

M.C.A. (Sem - III)
Object Oriented Programming C++
(May-2017)

Q.P. Code :04264

[Time: 3 Hours]

[Marks:100]

Please check whether you have got the right question paper.

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

- Q.1** a) Explain the basic concepts of Object Oriented Programming. What is the difference between C & C++ **10**
b) Define Call by Value and Call by Reference. What are the main advantages of passing arguments by reference? **10**
- Q.2** a) Explain File handling mechanism of C++? **10**
b) Describe Function Overloading & Function Overriding? Explain the concept of Friend Function? **10**
- Q.3** a) Design a class Employee with name, address, contact number and department attributes. Define 10 functions of Date-of-Joining and check salary. Design an exception to handle minimum salary criteria of 10,000. **10**
b) Write a program to create a base class Shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base class. Add to the base class, a member function get data () to initialize base class data members and another member function display area () to compute and display the area of figures. Make display area () as a virtual function and redefine this function in the derived classes to suit their requirements. **10**
- Q.4** a) Describe the properties of Constructor. Distinguish between the following two statements: **10**
Time T2(T1);
Time T2=T1;
T1 & T2 are objects of time class.
b) Explain with an example, how would you create space for an array of objects using pointers. **10**
- Q.5** a) When do we make a virtual function “pure”? What are the implications of making a function a pure virtual function? **10**
b) Write the different between: **10**
i) Overloaded function & function template
ii) Class template & template class
- Q.6** a) What is Constructor? Explain Default Constructor, Parameterized Constructor and Constructor Overloading with suitable example. **10**
b) Explain New and Delete operator with a suitable example? **10**
- Q.7** Write short notes on: (any four) **20**
i) Input and output stream
ii) this pointer
iii) setw manipulator
iv) Inheritance
v) Scope resolution Operator

M.C.A. (Sem – III)
Data Base Management Systems
(May-2017)

Q.P. Code :01505

[Time: Three Hours]

[Marks:100]

Please check whether you have got the right question paper.

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

Q.1 a. Consider a hotel management system. This is a number of hotels across the country with following assumptions:- **(10)**

- i. Each hotel has a possibly different number of rooms.
- ii. Rooms can be classified in a number of ways (for example, 2 double beds, a suite, one king, etc.)
- iii. Rooms have a different prices based on the day of the week and time of year. If there is a festival then rooms are generally priced higher, and Thursday, Friday, Saturday night rooms are more expensive.
- iv. Guests or customers are given a bill for each stay (a stay is one or more nights in a row) and notation is made of the date of payment.
- v. Customers check into a particular room in a particular hotel on a date, check out is assumed to be the date of the bill.
- vi. Generally, there is no need to have all the names of people staying in a room, but a count of the number of adults and children is necessary as rooms and each hotel have maximum occupancy rules.

Draw an ER diagram that represents this. Note all of the entities and relationships, cardinality, indicate key attributes on diagram.

b. Write schema definition and normalize all tables to 3NF for the above E-R Diagram. **(10)**

Q.2 a. Consider the database given by following schema :- **(10)**

Customer (Cust_No, Sales_Person_No, City)

Sales-person (Sales_Person_No, Sales_Person_name, common_prec, Year-of Hire)

Sales (Sales_person_No, Month, Year, sales_amount)

construct the following SQL queries based on the tables given above:-

- i. Display the list of all customers by Cust_No with the city in which each is located.
- ii. Display the total sales for year 2016 ordered by Sales_Person_No.
- iii. list the names of the sales persons who have sold items to Delhi Customers.
- iv. Display the details of sales persons who made maximum sales in month of January.
- v. Display details of sales person who has serviced maximum numbers of customers.

b. What are different levels of data independence? Explain. **(10)**

Q.3 a. Explain ARIES crash recovery algorithm in detail. **(10)**

b. Which indexing structure is best suited for range searches? Explain in detail. **(10)**

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- Q.4 a.** Consider the universal relation R(A, B, C, D, E, F, G, H, I, J,) and the set of FD'S (10)
- $\{A,B\} \rightarrow \{C\}$
 - $\{B,D\} \rightarrow \{E,\}$
 - $\{A,D\} \rightarrow \{G,H\}$
 - $\{A\} \rightarrow \{I\},$
 - $\{H\} \rightarrow \{A, J\}$
- What is the key of R?
- b. Explain deadlocks in DBMS? Also explain various deadlock & prevention techniques. (10)
- Q.5 a.** What do you mean by transaction in DBMS? Explain various properties of transaction. (10)
- b. What do you mean by query optimization in DBMS? Explain in detail. (10)
- Q.6 a.** What is locking protocol? Explain difference between 2 phase locking protocol. (10)
- b. Explain Bell-la padula model for database security? (10)
- Q.7** Write short notes on following: (Any Four) (20)
- a. Shadow paging
 - b. Triggers
 - c. Conflict Serializability
 - d. Dirty Read and Bling Write
 - e. Crash Recovery with Checkpoints

M.C.A. (Sem - III)
Data Communication Networks
(May-2017)

QP CODE: 01120

Total Marks: 100

(3 Hours)

- 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 TCP/IP protocol suite 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 the services provided by the data link layer and explain HDLC frame format in detail. (10)
3. (a) Discuss RSA public key crypto system with example. (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) FTP
 - d) ALOHA
 - e) Modes of communication

M.C.A. (Sem - III)
Operation Research
(May-2017)

Q.P. Code :07831

[Time: 3 Hours]

[Marks:100]

Please check whether you have got the right question paper.

- N.B:
1. Question no. 1 is compulsory.
 2. Attempt any four out of remaining six questions
 3. Figure to the right indicate full marks.

Q.1 a) Use graphical method to solve the following LPP 10

Maximize $Z = 2x_1 + x_2$
 Subject to $x_1 + 2x_2 \leq 10$
 $x_1 + x_2 \leq 6$
 $x_1 - x_2 \leq 2$
 $x_1 - 2x_2 \leq 1$
 $x_1, x_2 \geq 0$

b) A small project is composed of 7 activities, whose time estimates are listed in the table below. 10

Activity (i-j)	Estimated duration(weeks)		
	optimistic	Most likely	pessimistic
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

- I. Draw the network diagram of the activities in the project
- II. Find expected duration and variance for each activity
- III. What is expected project length?
- IV. Find critical path
- V. Calculate the variance and standard deviation of the project length.

Q.2 a) Use simplex method to solve the following LPP 10

Maximize $Z = 2x_1 + 5x_2$
 Subject to $x_1 + 4x_2 \leq 24$
 $3x_1 + x_2 \leq 21$
 $x_1 + x_2 \leq 9$
 $x_1, x_2 \geq 0$

b) Obtain an initial basic feasible solution to the following transportation problem using 10

- i. North- west corner method
- ii. Least cost method

	Distribution centre (Destinations)				supply	
	1	2	3	4		
1	2	3	11	7	6	
2	1	0	6	1	1	
3	5	8	15	9	10	
Plants (origins)	Requirement	7	5	3	2	

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- Q.3 a) Solve the following LPP using Big-M method 10
 Minimize $Z = 12x_1 + 20x_2$
 Subject to $6x_1 + 8x_2 \geq 100$
 $7x_1 + 12x_2 \geq 120$
 $x_1, x_2 \geq 0$

- b) Ten jobs are to be processed on two machines A and B in order AB. The job processing time in (hour) are given in table. Determine optimal sequence and evaluate total elapse time. Also find the idle time for each machine. 10

M/C	Job									
	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10
A	8	9	10	4	8	5	6	9	6	7
B	5	3	7	7	6	8	3	7	8	7

- Q.4 a. A department of a company has five jobs to be performed. The time (in hour) that each man takes to perform each job is given in the matrix. 10

Jobs	Employee				
	I	II	III	IV	V
A	10	5	13	15	16
B	3	9	18	13	6
C	10	7	2	2	2
D	7	11	9	7	12
E	7	9	10	4	12

How should the jobs be allocated, one per employee, so as to minimize the total man hours?

- b. Use two phase method to solve the following LPP 10
 Minimize $Z = x_1 + x_2$
 Subject to $2x_1 + x_2 \geq 4$
 $x_1 + 7x_2 \geq 7$
 $x_1, x_2 \geq 0$

- Q.5 a) A travelling salesman has to cover 5 cities in his tour. He has to visit the cities one by one and return to the starting city. The travelling cost (in thousand rupees) to each city from different cities in the given table. Which sequences of cities minimize his total cost? 10

To → from ↓	A	B	C	D	E
A	--	3	6	8	2
B	7	--	4	9	3
C	9	8	--	5	8
D	13	5	7	--	6
E	2	4	3	9	--

- b) A company has a machine cost is Rs. 80,000. Its maintenance cost and resale value at the end of different years are given below: 10

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

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

Q.6 a) Solve following problem dual simplex method.

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

10

b) Use Gomory's method to solve the following problem

Maximize $Z = 3x_1 + 12x_2$
 Subject to $2x_1 + 4x_2 \leq 7$
 $5x_1 + 3x_2 \leq 15$
 $x_1, x_2 \geq 0$

10

Q.7 a) Write short note on:

- i. Inventory problem
- ii. Branch and bound algorithm for travelling salesman problem

10

b) Find the optimal strategies and value of the game of following matrix.

10

		Player B		
		I	II	III
Player A	I	7	1	7
	II	9	-1	1
	III	5	7	6

M.C.A. (Sem - III)
Software Engineering
(May-2017)

Q.P. Code :03003

[Marks:100]

Please check whether you have got the right question paper.

- N.B:**
1. **Question No. 1 is compulsory.**
 2. **Answer any four questions out of the remaining six questions.**
 3. **All questions carry equal marks.**

- Q.1 A. What is Software Engineering? What is the role of management in software development? 10
 B. List & Explain various decomposition techniques with suitable example. 10
- Q.2 A. What are size metrics? How is function point metrics advantage over LOC metrics? 10
 B. Discuss any two white-box testing techniques with suitable examples along with the control flow graph. 10
- Q.3 A. Explain Software Requirement Specification. 10
 B. What is System Testing? Explain various methods of System Testing. 10
- Q.4 A. Explain WBS in detail with example. 10
 B. What is structured walkthrough and how are they carried out? 10
- Q.5 A. Define software configuration item and how they are used in software configuration process. 10
 B. Explain module coupling and module cohesion. Also explain different types of coupling in detail. 10
- Q.6 A. Explain Degree of Rigor, Task Set Selector and Task Network. 10
 B. What is software maintenance? Describe the various categories of maintenance? Which category consume maximum effort & why? Explain. 10
- Q.7 Write short notes on (any four) 20
- a) Reverse engineering
 - b) Make Buy Decision
 - c) Software Reliability
 - d) Formal Technical Review
 - e) RMMM plan

M.C.A. (Sem - III)
Management Information System
(May-2017)

Q.P. Code : 01553

[Time : 3 Hours]

[Marks : 100]

Please check whether you have got the right question paper.

- N.B:**
1. Question **No. 1** is **compulsory**.
 2. Attempt **any four** out of remaining **six**.
 3. **Elaborate** each answer with the help of an **example**.

1. (a) What are the characteristics of MIS & How does MIS differ from TPS & DSS? **10**
 (b) List the Management Challenges in Building, Maintaining & Operation of Information System. **10**
2. (a) Discuss Positive & Negative impact of Information System. **10**
 (b) A good MIS is an integral part of the Management System. Why so? What would happen if it is no? **10**
3. (a) What is a role of MIS in procurement? Explain with suitable example. **10**
 (b) How the challenges and threats in implementing MIS are overcome? Discuss with suitable example? **10**
4. (a) Discuss the role of information system in Globalization of Education. **10**
 (b) Differentiate between MIS and Electronic Data Processing (EOP). **10**
5. (a) Describe among the following plans : Strategic, Long-Range, Medium-Range and Short-Range. **10**
 (b) What are the parameters of quality Measurement? List and explain in brief how we can call information as a quality product? **10**
6. (a) Highlight the role of Operational models in development of MIS for an organization. **10**
 (b) Explain the value chain model in detail. **10**
7. Explain **any four** of the following terms : **20**
 - (a) TPS
 - (b) Porter's Competitive Model
 - (c) Levitt's Model
 - (d) Types of MIS
 - (e) Supply Chain Management