

Total No. of Questions : 5]

SEAT No. :

P2890

[Total No. of Pages : 3

[5421]-14

M.C.A. (Commerce) (Part - I) (Semester - I)
STATISTICAL AND NUMERICAL METHODS
(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of statistical table and calculator is allowed.
- 4) Symbols have their usual meaning.

Q1) Attempt any three of the following : [3 × 5 = 15]

- a) Find $\sqrt[3]{18}$ by Newton-Raphson method (perform 3 iterations).
- b) Find the root of the equation $x^4 + x^2 - 80 = 0$ between 2.8 and 3 using bisection method.
- c) Construct difference table from the values of x and y , also find the values of $\nabla^3 y_{40}, \nabla^2 y_{30}, \nabla^4 y_{50}$.

x	10	20	30	40	50
$y = f(x)$	45	65	80	92	100

d) Show that $E \nabla \equiv \Delta \equiv \nabla E$.

e) Evaluate $\left(\frac{\Delta^2}{E}\right)(x^3)$.

Q2) Attempt any three of the following : [3 × 5 = 15]

- a) Explain Euler's method to find solutions of ordinary differential equations.
- b) Evaluate $\int_0^{10} \frac{1}{1+x} dx$, by Simpson's $\frac{3}{8}$ rule.
- c) Use Langrange's interpolation formula to obtain the value of $y = f(x)$ at $x = 1.5$.

x	1	2	3
$y = f(x)$	6	16	32

P.T.O.

- d) Explain Picard's method of successive approximation.
- e) Given that $\frac{dy}{dx} = 1 - y$ with $y(0) = 0$, find $y(0.2)$ using Euler's modified method.

Q3) Attempt any three of the following : [3 × 5 = 15]

- a) Define time series. Describe components of time series.
- b) Describe moving average method of least squares for linear trend and exponential smoothing method.
- c) State the probability density function of normal distribution with mean m and variance σ^2 . State properties of normal distribution.
- d) If $X \rightarrow N(2, 9)$ then find
 $P(X \leq 2)$, $P(X \geq 5)$, $P(X \leq -5)$
- e) Describe Chi-square test of goodness of fit.

Q4) Attempt any three of the following : [3 × 5 = 15]

- a) Write the normal equations for fitting of second degree parabola.
- b) Explain: Two types of Errors
 Level of significance.
- c) From the following 2×2 contingency table.

	Smokers	Non-Smokers
Literate	83	57
Illiterate	45	68

Test whether there is any association between literacy and smoking habit at 5% level of significance.

- d) Use Range-Kutta second order method to compute y when $x = 0.1$,
 Given that $\frac{dy}{dx} = x + y$, $y(0) = 1$.
- e) State and prove general quadrature formula for numerical integration, also derive trapezoidal rule.

Q5) Attempt any two of the following :

[2 × 10 = 20]

- a) Obtain $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ for $x = 1.2$ from the following data :

x	1.0	1.2	1.4	1.6	1.8	2.0	2.2
y	2.7183	3.3201	4.0552	4.9530	6.0496	7.3891	9.0250

- b) Describe large sample test for testing the equality of two population proportions.
- c) Test at 5% level of significance whether the weight loss training programme is effective or not.

Weight Before training (Kg.)	84	80	75	77	84	90
Weight After training (Kg.)	80	75	74	75	88	84



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M.C.A (Commerce Faculty) (Semester - II)

206 : OBJECT ORIENTED PROGRAMMING

(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) All questions carry equal marks.
- 4) Assume suitable data if necessary.

Q1) Attempt any four :

[4 × 4 =16]

- a) Explain Data Encapsulation and data abstraction.
- b) Explain the use of following with syntax, i) try block ii) throw statement iii) catch block.
- c) Explain primitive data types in Java.
- d) Write a note on constructor.
- e) What is type conversion? Explain types with example using C++.

Q2) Attempt any four :

[4 × 4 =16]

- a) What do you mean by operator overloading? Explain with example.
- b) Define Array? How Array is used in Java.
- c) Difference between C++ and Java.
- d) Write a note on: Inheritance in Java.
- e) Define function. Explain inline function with example.

Q3) Attempt any four :

[4 × 4=16]

- a) Explain need of abstract class in Java.
- b) How to call function using C++?
- c) What are the advantages and disadvantages of inheritance?
- d) Explain why Java needs compiler and interpreter both.
- e) Explain working of friend function.

P.T.O.

Q4) Attempt any four :

[4 × 4 = 16]

- a) Write a program to find out the payroll system using single inheritance in C++.
- b) Write a C++ program to display multiplication table of given number?
- c) Write a C++ program using class with data members bookid and bookname. Write member functions to accept and display book details. Count the number of books (use static data member for maintaining book count)
- d) Write a program using Java to accept a string from user and display the string in alternate reverse case.(Use Command Line Argument) (eg I/P hello O/P HeLlO)
- e) Write a program in Java to create an abstract class volume. Derive two classes Cylinder and Cone. Calculate volume of both.

Q5) a) Trace output: (Consider there is no syntax error in given code) **[2 × 4 = 8]**
i)

```
public class Test
{
    static void nPrint(String msg,int n)
    {   while(n>0){
        System.out.println(msg);
        n--;}
    }
    public static void main(String a[])
    {
        Test t=new Test();
        t.nPrint("A Message",2);
    }
}
```

What will be the output, when executed? Explain, Why?

```
ii) #include <iostream.h>
#include <conio.h>
void main()
{
    int add(int a,int b=30);
    int a=20,b=40;
    cout<<"a+b="<<add(a);
    cout<<"a+b="<<add(a,b);
    getch();
}
```

What will be the output, when executed? Explain, Why?

- b) Attempt any two : **[2 × 4 = 8]**
- i) Write a Java program that accepts a character from user and check whether it is lower case or upper case character.
 - ii) Write a program using Java to accept the name and class-of-study from the user using command line argument and throw an user defined exception "Invalid Class" if the class is not "Fy", "Sy" or "Ty".
 - iii) Write a C++ program which will accept a series of input and display the count of odd and even numbers entered.



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SEAT No. :

P2892

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[5421]-35

M.C.A (Commerce Faculty) (Semester - III)

305 : CYBER LAW AND ETHICS

(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) All Questions are compulsory.
- 2) Figure to the right indicate full marks.

Q1) Attempt any four of the following :

[4 × 4 = 16]

- a) Explain in brief retention of electronic records.
- b) Give some limitations of Symmetric Crypto System.
- c) Explain Triple DES with diagram.
- d) Give a brief description about www.
- e) Explain Communication Act of 1996-section 23.

Q2) Attempt any four of the following :

[4 × 4 = 16]

- a) Explain RSA algorithm.
- b) Explain Battle of forms and list the steps to govern the contract in case of battle of forms.
- c) Give advantages of cyber Contracts.
- d) List and explain types of Victims of Stalking.
- e) Explain in details Asymmetric key-operation.

Q3) Attempt any four of the following :

[4 × 4 = 16]

- a) What are key Challenges of Cyber Crimes?
- b) Explain details Skipjack.
- c) Write a short note on Hacking
- d) List the duties of subscriber.
- e) Explain Internal Crime with example.

P.T.O.

Q4) Attempt any four of the following :

[4 × 4 = 16]

- a) How cyber crimes are classified? Explain.
- b) Write a note on Data Integrity.
- c) Give a brief description of Bulletin board system.
- d) What is E-commerce? What are different activities of E-commerce?
- e) Explain Direct and Indirect Harassment.

Q5) Attempt any four of the following:

[4 × 4 = 16]

- a) Give some Limitations of symmetric cryptosystem.
- b) Write down functions of controller.
- c) Explain mistake in electronic commerce.
- d) Explain Virus in details.
- e) What is online Harassment? Explain.



Total No. of Questions : 6]

SEAT No. :

P2893

[Total No. of Pages : 1

[5421]-36

M.C.A. (Commerce) (Semester - III)

306 : FINANCIAL AND INVESTMENT ANALYSIS

(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *Solve any Five Questions.*
- 2) *All Questions carry equal marks.*

Q1) What do you mean by IPO .Explain the Process of Book Building in an IPO.

Q2) Distinguish between:

- a) Primary Market and Secondary Market
- b) Investment and Speculation

Q3) What do you mean by Portfolio Management. Explain the process of Portfolio Management.

Q4) What do you mean by Mutual Fund? Explain Open ended and Close ended Mutual Funds.

Q5) Explain the Role of SEBI as a Regulatory Authority.

Q6) Write Short Notes on (Any Four) :

- a) Depositories
- b) OTCEI
- c) Merchant Banking
- d) Functions of Financial Intermediaries
- e) NSE
- f) Effects of combining securities.



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SEAT No. :

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[Total No. of Pages : 2

[5421]-46

M.C.A (Commerce Faculty) (Semester - IV)

406 : Knowledge Management for Business

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *All questions carry equal marks.*

Q1) Attempt any four of the following :

[4 × 4 = 16]

- a) What do you mean by case Based Reasoning. Compare with model Based Reasoning.
- b) Describe the cyclic model of knowledge management.
- c) What is Semantic Network? Discuss how knowledge is represented in a Semantic Network.
- d) Describe different ways to perform Outsourcing.
- e) Describe four possible scenarios of Multiple Experts.

Q2) Attempt any four of the following :

[4 × 4 = 16]

- a) Who is a CKO? What are the different responsibilities of CKO.
- b) List different advantages of Artificial Intelligence over Natural Intelligence.
- c) Describe process of knowledge Engineering.
- d) What is Uncertainty? Explain methods of representing it.
- e) Describe a frame? What do you mean by instantiation of frame.

P.T.O.

Q3) Write short note on any four :

[4 × 4 = 16]

- a) Organizational Memory.
- b) Interview.
- c) Repertory Grid Analysis.
- d) Rapid Prototyping.
- e) Expert system and Internet / Intranet.

Q4) Attempt any four of the following :

[4 × 4 = 16]

- a) Discuss reasons why expert system fail.
- b) Discuss various difficulties in transferring knowledge.
- c) Discuss difference between shallow and Deep knowledge.
- d) Discuss knowledge Management Activities.
- e) Explain maintenance and upgradation activities in Post Implementation Phase.

Q5) Attempt any two of the following :

[2 × 8 = 16]

- a) Explain process of forward chaining with example.
- b) Explain structure of Expert system with diagram.
- c) Explain Implementation phase in is development life cycle.



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SEAT No. :

P2895

[Total No. of Pages : 3

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M.C.A (Commerce) (Semester - V)

502 : DISTRIBUTED DATABASE SYSTEMS

(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figure to the right indicate full marks.*

Q1) Write a note on (Any Four) :

[4 × 4 = 16]

- a) E-Commerce
- b) Mixed Fragmentation
- c) R Trees
- d) Basic Time Stamp Protocol
- e) Performance Tuning

Q2) Attempt Following (Any Four) :

[4 × 4 = 16]

- a) What is Transactional workflow? Explain with example.
- b) What are Marketplaces? Explain it's different types.
- c) What are content of catalog?
- d) What are the basic alternatives for allocation of catalogs in distributed databases?
- e) Explain goals of transaction management.

Q3) Attempt Following (Any Four) :

[4 × 4 = 16]

- a) Explain different objects which represent geometric information.
- b) What is 2-phase commitment protocol?
- c) What is join graph? What is use of Join Graph? Explain with example.
- d) What is a deadlock? Explain Hierarchical deadlock detection.
- e) What are logs? What are the contents of log records?

P.T.O.

Q4) Attempt Following (Any Four) :

[4 × 4 = 16]

- a) Explain
 - i) Local-read Protocol
 - ii) Digital Certificate
- b) Explain Serializability of transaction in distributed database system with suitable example.
- c) Explain top-down approach of design of distributed database.
- d) What is query Optimization ? What are objectives of query optimization?
- e) What is multimedia database? Which are different multimedia data formats?

Q5) Attempt Following (Any Four) :

[4 × 4 = 16]

- a) DEPT (DEPTNUM, NAME, AREA) relation is horizontally fragmented into DEPT1, DEPT2 and defined as

$$\text{DEPT1} = \sigma_{\text{DEPTNUM} < 50 \text{ and } \text{AREA} = \text{"North"}}$$
$$\text{DEPT2} = \sigma_{\text{DEPTNUM} \geq 50 \text{ and } \text{AREA} = \text{"South"}}$$

Reduce the following query .

```
SELECT * FROM DEPT WHERE DEPTNUM = 125 AND AREA="SOUTH"
```

- b) Consider the following DWFGs

Consider the following scenario . Transaction T11 and T12 are executing at site 1. T13 and T14 are executing at site 2. Transaction T11 is waiting for Transaction T12. Transaction T13 is waiting for Transaction T14. Transaction T11 is waiting for Transaction T13. Transaction T14 is waiting for Transaction T12.

Draw LWFG and GWFG. Detect the deadlock.

- c) Consider the following relational schema

Book(bno,bname,pubname, price)

Author(ano,aname)

BA(bono.ano)

Construct optimized operator tree for the following query.

Select bname

from Book,author,BA

where Book.bno=BA.bno and

Author.ano = BA.ano and

pubname="Vision" and price<200

d) Consider the following relational schema

Emp(Eno, Ename, Title) & Pay (Title, sal)

Let P1: Sal < 35000 and P2: Sal ≥ 35000 be two predicates . Perform a horizontal fragmentation of relation PAY to obtain fragments PAY1 and PAY2.

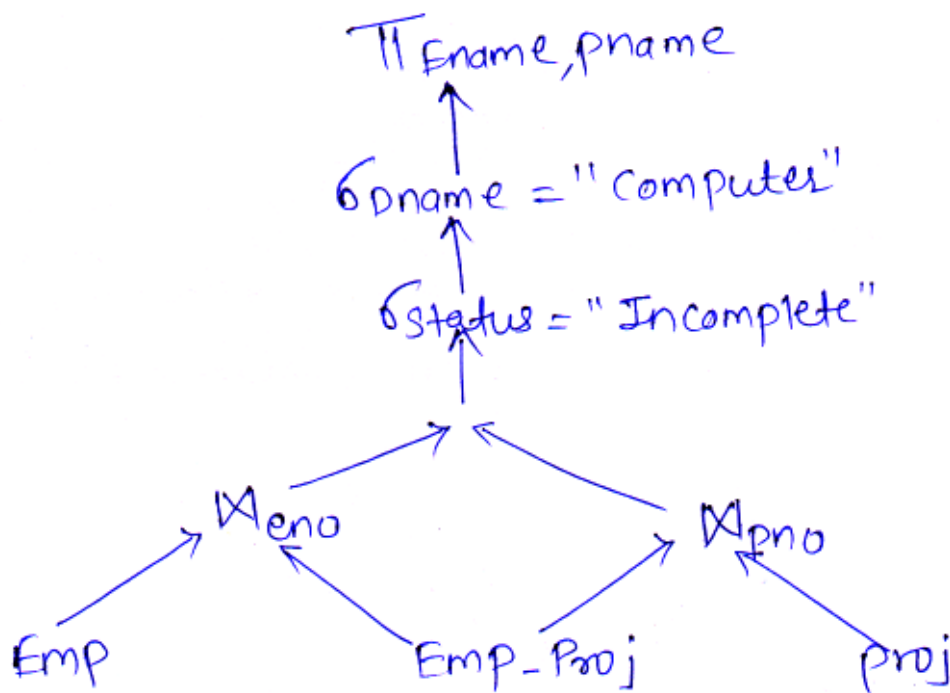
e) Consider the following schema

Emp (Eno, Ename, City, Dname)

Proj (Pno, Pname, Status)

Emp_Proj(Eno, Pno)

Convert the following tree into optimized operator tree.



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M.C.A. (Commerce Faculty) (Semester - V)

MATHEMATICS

506 : Operations Research

(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of statistical tables and calculator is allowed.
- 4) Symbols have their usual meanings.

Q1) Attempt any four of the following :

[16]

- a) How does operations research assist management in decision making?
- b) Solve the following L.P.P. by graphical method.

$$\text{Min } z = 8x_1 + 3x_2$$

subject to the constraints :

$$x_1 \leq 4$$

$$x_2 \geq 2$$

$$x_1 + x_2 \geq 5$$

$$x_1, x_2 \geq 0$$

- c) Explain the following terms :
 - i) Feasible solution
 - ii) Slack variables
 - iii) Basic variables
 - iv) Optimum solution
- d) Show that the following LPP has unbounded solution

$$\text{Max } z = x_1 + 3x_2 + 7x_3 - 4x_4$$

Subject to :

$$2x_1 + 3x_2 - 6x_3 + x_4 \geq -14$$

$$3x_1 - 2x_2 + 4x_3 + x_4 \leq 11$$

$$4x_1 - 3x_2 - 4x_3 + 3x_4 \leq 21$$

$$x_1, x_2, x_3, x_4 \geq 0$$

P.T.O.

- e) Obtain an initial basic feasible solution of the following transportation problem by North West Corner method.

From \ To	W ₁	W ₂	W ₃	W ₄	Supply
F ₁	14	25	45	5	6
F ₂	65	25	35	55	8
F ₃	35	3	65	15	16
Demand	4	7	6	13	

Also find the corresponding transportation cost.

- f) Solve the following assignment problem for minimization.

	I	II	III	IV
A	12	30	21	15
B	18	33	09	31
C	44	25	24	21
D	23	30	28	14

Q2) Attempt any four of the following :

[16]

- a) Define
 i) Network
 ii) Predecessor Activity
 b) Write the standard form of the following LPP

$$\text{Maximize } (z) = 5x_1 - 3x_2 + x_3$$

Subject to :

$$x_1 - x_3 \geq 5$$

$$x_2 + 2x_3 \leq 6$$

$$x_1 - x_2 + x_3 = 4$$

$$x_1, x_2, x_3 \geq 0$$

- c) Write the dual of the following LPP

$$\text{Max } (z) = 7x_1 + x_2 - 3x_3$$

Subject to :

$$2x_1 - 3x_2 + 4x_3 \leq 7$$

$$2x_1 - 2x_2 \leq 8$$

$$3x_1 - x_3 \geq 6$$

$$x_1, x_2, x_3 \geq 0$$

- d) Discuss the various steps involved in the application of PERT and CPM.
 e) Solve the following game by dominance principle.

	I	II	III	IV	V
I	2	4	3	8	5
II	4	5	2	6	7
III	7	6	8	7	6
IV	3	1	7	4	2

- f) Find initial basic feasible solution of the following transportation problem by Matrix Minima method.

To →	D ₁	D ₂	D ₃	D ₄	Capacity
From ↓					
S ₁	19	30	50	10	7
S ₂	70	30	40	60	9
S ₃	40	8	70	20	18
Demand	5	8	7	14	

Also find the corresponding transportation cost.

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

- a) A machine is used for producing two products I and II product I is produced by using 3 units of chemical salts and 2 units of chemical mixture. Product II is produced by using 2 units of chemical salts and 4 units of chemical mixture. Only 1000 units of chemical salt and 1500 units of mixture are available. The profit on the product I per unit of it Rs. 25 and that for II is Rs. 20. Give the mathematical formulation for this LPP to maximize profit.
- b) Explain the following terms in PERT/CPM :
- i) Earliest time
 - ii) Latest time
 - iii) Critical path
- c) Convert the following transportation problem into linear programming problem.

	D ₁	D ₂	Supply
O ₁	8	12	22
O ₂	13	12	25
Demand	17	30	

- d) Define the following terms with reference to transportation problem.
- i) Unbalanced T.P.
 - ii) Initial Basic Feasible Solution
 - iii) Dummy Source
 - iv) Infeasible solution
- e) Solve the following assignment problem for maximization.

	A	B	C	D
I	100	140	280	70
II	130	160	200	60
III	80	130	300	90
IV	150	110	250	50

- f) Explain U-V method for obtaining an optimal solution of a transportation problem.

Q4) Attempt any two of the following :

[16]

- a) Solve the following LPP by using Big M method.

$$\text{Max (z)} = 50x_1 + 70x_2$$

Subject to :

$$2x_1 + 4x_2 \geq 40$$

$$3x_1 + 3x_2 \geq 35$$

$$x_1, x_2 \geq 0$$

- b) Obtain an initial basic feasible solution of the following transportation problem by Vogel's Approximation Method.

To → From ↓	D ₁	D ₂	D ₃	Supply
O ₁	9	6	0	5
O ₂	5	1	0	20
O ₃	3	2	4	10
O ₄	7	5	2	15
Demand	25	10	15	

Also find the corresponding transportation cost.

- c) Discuss the role of sensitivity analysis in linear programming. Under what circumstances is it needed and under what conditions do you think it is not necessary?

Q5) Attempt any two of the following : [16]

- a) What is goal programming? Clearly state its assumptions.
- b) Define the following terms :
- i) Mixed Strategy
 - ii) Two person zero sum game
 - iii) Finite game
 - iv) Fair game
- c) For the game with the following pay-off, determine the optimal strategies and the value of the game.

		Player B	
		I	II
Player A	I	10	-10
	II	-25	25

