

MCA (SEM-III)
OBJECT ORIENTED PROGRAMMING C++
(MAY-2018)

Q. P. Code: 25237

[Total Marks: 100]

(3 Hours)

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

- Q.1** A. What is inheritance? Explain the different types of inheritance supported by C++. **10**
B. What are the features of Object Oriented Programming? Discuss. **10**
- Q.2** A. What is virtual function? How to make function virtual? Give the example. **10**
B. Explain the use of pointers to objects. Give an example. **10**
- Q.3** 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. What are inline functions? Explain its use with an example. **10**
- Q.4** A. Explain constructor and destructor? How they are useful, explain in detail with example. **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. Describe the various modes available in C++ to open files. **10**
B. Explain class template and function template with examples **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 new and delete in dynamic memory management **10**
- Q.7** Write Short notes on: (*any 4*) **20**
- a. STL
 - b. Namespace
 - c. Abstract class
 - d. this pointer
 - e. Copy constructor

MCA (SEM-III)
DATA BASE MANAGEMENT SYSTEMS
(MAY-2018)

Q.P. Code: 38908

(3 Hours)

[Total Marks : 100]

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

Write a short note on following (any Four)

1. (a) Construct an E-R diagram for a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents (10)
(b) Write Schema definition and normalize all tables till 3NF for the above ER diagram (10)
2. (a) Define Transaction? Explain ACID properties of transaction ? (10)
(b) Define Serializability? Explain view serializability with the help of an example. (10)
3. (a) Define deadlock ? How deadlocks can be resolved in database. (10)
(b) Define hash based indexing with the help of an example. (10)
4. (a) Explain architecture of DBMS with the help of neat diagram (10)
(b) Define data model ? Name various data models used in DBMS ? Also explain them with the help of an example. (10)
- 5 (a) Explain the significance of timestamp protocol for controlling the concurrency in DBMS. (10)
(b) What is the need of query optimization in DBMS explain with the help of an example . (10)
- 6 (a) Define locking protocols in DBMS ? How strict 2 phase locking protocol is better then 2 phase locking protocol? Explain with the help of an example. (10)
(b) Explain Bell-la pedula model for database security ? (10)
- 7 Write short notes on any four (20)
 - (a) Physical and logical Data Indpendence
 - (b) Shadow Paging
 - (c) Views
 - (d) Triggers
 - (e) Dirty Read and Blind Write

MCA (SEM-III)
DATA COMMUNICATION NETWORKS
(MAY-2018)

Q.P. Code: 22598

Total Marks: 100

(3 Hours)

- 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 operation of CSMA/CD. Discuss various Persistent [10]
algorithms used.
- (b) Explain the difference between Packet, Circuit and Message switching. [10]
Also discuss the uses of each switching.
- Q2. (a) Explain three way handshake for TCP connection establishment. [10]
- (b) Explain OSI model and compare it with the TCP/IP. [10]
- Q3. (a) What is Sliding Window? Explain Go back N Protocol in detail. [10]
- (b) What is congestion? Discuss various methods of preventing [10]
congestion.
- Q4. (a) What is Classful addressing? Discuss Class A, Class B, Class C, Class [10]
D and Class E addresses with its ranges and subnet mask for each
class in dotted decimal notation with example.
- (b) Describe IEEE 802.3 and 802.5 standards in detail. [10]
- Q5. (a) Explain various guided media used in data communication. [10]
- (b) What is the need of Routing Algorithm? In which layer it is [10]
implemented? Discuss shortest path routing algorithm.
- [10]
- Q6. (a) Explain TCP Header format in detail. [10]
- (b) Explain DES cipher Algorithm in detail. [10]
- Q7. Write Short notes on any **four** of the following: [20]
- (a) Tunneling
 - (b) FTP
 - (c) ARP
 - (d) DNS
 - (e) ICMP

- N.B:
- (1) Question No. 1 is **compulsory**.
 - (2) Attempt any **four** out of remaining **six** questions.
 - (3) Assume any **necessary** data but justify the same.
 - (4) Figures to the **right** indicate **marks**.
 - (5) Use of scientific **calculator** is **allowed**.

1 a) A firm is engaged in producing two products A and B. Each unit of A requires two kg of raw material and four labour hours for processing whereas each unit of product B requires 3 kg of raw material and three hours of labour of the same type. Every week, the firm has an availability of 60 kg of raw material and 96 labour hours. One unit of product A sold yields Rs 40 and one unit of product B sold gives Rs 35 as profit. Formulate this problem as a linear programming problem to determine as to how many units of each of the products should be produced per week so that the firm can earn the maximum profit. Assume that there is no marketing constraint so that all that is produced can be sold. Solve the problem graphically.

[10]

b) The following is the activity list of a project with time estimates

[10]

Activity	Time(days)		
	Optimistic	Most likely	Pessimistic
1-2 (A)	6	6	24
1-3 (B)	6	12	18
1-4 (C)	12	12	30
2-5 (D)	6	6	6
3-5 (E)	12	30	48
4-6 (F)	12	30	42
5-6 (G)	18	30	54

What is the probability of the project not being completed in 80 days?

[Given, for SN, Z=0.69, area between mean and value of Z is 0.2549].

2 a) Solve the following LPP by simplex method.

[10]

$$\begin{aligned} &\text{Maximize } Z=107x_1+x_2+2x_3 \\ \text{Subject to: } &\frac{14}{3}x_1+\frac{1}{3}x_2-2x_3+x_4=7 \\ &16x_1+\frac{1}{2}x_2-6x_3 \leq 5 \\ &3x_1-x_2-x_3 \leq 0 \\ &x_1, x_2, x_3, x_4 \geq 0 \end{aligned}$$

b) A company has three plants and four warehouses. The supply and demand in unit and the corresponding transportation costs are given. If the solution is as given below, answer the following questions giving reasons. [10]

Plants	Warehouse				Supply
	I	II	III	IV	
A	5	10	4 (10)	5	10
B	6 (20)	8	7	2 (5)	25
C	4 (5)	2 (10)	5 (5)	7	20
Demand	25	10	15	5	

Is this solution optimal? Does problem have more than one optimal solution? If so, show all of them.

3 a) Solve the following using big M method. [10]

$$\begin{aligned}
 \text{Minimize: } & Z = 2x_1 + 8x_2 \\
 \text{Subject to: } & 5x_1 + 10x_2 = 150 \\
 & x_1 \leq 20 \\
 & x_2 \geq 14 \\
 & x_1, x_2 \geq 0
 \end{aligned}$$

(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 preference scores by giving each flight a number out of 10. The higher the number the greater the preference is. Certain of these flights are unsuitable to some pilots due to domestic problems. These are marked with an (X).

Pilot	Flight No.				
	1	2	3	4	5
A	8	2	X	5	4
B	10	9	2	8	4
Men 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 pilots to flights in order to meet as many preferences as possible? [10]

4 a) Use dual simplex method to solve the following LPP. [10]

$$\begin{aligned} \text{Min } Z &= 2x_2 + 5x_3 \\ \text{Subject to the constraints} \\ x_1 + x_2 &\geq 2 \\ 2x_1 + x_2 + 6x_3 &\leq 6 \\ x_1 - x_2 + x_3 &= 4 \\ x_1, x_2, x_3 &\geq 0 \end{aligned}$$

b) Six jobs are to be processed at three machines A, B, and C in the order BAC. The time taken by each job on the three machines is given below. Each machine can process one job at a time.

Processing Time (min)		Jobs					
		1	2	3	4	5	6
M/C	A	30	40	20	10	50	35
M/C	B	50	80	90	70	60	75
M/C	C	40	80	70	60	20	45

Determine the optimum sequence for the jobs and total elapsed time. Also find the idle time for each machine. [10]

5 a) Write short notes on the following. [10]

- (i) Different costs associated with inventory problem.
- (ii) Redundant constraints in LPP.

b) Solve using Gomory's cutting plane method. [10]

$$\begin{aligned} \text{Maximize } z &= x_1 + 2x_2 \\ \text{Subject to: } 3x_1 + 2x_2 &\leq 5 \\ x_2 &\leq 2 \\ x_1, x_2 &\geq 0 \text{ and integer.} \end{aligned}$$

6 a) Explain the following. [10]

- (i) Branch and bound method of solving Traveling Salesman Problem.
- (ii) Matrix method of solving a game theory problem.

b) The following mortality rate have been observed for a certain type of fuse. There are 1000 fuses in use, and it costs Rs 5 to replace an individual fuse. If all fuses were replaced simultaneously it would cost Rs 1.25 per fuse. It is proposed to replace all fuses at fixed interval of time, whether or not they have burnt out, and to continue replacing out fuses as and when they fail. At what interval the group replacement should be made? Also prove that this optimum policy is superior to the straightforward policy of replacing each fuse only when it fails.

[10]

Week	1	2	3	4	5
% failing at the end of the week	5	15	35	75	100

7 a) The following information of a project is given.

[10]

Activity	Normal		Crash	
	Time (weeks)	Cost (Rs)	Time (weeks)	Cost (Rs)
1-2	8	7000	3	10000
1-3	4	6000	2	8000
2-3	0	0	0	--
2-5	6	9000	1	11500
3-4	7	2500	5	3000
4-6	12	10000	8	16000
5-6	15	12000	10	16000
5-7	7	12000	6	14000
6-8	5	10000	5	10000
7-8	14	6000	7	7400
7-9	8	6000	5	12000
8-9	6	6000	4	7800

Indirect cost for the project is Rs 1,000 per week.

Draw the network of the project. What is the normal duration cost of the project? If only one activity is to be crashed, which one should be selected for crashing? What will be the project duration and total cost after first crashing?

b) Two companies A and B are competing for the same product. Their different strategies are given in the following payoff matrix:

[10]

Company A		Company B			
		I	II	III	IV
	I	3	2	4	0
	II	3	4	2	4
	III	4	2	4	0
	IV	0	4	0	8

Use dominance principle to find optimal strategies.

Note: 1) Q1. is compulsory

2) Attempt any Four Questions from Question no. 2 to 7

- Q1. A) Explain in brief module coupling and module cohesion. Explain different types of coupling. 10
- B) Consider a project with the following functional units: 10
- Number of user inputs = 50
 - Number of user outputs = 40
 - Number of user enquiries = 35
 - Number of user files = 06
 - Number of external interfaces = 04
- Assume all complexity adjustment factors and weighting factors are average. Compute the function points for the project.
- Q2. A) Explain Mc Call's software quality model in details. 10
- B) Define metrics. Explain relationships among measures, metrics and indicators. Compare function oriented metric with size oriented metric. 10
- Q3. A) What is SCM? Why it is necessary? Explain SCM process in details. 10
- B) Explain the components of Use Case diagram with suitable example 10
- Q4. A) Explain in detail Risk Identification and Risk Projection. 10
- B) Explain the term Software Requirement Specification. Explain the features of good SRS. 10
- Q5. A) Define staffing level estimation. Explain Rayleigh curve. Also state effect of schedule change on cost. 10
- B) Define Degree of Rigor. Explain how degree of rigor is calculated based on TSS. 10
- Q6. A) Define software reliability. Explain different reliability metrics. Explain one reliability growth model. 10
- B) Explain different levels and methods of software testing 10
- Q7. Write Short notes on (any Four) 20
- (a) Software reverse engineering
 - (b) Structure chart
 - (c) Work Break Down Structure.
 - (d) Make buy decision
 - (e) Four P's in software management

MCA (SEM-III)
MANAGEMENT INFORMATION SYSTEM
(MAY-2018)

Q. P. Code: 39273

Time: 3 Hrs.

Marks:100

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) Explain Simon's model in decision making process? 10
(B) Discuss positive & negative impact of information system. 10
2. (A) What Are The Characteristics Of MIS & How Does MIS Differ From TPS & DSS? 10
(B) Explain The Value Chain Model In Detail. 10
3. (A) What Is Levitt's Model? Explain With Suitable Example. 10
(B) What Is Porter's Competitive Model? Discuss With Suitable Example? 10
4. (A) Discuss The Role Of Information System In Globalization. 10
(B) Differentiate Between MIS And CRM. 10
5. (A) The manager has a leadership role to play. How can MIS support this role? 10
(B) What Are The Parameters Of Quality Measurement? List And Explain In Brief 10
How We Can Call Information As A Quality Product?
6. (A) Explain prototype approach for development and implementation of MIS 10
(B) Explain factors for success and failure of MIS. 10
7. Explain **Any Four** of The Following Terms : 20
(A) Artificial Intelligence
(B) Challenges And Threats to Implementing MIS
(C) Role of MIS In Procurement
(D) Importance of Mis.
(E) Roles of the MIS:
