M.C.A [SEM – III]

Object Oriented Programming C++

(DEC- 2017)

Q. P. Code: 25238

[Total Marks: 100]

(3 Hours)

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

1. **(a)** Write a program to define a class to represent a bank account. Include the following members: Name of the depositor, Account number, Type of account, Balance amount in the account Define the member functions **t**o assign initial values, to deposit an amount, to withdraw an amount after checking the balance, to display name and balance. **(10)**

(b) Define Object Oriented Programming. What are the features of OOP's? **(10)**

2. **(a)** What is Constructor? Explain Default Constructor, Parameterized Constructor and Copy constructor with suitable example. **(10)**

(b) What is Inheritance? Explain the different forms of inheritance. **(10)**

3. **(a)** Write a program to overload binary '+' operator to demonstrate concatenation of one string at the end of another. **(10)**

(b) Define Polymorphism? Explain how run time polymorphism is achieved with an example. Add a note on Virtual Destructor. **(10)**

4. **(a)** Explain with example data conversion in C++ : **(10)**
i) basic to object type
ii) object to basic type

(b) What is dynamic memory management? Explain the use of new and delete keyword with example. **(10)**

5. **(a)** Explain exception handling mechanism in C++. Write a program to handle 'array out of bound' exception. **(10)**

(b) What is container? Explain container types. **(10)**

6. **(a)** Explain the different file opening modes in C++. Create a class library with member's bookid, book_name, author and price. Write a program to store the details of Library class and retrieve it from a binary file. **(10)**

(b) What are the components of Standard Template Library? **(10)**

7. **Write Short Notes on *any four* :-** **(20)**

1. this pointer
2. inline keyword
3. command line arguments
4. Friend function
5. function templates
6. Manipulators with arguments

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M.C.A [SEM – III]

Data Base Management Systems

(DEC- 2017)

Q. P. Code: 22969

[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 railway 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)	Write a detailed note on query optimization.	10
	(b)	Explain architecture of database system. What are roles and responsibilities of a DBA?	10
Q3.	(a)	What are different levels of data independence? Explain in detail.	10
	(b)	What is deadlock? Describe and compare deadlock detection and prevention techniques.	10
Q4.		Differentiate between the following a) Hierarchical and network model b) Strong and weak entity c) structure and hash indexing d) Ternary and aggregation	20
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 an index on a file? What is search key for an index? Why do we need indices?	10
	(b)	What is transaction? Explain ACID properties.	10
Q7.		Write short note on **any four** of the following (a) triggers (b) crash recovery and checkpoints (c) shadow paging (d) types of database (e) super and candidate keys	20

M.C.A [SEM – III]

Data Communication Networks

(DEC- 2017)

Q.P. Code: 22599

(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 the functionalities of each layer in the OSI reference model. (10)
   (b) Explain circuit switching, Message switching and packet switching in detail with pros and cons of each switching. (10)

2. (a) Discuss RSA public key crypto system with example. (10)
   (b) (i) Construct the hamming code for the bit sequence 10101111. (05)
   (ii) A bit string, 0111101111101111110, needs to be transmitted at the data link layer. What is the string actually transmitted after bit stuffing? (05)

3. (a) Discuss ALOHA multiple access techniques and its different forms with its performance. (10)
   (b) Discuss the 4-way handshake for TCP connection termination. (10)

4. (a) What is sliding window? Explain Selective Repeat protocol in detail. (10)
   (b) Explain any two IEEE 802 standards with its frame formats. (10)

5. (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 Dijkstra's algorithm with example. (10)

6. (a) Explain E-mail architecture and services. Also discuss the message formats of E-mail service. (10)
   (b) Explain the terms LAN, WAN, MAN and wireless networks with its characteristics. (10)

7. Write Short Notes on ***any four*** :- (20)
   a) GEO, LEO and MEO
   b) Half duplex and full duplex communication
   c) Flooding
   d) UDP
   e) CDMA

M.C.A [SEM – III]

Operation Research

(DEC- 2017)

Q. P. Code: 24554

[Time: 3 hours] **[Marks: 100]**

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

Q1 a) Solve the following LPP using Graphical Method

Maximize $Z = 40x_1 + 100x_2$

Subject to $12x_1 + 6x_2 \leq 3000$

$4x_1 + 10x_2 \leq 2000$

$2x_1 + 3x_2 \leq 900$

$x_1, x_2 \geq 0$ [10]

b) Suppose the following estimate of activity times (days) are provided.

Activity	Optimistic time	Most Likely time	Pessimistic time
1-3	1	3	5
1-2	3	4	5
3-5	4	5	6
2-4	3	5	7
4-5	5	6	13
5-6	4	7	10
4-6	6	8	10

i) Draw a network.

ii) Find the expected duration and variance for each activity

iii) What is the project length?

iv) Find the critical path of the project.

[10]

Q2 a) Solve the following LPP by Simplex Method

Maximize $Z = 4x1 + 10x2$

Subject to $2x1 + x2 \leq 10$

$2x1 + 5x2 \leq 20$

$2x1 + 3x2 \leq 18$

$x1, x2 \geq 0$ [10]

b) Find the initial basic feasible solution for the following transportation problem by Vogel's approximation method:

	To				Supply
From	3	1	7	4	300
	2	6	5	9	400
	8	3	3	2	500
Demand	250	350	400	200	

[10]

Q3 a) Five jobs are to be processed at three machines A, B and C in the order ABC. The time taken by each job on the three machines is given below. Each machine can process one job at a time. Determine the optimum sequence for the jobs and total elapse time. Also find the idle time for each machine.

Task	Jobs				
	1	2	3	4	5
A	7	12	11	9	8
B	8	9	5	6	7
C	11	13	9	10	14

[10]

b) Solve the following LPP by Big-M method:

Maximize $Z = 3x1 - x2$

Subject to $2x1 + x2 \leq 2$

$x1 + 3x2 \geq 3$

$x2 \leq 4$

$x1, x2 \geq 0$ [10]

Q4 a) A salesman has to visit five cities A, B, C, D and E. The distance between 5 cities are as follows. If the salesman starts from city A and has to come back to city A. Which route will he select so that the total time to visit all cities will be minimum?

		To city				
		A	B	C	D	E
From City	A	0	7	6	8	4
	B	7	0	8	5	6
	C	6	8	0	9	7
	D	8	5	9	0	8
	E	4	6	7	8	0

[10]

b) Solve the following problem using Dual Simplex method:

Minimize $Z = 2x1 + 2x2 + 4x3$

Subject to $2x1 + 3x2 + 5x3 \geq 2$

$3x1 + x2 + 7x3 \leq 3$

$x1 + 4x2 + 6x3 \leq 5$

$x1, x2, x3 \geq 0$ [10]

[TURN OVER]

Q5 a) Use Two phase method to solve the following LPP:

Maximize $Z = 5x1 - 4x2 + 3x3$

Subject to $2x1 + x2 - 6x3 = 20$

$6x1 + 5x2 + 10x3 \leq 76$

$8x1 - 3x2 + 6x3 \leq 50$

$x1,x2,x3 \geq 0$ [10]

b) Solve the following assignment problem and find the optimum assignment that will result in the minimum man hours needed.

		Jobs				
		A	B	C	D	E
Workers	P	10	12	15	12	8
	Q	7	16	14	14	11
	R	13	14	7	9	9
	S	12	10	11	13	10
	T	8	13	15	11	15

[10]

Q6 a) Use Gomory's Method to solve the following problem:

Maximize $Z = 5x1 + 7x2$

Subject to $-2x1 + 3x2 \leq 6$

$6x1 + x2 \leq 30$

$x1,x2 \geq 0$ and integer [10]

b) The maintenance engineer for a large construction company is examining alternatives open to him for the replacement of hydraulic hoses in the firm's 100 front end loaders, each loader uses six hoses, which from historical maintenance records fail at following rate

Month of use	1	2	3	4	5
% requiring replacement by that month	10	15	20	70	100

The engineer learns that in field replacement costs Rs.80 per hose while it cost only Rs.40 per hose if all the hoses are replaced at regular interval during routine maintenance and service. Evaluate the alternatives open to this engineer and recommend a course of action. [10]

Q7 a) Write short note on :

i) Pure and Mixed strategies in game theory

ii) Inventory Model

[10]

b) Find the optimal strategies and value of the game for the following problem:

	Player B		
Player A	1	-1	-1
	-1	-1	3
	-1	2	-1

[10]

M.C.A [SEM – III]
Software Engineering
(DEC- 2017)

Q.P. Code: 26569

(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

Q.1	A	What is requirement engineering? List and explain steps in requirement engineering.	10
	B	Explain COCOMO-I model in detail.	10
Q.2	A	What is software reliability?Explain Capability maturity model	10
	B	What do you understand by system testing? List and explain the different types of system testing.	10
Q.3	A	Explain Putnam Resource allocation model in detail.	10
	B	Define SRS. Explain in detail.	10
Q.4	A	Define Structure Chart. Also explain different types of structured charts with example.	10
	B	Define work breakdown structure. Explain difference between activity network diagram and work breakdown structure.	10
Q.5	A	Define software configuration items. Explain how they are used in SCM process.	10
	B	Define degree of rigor. Explain how degree of rigor is calculated based on TSS.	10
Q.6	A	What are size metrics? How is a function points metrics advantageous over LOC metric? Explain	10
	B	What are Risk? Explain different steps to manage risks. List & Explain types of software risks & general risks.	10
Q.7		Write Short Notes on : **(any four)**	20

a. Status Reporting

b. Make buy decision

c. RMMM plan

d. Configuration audit

e. Software Reviews

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M.C.A [SEM – III]

Management Information System

(DEC- 2017)

Q. P. Code : 27601

Total Marks: 100

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) What is Organization? Explain using Levitt's model? [10]

(B) What is Business process? Explain types of Business Information systems from a functional perspective? [10]

Q.2 (A) What is DSS? Explain various components of DSS? [10]

(B) Distinguish between long-range and short-range planning? Why a long-range plan is necessary in development of MIS? [10]

Q.3 (A) what are various types of systems in organization? [10]

(B) What are the various ways of managing quality in MIS? [10]

Q.4 (A) What is rational decision making and its types in detail? [10]

(B) What is the nature of IT decision making? How it's different from other decisions? [10]

Q.5 (A) Explain the methods of deciding the Decision alternatives? [10]

(B) What are the various methods of data and information collection? Explain? [10]

Q. 6 (A) explain in detail development and implementation of MIS? [10]

(B) List the factors contributing the success and failure of MIS? Explain? [10]

Q.7 Write short notes on [20]
(a) Strategic decision
(b) Push v/s Pulled based S.C.M
(c) Knowledge Based Expert System
(d) CRM

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