

MCA (SEM-III)
OBJECT ORIENTED
PROGRAMMING WITH C++
(DEC- 2019)

(3 hours)

Total marks: 100

1. Q1 is compulsory
2. Attempt any Four from remaining Six questions

- Q.1** A Define a Class to implement a stack of integers. Add different methods to push and pop the data. Add exception to check overflow and underflow situations. **10**
- B Explain the use of pointers to objects. Give an example. **10**
- Q.2** A What are inline functions? Explain its use with an example. **10**
- B What is inheritance? Explain the different types of inheritance supported by C++. **10**
- Q.3** A What are the features of Object Oriented Programming? Discuss. **10**
- B Explain new and delete in dynamic memory management. **10**
- Q.4** A Describe the various modes available in C++ to open files. **10**
- B Write a C++ program to overload the operator '*' to concatenate two strings. Do not use any standard library string handling functions. **10**
- Q.5** A Explain class template and function template with examples **10**
- B What is virtual function? How to make function virtual? Give the example. **10**
- Q.6** A What is friend function? What is friend class? How to declare it? Where the use of friend function is necessary? Explain. **10**
- B Explain constructor and destructor? How they are useful, explain in detail with example. **10**
- Q.7** Write Short notes on: (any 4) **20**
- a. Static data member
 - b. Copy constructor
 - c. Abstract class
 - d. this pointer
 - e. STL

MCA (SEM-III)**DATA BASE MANAGEMENT SYSTEM****(DEC-2019)**

(3 Hours)

[Total marks:100]

- Note (1) Q1. is compulsory, attempt any four out of remaining.
 (2) All question carry equal marks.
 (3) Answer to sub-questions should be grouped together.

- Q1. (a) Draw an ER diagram for movie ticket booking system. Document all assumptions that you make for designing. 10
 (b) Write schema definition and normalize all tables in 3NF for the above ER diagram. 10
- Q2. (a) What is deadlock? Describe and compare deadlock detection and prevention techniques. 10
 (b) Explain architecture of database system. What are roles and responsibilities of a DBA? 10
- Q3. (a) What is an index on a file? What is search key for an index? Why do we need indexes? 10
 (b) Write a detailed note on query optimization. 10
- Q4. Differentiate between the following 20
 a) Hierarchical and network model
 b) Strong and weak entity
 c) 3NF and BCNF
 d) Physical and Logical Data Independence
- Q5. (a) What is bell la pedula model? Explain in detail. 10
 (b) Define decomposition. Explain loss less and dependency preserving decomposition. 10
- Q6. (a) What is transaction? Explain ACID properties. 10
 (b) What are different levels of data independence? Explain in detail. 10
- Q7. Write short note on **any four** of the following 20
 (a) Ternary Relationship in E-R diagram
 (b) Grant and Revoke Command
 (c) shadow paging
 (d) Views
 (e) Super and candidate keys

- N.B. :**
- 1) Question No.1 is **compulsory**.
 - 2) Attempt any **four** from the remaining **six** questions.
 - 3) Figures to the right indicate full marks.

- Q1. (a) Explain the OSI Reference model in Detail [10]
 (b) Explain how Congestion is handle by TCP [10]
- Q2. (a) What do you understand by routing? Explain Link state routing algorithm [10]
 (b) Explain the concept of sliding window protocol? [10]
- Q3. (a) Difference between ARP Vs RARP [10]
 OSI and TCP/IP Reference model
 (b) Explain unguided media of transmission [10]
- Q4. (a) Explain three way handshake used by TCP for connection establishment [10]
 (b) Explain the concept of satellite network LEO MEO and GEO? [10]
- Q5. (a) Explain in detail IP addressing schema [10]
 (b) Explain TCP Header in detail [10]
- Q6. (a) Explain slotted and Pure ALOHA Protocol in detail [10]
 (b) Explain in detail CSMA,CSMA/CD and CSMA/CA [10]
- Q7. Write Short Notes on (any four): [20]
 (a) Collision free protocol-1 bit map
 (b) DHCP
 (c) HTTP
 (d) Cryptography
 (e) DNS

MCA (SEM-III)
OPERATION RESEARCH
(DEC- 2019)

Marks: 100

Please check whether you have got the right question paper

- Note:
1. Question 1 is compulsory.
 2. Attempt **any 4** from the remaining 6 questions.
 3. Figures to the right indicate marks.
 4. Use of scientific calculator is allowed.

Q.1 a) Solve the following LPP using Graphical Method. [10]

Maximize $Z = x + y$
 Subject to $x + 2y \leq 8$
 $3x + 2y \leq 12$
 $x, y \geq 0$

b) Processing time of six jobs (in hrs.) on three machines M1, M2, M3 are given below: [10]

Jobs	1	2	3	4	5	6
M/C M1	3	12	5	2	9	11
M/C M2	8	6	4	6	3	1
M/C M3	13	14	9	12	8	13

Determine the sequence which will minimize the total elapse time. Also find idle time for each machine.

Q.2 a) Find optimal strategies and value of the game where pay-off matrix of the two player is given by [10]

		Player B		
		B1	B2	B3
Player A	A1	-1	2	1
	A2	1	-2	2
	A3	3	4	-3

b) Solve the following LPP by using Simplex Method. [10]

Maximize $Z = 3x_1 + 2x_2$
 Subject to $x_1 - x_2 \leq 1$
 $3x_1 - 2x_2 \leq 6$
 $x_1, x_2 \geq 0$

Q.3 a) The engineering company has a machine whose purchase price is Rs. 80000. The expected maintenance costs and resale prices in different years are given in the following table. [10]

Year	1	2	3	4	5	6	7
Maintenance Cost (Rs.)	1000	1200	1600	2400	3000	3900	5000
Resale Value (Rs.)	75000	72000	70000	65000	58000	50000	45000

At what time interval in your opinion should the machine be replaced

- b) A company has 4 salesmen A, B, C and D. These salesmen are to be allotted 4 districts 1, 2, 3 and 4. The estimated profit per day for each salesman in each district is given in the table. [10]

	1	2	3	4
A	16	10	14	11
B	14	11	15	15
C	15	15	13	12
D	13	12	14	15

What is the optimum assignment which will yield maximum profit?

- Q.4 a) Solve the following LPP using Big-M method. [10]

Minimize $Z = 2x_1 + x_2 + x_3$
 Subject to $4x_1 + 6x_2 + 3x_3 \leq 8$
 $3x_1 - 6x_2 - 4x_3 \leq 1$
 $2x_1 + 3x_2 - 5x_3 \geq 4$
 $x_1, x_2, x_3 \geq 0$

- b) Draw the network for following activities and determine total, free and independent float. [10]

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

- Q.5 a) Solve the following LPP by using Dual Simplex Method. [10]

Minimize $Z = 2x_1 + 2x_2 + 4x_3$
 Subject to $2x_1 + 3x_2 + 4x_3 \geq 2$
 $3x_1 + x_2 + 7x_3 \leq 3$
 $x_1 + 4x_2 + 6x_3 \leq 5$
 $x_1, x_2, x_3 \geq 0$

- b) For the following set of activities and different time estimates (in weeks) 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

- Determine expected task time and their variance
- Draw network
- What is the project length and critical path

Q.6 a) Solve the following LPP by Two Phase Method. [10]

Maximize $Z = 4x_1 + 3x_2$
 Subject to $2x_1 + x_2 \leq 12$
 $3x_1 + 3x_2 \leq 10$
 $4x_1 + 2x_2 \leq 8$
 $x_1 + x_2 \geq 1$
 $x_1, x_2 \geq 0$

b) Find the initial basic feasible solution for the following transportation problem by Vogel's Approximation method. [10]

	M1	M2	M3	Capacity
W1	26	23	10	61
W2	14	13	21	49
W3	16	17	29	90
Requirement	52	68	80	

Q.7 a) Solve the following problem by using Gomory's Cutting plane method. [10]

Maximize $Z = 3x_1 + 12x_2$
 Subject to $2x_1 + 3x_2 + 5x_3 \geq 2$
 $3x_1 + x_2 + 7x_3 \leq 3$
 $x_1 + 4x_2 + 6x_3 \leq 5$
 $x_1, x_2, x_3 \geq 0$

b) Explain the following terms with suitable example. [10]

- i) Inventory Problem
- ii) Steps to construct dual of primal LPP

MCA (SEM-III)
SOFTWARE ENGINEERING
(DEC- 2019)

(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). Explain decomposition techniques in detail

[10]

(b). Consider a project with following functional units

No. of user inputs = 60, No. of user outputs = 25, No. of user inquires = 30

No. of user files = 10, No. of external interfaces = 12.

Assume that all complexity adjustment is significant and weighting factor values are complex (high).

Calculate the functional point for the project.

[10]

2 (a). Explain various organizational and team structures in detail

[10]

(b). What are the different steps to manage risks. Explain types of software & general risks

[10]

3 (a). Explain module cohesion and different types of cohesion

[10]

(b). What is Software Engineering? What is the role of management in software development?

[10]

4 (a). What is SCM? Explain SCCS in detail.

[10]

(b). Explain SEI CMM in detail.

[10]

5 (a). What is SRS? Explain the characteristics and organization of an SRS

[10]

(b). Explain various reliability metrics in detail

[10]

6 (a). Explain white box testing in detail.

[10]

(b). Explain Formal Technical review in detail.

[10]

7. Write short notes on any four

[20]

- a. Relationship between people and effort
- b. Status reporting
- c. Degree of rigor
- d. COCOMO II
- e. Re engineering

- NOTE:**
- (1) Question No. 1 is compulsory
 - (2) Answer any four questions from Question No.2 to 7
 - (3) All questions carry equal marks.

- Q.1 (A) Explain how quality of information improves the knowledge and decision- making capability of the people? [10]
 (B) What is Business process? Explain types of Business Information systems from a functional perspective? [10]
- Q.2 (A) Explain the Porter's Competitive model. [10]
 (B) What is rational decision making? Can a decision be called as right or wrong? What problem a decision maker has to face in making rational decisions? [10]
- Q.3 (A) MIS supports a manager in his functional responsibilities. Explain? [10]
 (B) When would you resort to prototype approach and life cycle approach in the development of the MIS? Explain? [10]
- Q.4 (A) What problems does the System Analyst face in ascertaining the information requirements at various level of management and how are these problems tackled?[10]
 (B) Explain using Levitt's model with the help of an example? [10]
- Q.5 (A) What are the three parameters used in the evaluation of the IT before decision is made? Explain? [10]
 (B) What is an expert system? Explain knowledge based Expert systems with an example? [10]
- Q.6 (A) What is DSS? Explain various components of DSS? [10]
 (B) What is the role of MIS in Procurement? Explain? [10]
- Q.7 Write short notes on [20]
 (a) Bull whip effect
 (b) AI systems
 (c) Strategic Planning
 (d) General Model of a Human as an Information Processor