

MCA (SEM- III)
Object Oriented Programming C++
(OCT-16)

QP CODE : 511400

[Total Marks: 100]

- N.B. :**
- 1) Question No.1 is **compulsory**.
 - 2) Attempt any **four** from the remaining **six** questions.

1. (a) What is inheritance? Explain different types of inheritance with (10) example.
- (b) What is Object Oriented Programming? Differentiate between C and (10) C++.
2. (a) Write a program to overload a binary + operator for class complex to (10) add two complex numbers.
- (b) What is call by value and call by reference? (10)
3. (a) What is Standard Template Library and What it contains? (10)
- (b) What is template? Explain template advantages. (10)
4. (a) What are Constructor and Destructor? Explain different types of (10) constructors.
- (b) What is friend function explain with example. (10)
5. (a) What is function overloading? Explain with example. (10)
- (b) Differentiate between Structure and Class. (10)
6. (a) What is Static data member? Explain their characteristics. (10)
- (b) What is container? Explain container types. (10)
7. Write Short Notes on **any four** :- (20)
 1. Inline function
 2. Virtual function
 3. Scope resolution operator
 4. Manipulators
 5. Data types in C++

MCA (SEM-III)
Data Base Management Systems
(OCT-16)

QP CODE : 511202

(3 Hours)

Total Marks: 100

N.B.

1. Question No. 1 is compulsory.
2. Attempt any **four** from the remaining **six**.
3. All questions carry **equal** marks.

Q1 A college library holds books for its members to borrow. Each book may written by more than one author. Any one author may written many books. If no copies of a wanted book are currently in stock, a member may make a reservation for the title until it is available. If books are not returned on time a fine is imposed and if fine is not paid the member is barred from loaning any other book until the fine is paid. (20)

- a) Construct an ER diagram for above library system. Document all assumptions that you make for designing.
- b) Write schema definition and normalize all tables to 3NF for the above ER Diagram.

Q2 a) Consider the following relational schema:

Book(bookid, title, publisher_name)

Book_author (bookid, author_name)

Book_copies (bookid, branchid, No_of_copies)

Write the following queries in SQL.

- 1) Retrieve the author name of book having title 'Operating System'.
- 2) Retrieve the total number of titles of each publisher.
- 3) Retrieve the total number of titles.
- 4) Retrieve title, publishername & authorname of the bookid 'B101'.
- 5) Retrieve the number of copies with bookid='B101' and branchid='BR001'.

(10)

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- b) Differentiate any two:
- 1) Strong and Weak Entity
 - 2) Specialization and Generalization
 - 3) Physical and Logical data independence (10)
- Q3 a) Explain the limitations of file processing system. (10)
- b) What is deadlock? Describe deadlock prevention and detection techniques. (10)
- Q4 a) Discuss the various steps of processing a high level query. (10)
- b) What is data model? Explain hierarchical model with its advantages and disadvantages. (10)
- Q5 a) Explain the desirable properties of decomposition. (10)
- b) Write the roles and responsibilities of DBA. (10)
- Q6 a) What is an index on a file? What is a search key for an index? Why do we need indexes? (10)
- b) What is Bell La Pedula model? Explain. (10)
- Q7 Write short note on the following (any four): (20)
- a) 2PL
 - b) Closure of set of FD
 - c) Triggers
 - d) Shadow Paging
 - e) Super and Candidate Keys

MCA (SEM- III)
Data Communication Networks
(OCT-16)

Q.P. Code : 511302

(3 Hours)

[Total Marks : 100

- N.B. :**
- 1) Question No.1 is **compulsory**.
 - 2) Attempt any **four** from the remaining **six** questions.
 - 3) All questions carry equal marks.

1. (a) Explain why layered architecture is preferred in communication. Explain OSI model in detail. 10
(b) Discuss guided media used in data communication. 10
 2. (a) Calculate the CRC for 100101000111 using the divisor 110011. 10
(b) Discuss RSA public key crypto system with example. 10
 3. (a) Discuss the services provided by the data link layer and explain HDLC frame format in detail. 10
(b) Discuss the 4-way handshake for TCP connection termination. 10
 4. (a) Define congestion. Discuss the various methods of preventing and reducing the congestion. 10
(b) What are the services provided by the network layer? Explain the Bellman Ford Routing algorithm. 10
 5. (a) Explain the methods of converting digital data in to analog signal. 10
(b) What is classful addressing? Discuss Class A, class B, Class C, Class D and Class E addresses with its ranges in decimal dotted notation and example. 10
 6. (a) What is sliding window? Explain Go back N protocol in detail. 10
(b) Explain any two IEEE standards in detail. 10
 7. Write Short Notes on any four :- 20
 - a) ARP
 - b) DHCP
 - c) Tunneling
 - d) FTP
 - e) ALOHA
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MCA (SEM- III)
Operation Research
(OCT-16)

QP CODE : 511501

(3 Hours)

Total Marks: 100

N.B.: (1) Question No. 1 is compulsory.

- (2) Attempt **any four** questions out of remaining six questions.
- (3) Assume any necessary data, if required but justify the same.
- (4) Figure to the right indicate marks
- (5) Use of scientific calculator is allowed.

Q.1 A. A firm uses lathes, milling machines and grinding machines to produce two machines parts. Following table represents the machining time required for each part, the machining times available on different machines and the profit on each machine part **[10]**

Type of Machine	Machining time required for the machine part (minutes)		Maximum time available per week (minutes)
	I	II	
Lathes	12	6	3000
Milling Machines	4	10	2000
Grinding Machine	2	3	900
	Rs.40	Rs.100	

Use Graphical Method to find number of parts I and II to be manufactured per week to maximize the profit

B. For the following set of activities and different time estimates (in days) for a project **[10]**

Activity	Optimistic Time (to)	Most likely Time (tm)	Pessimistic Time (tp)
1-2	3	6	15
1-3	2	5	14
1-4	6	12	30
2-5	2	5	8
2-6	5	11	17
3-6	3	6	15
4-7	3	9	27
5-7	1	4	7
6-7	2	5	8

- i. Draw the network
- ii. Determine the expected task times and their variance.
- iii. Find the earliest and latest expected times for each node.
- iv. Find the critical path.
- v. What is the probability that the project will be completed by 27 days?
[$p(z=0.35) = 0.1368$]

- Q.2 A.** A salesman has to visit five cities A, B, C, D, and E. The distance between 5 cities as below. If the salesman starts from city A and has to come back to city A which route will be selected so that the total distance travelled is minimum. **[10]**

		To city				
		A	B	C	D	E
From City	A	0	2	5	7	1
	B	6	0	3	8	2
	C	8	7	0	4	7
	D	12	4	6	0	5
	E	1	3	2	8	0

- B.** Purchase cost of equipment is Rs. 5000. The running cost and salvage value are as given into table. **[10]**

Year	1	2	3	4	5	6
Running cost (Rs.)	1400	1500	1700	2000	2400	2600
Salvage Value	3400	2400	1650	1100	800	500

If the running costs are arising at the end of the year and interest rate is 5% per year. What will be the optimum replacement policy?

- Q.3 A.** Use Two Phase Method to solve the following LPP. **[10]**

Maximize $Z = 4x_1 + 3x_2$
 Subject to $x_1 + 2x_2 + d_1 = 6$
 $2x_1 + x_2 + d_2 = 6$
 $x_1 + x_2 + d_3 = 8$
 $d_1 + d_2 = 6$
 $d_1, d_2 \geq 0$

- B.** Determine the sequence of jobs that will minimize total elapse time. **[10]**
 Calculate minimum elapse time and also calculate idle time of each machine in this period.

job	1	2	3	4	5
M1	8	10	6	7	11
M2	5	6	2	3	4
M3	4	9	8	6	5

Q.4 A. Solve the following LPP by simplex method. [10]

Maximize $Z = 10x_1 + 6x_2 + 4x_3$

Subject to $d_1x_1 + d_2x_2 + d_3x_3 \leq 60$
 $6d_1x_1 + 4d_2x_2 + 9d_3x_3 \leq 60$
 $1d_1x_1 + 1d_2x_2 + 1d_3x_3 \leq 60$
 $x_1, d_1, d_2, d_3 \geq 0$

B. A cement factory manager is considering the best way to transport cement [10]
 from his three manufacturing centers P, Q, R to depots A, B, C, and D, E. The
 weekly production and demand along with transportation costs per ton are
 given below

		Depot					production
		A	B	C	D	E	
Manufacturing center	P	4	1	3	4	4	60
	Q	2	3	2	2	3	35
	R	3	5	2	4	4	40
	Demand	22	45	20	18	30	135

What should be the distribution program? (use VAM)

Q.5 A. Use the dual simplex method to solve the following problem. [10]

Minimize $Z = x_1 + 2x_2 + 3x_3$

Subject to $2x_1 - d_1x_2 + d_2x_3 \leq 4$
 $d_1x_1 + d_2x_2 + 1d_3x_3 \leq 8$
 $x_2 - d_1x_3 \leq 1$
 $d_1, d_2, d_3 \geq 0$

B. Solve using the graphical method [10]

Maximize $Z = x_1 + x_2$

Subject to $1d_1x_1 + 1d_2x_2 \leq 9$
 $d_1x_1 + d_2x_2 \leq 1$
 $d_1, d_2 \geq 0$

Q.6 A. Use Big -M method to solve the following LPP. [10]

Maximize $Z = 3x_1 - x_2$

Subject to $1d_1x_1 + d_2x_2 \leq 1$
 $d_1x_1 + 1d_2x_2 \leq 1$
 $d_1x_1 \leq 1$
 $d_1, d_2 \geq 0$

- B.** An airline has drawn up a new flight schedule involving five flights. To assist in allocating five pilots to the flights, they have asked them to state their preferences scores by giving each flight a number out of 10. The higher the number greater the preference is. Certain of these flights are unsuitable to some pilots due to domestic problems. These are marked with (x). **[10]**

		Flight No.				
		1	2	3	4	5
pilot	A	8	2	X	5	4
	B	10	9	2	8	4
	C	5	4	9	6	X
	D	3	6	2	8	7
	E	5	6	10	4	3

What should be the allocation of the pilot to flight in order to meet as many preferences as possible?

- Q.7 A.** Write short notes on: **[10]**
- i) Inventory problem
 - ii) Creation of dual from primal LPP

- B.** Find the optimal strategies and value of the game of following: **[10]**

		Player B		
		I	II	III
Player A	I	7	3	1
	II	1	7	3
	III	0	1	7

MCA (SEM- III)
Software Engineering
(OCT-16)

QP CODE : 511602

(3 Hours)

[Total Marks: 100

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

2) Attempt any four questions from remaining six questions

3) Illustrate answers with sketches wherever required and use of pencil should be done
for drawing sketches

1 (a). Consider a database application with the following information [10]

- i. It has 5 screen with 5 views each and from 6 data tables for 3 servers and 4 clients
- ii. It may generate 2 report of 5 section each from 6 data tables for 2 servers and 3 clients
- iii. There is 10% reuse of objects points

Developers experience and capability in the similar environment is low, the maturity of organization in terms of capability is also low. Calculate: the object point count, new object points and effort to develop such a project.

(b).What is requirement engineering? Explain different steps in requirement engineering [10]

2 (a). Discuss various key process areas of CMM at various maturity levels. [10]

(b).Define software reliability. Explain different reliability metrics. Explain one reliability growth model. [10]

3 (a). What is software engineering? Explain the role of management in software development [10]

(b). Explain different decomposition techniques with suitable examples. [10]

4 (a). What is path testing? Explain cyclometric complexity with suitable example. [10]

(b). What is SCM? Why it is necessary? Explain SCM process in detail. [10]

5 (a). What is meant by RMMM plan? Develop and explain a RMMM plan for any IT risk. [10]

(b). Define module coupling and module cohesion. Explain different types of coupling . [10]

6 (a). Explain boundary value analysis testing techniques with the help of an example. [10]

(b). What is software maintenance? Describe various categories of maintenance. [10]

7. Write short notes on any four [20]

- a. Software Reengineering
 - b. Work Breakdown Structure
 - c. Debugging
 - d. SRS
 - e. Structure chart
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MCA (SEM- II)
Management Information
System

Q. P. Code : 511702

Total. Marks: 100

Time: 3 Hrs

NOTE:

- I. Question No. 1 is **Compulsory**.
- II. Attempt any four out of remaining six
- III. Elaborate each answer with the help of an **example**

1. (A) What is MIS? Explain why MIS system is needed and where? **10**
(B) Explain how information system impacts on organizations and business firms. **10**
2. (A) What is organization? Explain using Levitt's model. **10**
(B) What are characteristics of MIS? Explain in detail types of MIS system. **10**
3. (A) Explain supply chain management system in detail with one real time example. **10**
(B) Explain in detail DSS system and its roles in organization. **10**
4. (A) What is information? What are functions of information system? Discuss good and bad impact of Information system. **10**
(B) Elaborate in detail classification and value of information **10**
5. (A) Explain core business processes in detail with appropriate type of Information system used in it. **10**
(B) How does data mining works? Explain different phases of data mining. **10**
6. (A) Differentiate between product organization and matrix organization in detail. **10**
(B) Explain Herbert Simon model and its pros and cons in detail. **10**
7. Explain any four of the following terms : **20**
(A) AI systems
(B) Perspective of Information system.
(C) CRM systems
(D) MIS: factors for success and failure
(E) Knowledge Based Expert System (KBES)

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