem :

10

		Jobs			
		1	2	3	4
Machine	I	6	5	1	6
	II	2	5	3	7
	III	3	7	2	8
	IV	7	7	5	9
	V	12	8	8	6
	VI	6	9	5	10



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M.C.A. (Semester IV and V) (Mgt. Faculty) Examination, 2009
ITE 6 : IMAGE PROCESSING
(2002 Pattern)

Time : 3 Hours

Max. Marks : 80

- Instructions :** 1) *Question 1 is compulsory.*
2) *Solve **any four** question from 2 to 6*
3) *Assume suitable data **wherever** necessary.*
4) *Draw neat diagram **wherever** necessary.*
5) *Figure to the **right** indicate **full** marks.*

1. Define the following : **(10×2)**
- a) Connectivity.
 - b) Sampling.
 - c) Quantization.
 - d) “Noise” of an image.
 - e) Walsh transform.
 - f) Compression due to quantization.
 - g) Representation of an image in frequency domain.
 - h) Gray value.
 - i) Mask.
 - j) Edge.
2. a) How do you acquire an image ? Explain in detail. **(7+8)**
b) Define and explain image sliding and image stretching.
3. a) Define and explain low pass filters in brief. **(7+8)**
b) Define an edge. Explain various edge enhancement filters.

P.T.O.



4. a) Define prewitt filter. (7+8)
b) Explain in detail “Homomorphie filter”.
5. a) Define and explain thresholding. (7+8)
b) Explain segmentation by PIXEL based methods.
6. a) Define Erosion and Dilation. (7+8)
b) Explain how the morphological operations may be extended to gray scale images.
-



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M.C.A. (Semester – IV & V)(Management Faculty) Examination, 2009
(Elective
IT-E9 : COMPUTER GRAPHICS AND MULTIMEDIA
(2002 Pattern)(Old)

Time : 3 Hours

Max. Marks : 80

Instructions : 1) *Q. 1 and Q. 7 are compulsory.*
2) *Solve **any four** questions from Q. 2 to Q. 6..*
3) *Figures at **right** indicate **full** marks.*

1. a) Explain with block diagram JPEG compression using DCT. **10**
b) Explain sound recovery techniques. **10**
2. Explain multimedia building blocks. **10**
3. Explain motion of synchronization in video. **10**
4. Explain various MPEG standards and their features. **10**
5. Explain video processing using Java. **10**
6. Explain any two function calls for music in Windows. **10**
7. Write short notes (**any four**) : **(5×4=20)**
 - a) LWZ Algorithm and GIF
 - b) Multimedia Hardware
 - c) SGMI
 - d) AVI file format
 - e) Video Recovery Techniques.



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M.C.A. (Mgt. Faculty) (Semester–IV & V) Examination, 2009
BM–E1 : MANAGERIAL ECONOMICS (Old)
(2002 Pattern)

Time : 3 Hours

Max. Marks : 60

Instructions : i) Attempt *any four* questions.
ii) *All* questions carry *equal* marks.

1. What are the objectives of managerial theories of the firm ?
2. What is elasticity of demand ? Describe the different methods of demand forecasting.
3. What is law of supply ? Explain the concept of economics and diseconomics ?
4. Explain short run and long run cost curves.
5. How price is determined under perfect competition ?
6. What is 'Profit' ? Distinguish between economic and accounting profit with examples.

B/II/09/100



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M.C.A. (Semester – IV) (Mgt. Faculty) Examination, 2009
BM 41 : ORGANISATIONAL BEHAVIOUR (Elective)
(2002 Pattern)

Time : 3 Hours

Max. Marks : 80

Notes : 1) *Q. No. 1 and Q. No. 8 are compulsory.*
2) *Attempt any other 3 questions.*
3) *Marks at right indicate maximum marks.*

1. Define and explain organisational behaviour. Explain any one model of organisational behaviour. 20
2. Explain concept of personality and its factors / determinants. 15
3. Explain Herzbergs two factor theory. 15
4. What is stress ? What are its effects ? 15
5. Explain importance of leadership and leadership styles. 15
6. Explain how to overcome resistance to change. 15
7. Explain conflict resolution and coping strategies. 15
8. Write short notes on (**any three**) : 15
 - 1) TQM
 - 2) Morale and Motivation
 - 3) Teams
 - 4) Autocratic leader
 - 5) Empowerment
 - 6) Organisational Development.



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M.C.A. (Semester – IV & V) (Mgt. Faculty) Examination, 2009
TAXATION PRACTICE (BME6)
(2002 Pattern)

Time : 3 Hours

Max. Marks : 80

Instructions : 1) Attempt *any five* questions.
2) *All* questions carry *equal* marks.

1. Explain with the help of suitable illustrations; the provisions of the Income Tax Act, 1961 regarding the deduction of tax at source from payment of professional fees and technical consultancy fees.
2. Explain in detail the concept of Agricultural Income and its taxability under the Income Tax Act, 1961.
3. Discuss the various conditions for claiming deduction of interest and remuneration to the partners in the hands of partnership firm.
4. When is a sale or purchase of goods said to take place in the course of import or export ? Explain.
5. Define and explain the term Assets under the Wealth Tax Act.
6. What do you understand by salary ? What is the basis of charge of salary income under the Income Tax Act.
7. Explain the meaning of following terms under the Central Sales Tax Act :
i) Appropriate state ii) Person iii) Goods iv) Sale
8. Write short notes on (**any four**) :
i) Gross Total Income
ii) Exempt Income
iii) Long Term Capital Gains
iv) Deductions allowed for calculating wealth tax liability.