

**M.C.A (Sem – III)**  
**Object Oriented Programming**  
**C++**  
**April - 2015**

M.C.A. (Sem -III)  
(3 Hours)

QP Code : 19415

April - 2015

[Total Marks : 100

- N.B.:
- (1) Question No. 1 is **compulsory**.
  - (2) Attempt any **four** out of remaining **six** questions.
  - (3) Program should be well documented. Make constructors and destructors are **required**.

1. Write short notes on the following :— 20
  - (a) Aggregation
  - (b) Static data member
  - (c) Keyword Explicit
  - (d) Command Line Arguments.
2. (a) What is multiple inheritance ? What is the ambiguity caused by it ? How is it resolved ? 10  
(b) Write a program to create a student class that has data members – roll number, name. Create 3 records of students, write them to a file and read back the record requested by the use (random retrieval). 10
3. (a) What are friend functions ? How are they defined and accessed ? Explain with example. 10  
(b) What are virtual functions ? How do they help achieve run time polymorphism ? 10
4. (a) Create a class counter and overload - -operator (prefix and postfix) to decrement count. Display the decremented values in the main program. 10  
(b) What is STL and what are its components. Explain each in brief. 10
5. (a) Create a class stack. Handle the exceptions of underflow and overflow in it for push and pop operations. 10  
(b) Explain the use of new and delete operators. 10
6. (a) Create a class Bank Account. Define constructors to open an account. Define methods to deposit, with draw and check balance. 10  
(b) Explain function overloading with example. 10
7. (a) Explain use of array of objects with suitable example. 10  
(b) Explain principal concepts of object oriented programming. 10

**M.C.A (Sem – III)**  
**Data Base Management**  
**Systems**  
**April - 2015**

M.C.A. (Sem -III)

QP Code : 19410 April - 2015

Revised Course  
(3 Hours)

Total Marks: 100

Note:

- Q1 is compulsory.
- Attempt any four out of remaining six questions.
- Assumptions made should be clearly stated.
- Draw the diagrams whenever required

Q 1 Consider a university who has several departments. Each department is managed by a Head, and at least one professor. Professors must be assigned to one, but possibly more departments. At least one professor teaches each course, but a professor may be on sabbatical and not teach any course. Each course may be taught more than once by different professors. We should know of the department name, the professor name, the professor employee id, the course names, the course schedule, the term/year that the course is taught, the departments the professor is assigned to, the department that offers the course.

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

- Q2 (a) Explain the architecture of DBMS. 10  
(b) What is normalization? Explain the two conditions required during normalization through decomposition of data. 10
- Q 3 (a) Explain Bell LaPadula model. 10  
(b) What is functional dependency? How is it different from multi valued dependency When are two sets of functional dependencies are equivalent? 10
- Q 4 (a) What is deadlock? Discuss deadlock detection and prevention techniques. 10  
(b) What is timestamp protocol and how it used for concurrency control? 10
- Q 5 (a) Explain the various levels of abstraction in a database system. 10  
(b) What is an index on a file of records? What is a search key for an index? Why do we need indexes? 10
- Q 6 (a) Differentiate the following(Any two) 10  
i. Primary Memory vs Secondary memory  
ii. Network vs Hierarchical Model  
iii. 3NF vs BCNF
- (b) Explain the various states of transaction 10

QP Code : 19410

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Q7

Write short note on the following (Any four)

20

- i. View
- ii. Weak Entity
- iii. Triggers
- iv. Outer Join
- v. Strict 2PI and Rigrous 2PL

————— XXXX —————



**M.C.A (Sem – III)**  
**Data Communication**  
**Networks**  
**April - 2015**

M.C.A. (Sem -III)

April - 2015

**QP Code : 19412**

**Max. Marks: 100**

**NOTE:**

- ⇒ Question No. 1 is Compulsory.
- ⇒ Each question carries **equal mark [20 Marks each]**.
- ⇒ Attempt only four questions from 2 to 7.

- Q.1.** **10**
- A. Explain why layered architecture is preferred in communication model. Explain ISO-OSI Reference model. Compare ISO and TCP/IP.
- B. Define Congestion. Discuss the various methods of preventing and detecting congestion. **10**
- Q.2.**
- A. Explain the principle of optical fiber transmission and describe the components of optical fiber cable. What are advantages of optical fiber cable over twisted pair and coaxial cable? **10**
- B. Explain any two IEEE 802 standards with the format of the frames. **10**
- Q.3.**
- A. A multistage switch has three stages with four, three, and four switches respectively in each of the stages. Each of the first stage switches has 5 inputs and 3 outputs, each of the second stage switches has 4 inputs from first stage and 4 outputs, and each of third stage switches has 3 inputs from second stage and 5 outputs. **10**
- i. Give a diagrammatic representation.
  - ii. How many crosspoints are needed in the multistage switch?
  - iii. How many crosspoints are needed if we use a single switch?
  - iv. How much efficiency is improved if we use a three stage switch instead of one?
- B. What is bit stuffing? Explain as it is used in HDLC. What are the different types of frames used in HDLC. **10**
- Q.4.** **10**
- A. What is the least cost algorithm? State the difference between Dijkstra's algorithm and the Bellman Ford algorithm? Will both the algorithm yield the same route from the source to the destination? Why or why not? **10**
- B. What is the difference between CSMA and CSMA/CD and collision free protocol? Explain any one collision free protocol. **10**
- Q5.**
- A. i. The codeword 1111101101 was received. Correct errors, if any using Hamming code algorithm. **5**
- ii. The subnet mask 255.255.240.0 and IP address 150.215.017.009. Calculate subnet addresses and how many subnet could you form? **5**
- B. i. Calculate the CRC for the following bit stream: 11101011011 with the generator polynomial  $x^3+x+1$  **5**
- ii. To digitize human voice, what is the bit rate assuming eight bits per sample. **5**
- Q.6.**
- A. Explain three way hand-shake as used in TCP connection. **10**
- B. What is public-key cryptography and what are public and private keys? With the help of an example describe the RSA algorithm for encryption of data.

(2)

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Q.7. Write short notes on (any **four**)

**20**

- i. PAM, PWM and PCM
  - ii. HTTP and DNS
  - iii. Sliding window protocol
  - iv. IPv4
  - v. SMTP
- 



Time: 3 Hrs

Total Marks: 100

N.B 1. Question No.1 is compulsory

2. Attempt any four questions out of the remaining six questions
3. Figures to the right indicate marks
4. Use of scientific calculator is allowed

Q1

Two firms are competing for business under conditions so that one firm's gain is another firm's loss. Firm A's pay-off matrix is given below

		Firm B		
		No advertising	Medium advertising	Heavy advertising
Firm A	No advertising	10	5	-2
	Medium advertising	13	12	15
	Heavy advertising	16	14	10

Suggest the optimum strategies for the two firms

(10)

- a) Use simplex method to solve the LPP

$$\text{Minimize } Z = x_1 - 3x_2 + 2x_3$$

$$\text{Subject to: } 3x_1 - x_2 + 3x_3 \leq 7$$

$$-2x_1 + 4x_2 \leq 12$$

$$-4x_1 + 3x_2 + 8x_3 \leq 10$$

$$x_1, x_2, x_3 \geq 0$$

(10)

Q2

- a) A book binder has one printing press, one binding machine and manuscripts of a number of different books. The time required in minutes to perform the printing and binding operations for each book are known. We wish to determine the order in which books should be processed in order to minimize the total time required to turn out all the books. And also the idle time of printing and binding machines

2

QP Code : 19419

Book	1	2	3	4	5	6
Printing time	30	120	50	20	90	110
Binding time	80	100	90	60	30	10

(10)

b). In a constructing company five supervisors are to be assigned to five construction sites. To make the process easy, the company has asked the supervisors to state their preference scores by giving each construction site a number out of 10. The higher the number the greater the preference is. Certain sites are not suitable to some of the supervisors due to domestic problems. These are marked as X.

Supervisor	1	2	3	4	5
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 supervisors to construction site in order to meet as many preferences as possible. (10)

Q3

a) Consider the data shown below for the crashing and costs of a project

Activity	Normal time(days)	Crash time(days)	Normal cost(Rs)	Crash cost(Rs)
1-2	5	4	170	240
1-3	9	6	310	550
2-3	6	4	80	200
2-4	10	8	130	230
3-4	6	4	110	290

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- i) Draw the network diagram for the above data and identify the critical path  
 ii) What is the optimal project duration and the corresponding cost.

The indirect cost is Rs 120 per day. (10)

- b) Use two phase method to solve the following LPP

$$\text{Maximize } Z = 2x_1 + 3x_2 - 5x_3$$

$$\text{Subject to : } x_1 + x_2 + x_3 = 7$$

$$2x_1 - 5x_2 + x_3 \geq 10$$

$$x_1, x_2, x_3 \geq 0 \quad (10)$$

Q4

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

	A	B	C	D	E
P	4	1	3	4	4
Q	2	3	2	2	3
R	3	5	2	4	4

The availability at the centers P, Q, R are 60, 35, 40 and the demand at the depots are 22, 45, 20, 18, 30 respectively. What should be the optimum distribution schedule? (10)

- b) Use Big M method to minimize  $Z = 2x_1 + 8x_2$

$$\text{Subject to : } 5x_1 + 10x_2 = 150$$

$$x_1 \leq 20$$

$$x_2 \geq 14$$

$$x_1, x_2 \geq 0$$

(10)



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Q5

a)

The following are set of activities and different time estimates for a project in days

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

- i) Draw the network. Determine the expected task times and their variances.  
 ii) Find the earliest and latest expected times for each node. Find the critical path.  
 What is the probability of completing the project in 27 days [ $P(z=.35) = 0.1368$ ]

(10)

b)

Use Gomory's technique to solve the following problem

$$\text{Maximize } Z = 2x_1 + x_2$$

$$\text{Subject to : } 2x_1 + 5x_2 \leq 17$$

$$3x_1 + 2x_2 \leq 10, \quad x_1, x_2 \geq 0 \text{ and integer}$$

(10)

Q6

- a) A firm makes two types of furniture, chair and tables. The contribution for each product as calculated by the accounting department is Rs 20/ per chair and Rs35/ per table. Both products are processed on three machines M1, M2 and M3. The time required in hours by each product and total time available in hour per week on each machine are as follows.

Machine	Chair	Table	Available Time
M1	3	3	36
M2	5	2	50
M3	2	6	60

How should the manufacturer schedule his production in order to maximize contribution?  
Formulate as LPP and solve graphically.

(10)

b) Solve the following LPP by Dual simplex method

$$\text{Minimize } Z = 10x_1 + 6x_2 + 2x_3$$

$$\text{Subject to : } x_1 - x_2 + x_3 \geq 1$$

$$3x_1 - x_2 - x_3 \geq 2$$

$$x_1, x_2, x_3 \geq 0$$

(10)

Q7

a) Write short notes on

i) Inventory problem

ii) Creation of Dual from primal LPP

(10)

b) The initial cost of a machine is Rs 30000 and running cost which increases with age of the machine is given below

Year	1	2	3	4	5	6	7
Running cost	5000	6000	8000	10000	13000	16000	20000

What is the replacement policy? When this machine is to be replaced?. The rate of interest is 10% and scrap value is nil

(10)

**M.C.A (Sem – III)**  
**Software Engineering**  
**April - 2015**

M.C.A. (Sem -III)

**QP Code : 19422**

April - 2015

**Max. Marks: 100**

**Time: 3hrs**

- 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) Automated teller machine (ATM) having a magnetic strip reader for reading an ATM card, a customer console (keyboard and display) for interaction with the customer, a slot for depositing envelopes, a dispenser for cash (in multiples of Rs.100), a printer for printing customer receipts, and a key-operated switch to allow an operator to start and stop the machine. The ATM will communicate with the bank's computer over an appropriate communication link. The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) and amount both of which will be sent to the bank for validation as part of each transaction. The customer will then be able to perform one or more transactions. The card will be retained in the machine until the customer indicates that he/she desires no further transactions. For the above system draw CLD, DFD up to second level, and data dictionary. [10]
- (b) What is Spiral model? How is the Spiral model useful in Software engineering? Discuss its advantages and disadvantages. [10]
- Q.2) (a) Explain in detail Risk Identification and Risk Projection. [10]
- (b) What is meant by Software reliability? Explain Capability Maturity Model. [10]
- Q.3) (a) What are size metrics? How a function point metric has advantage over LOC metric? Explain. [10]
- (b) Explain McCall's software quality model in details. [10]
- Q.4) (a) Enlist and explain the steps required to perform a cost estimation using COCOMO model. [10]
- (b) Explain the different levels and methods of software testing. [10]
- Q.5) (a) Explain Degree of Rigor, Task set selector and Task Network. [10]
- (b) Define software design. Explain the features of good software design. Explain the relationship of coupling and cohesion with functional independence. [10]
- Q.6) (a) Explain the term Software Requirement Specification. [10]
- (b) What are the requirements of a good system analyst? [10]
- Q.7) Write short notes on (any four): [20]
- (a) List of Deliverables  
(b) Structure chart  
(c) Software Configuration Management  
(d) Art of debugging  
(e) Waterfall Model

**M.C.A (Sem – III)**  
**Management Information**  
**System**  
**April - 2015**

M.C.A. (Sem -III)

April - 2015

**QP Code : 19425**

(3 Hours)

[ **Total Marks : 100**

- N. B. :** (1) Question No. 1 is compulsory.  
(2) Solve any four questions from Q.No. 2 to Q. No. 7.  
(3) All Questions carries equals 20 marks.

1. (a) Explain the different criteria which can be used in Decision Making with Herbert-Simon Model. **10**  
(b) Explain the role of MIS in Enterprise System and explain it's application **10**
2. (a) How you measures the quality parameter in development of MIS? **10**  
(b) Explain the various methods of collecting information and what are the factors are essentials for quality of information. **10**
3. (a) Explain various models / tools are used in Decision Support System. **10**  
(b) Enlist all the methods use to avoid misuse of Information. **10**
4. (a) Explain the application of MIS in manufacturing sectors with one example of Marketing Management. **10**  
(b) Explain the role of Information Technology evaluation in Decision Making. **10**
5. (a) Explain the importance of Data Validation and Transaction Validation in relation to the quality of information. **10**  
(b) Explain with example Goals, Strategies and Objectives. How they are relevant to MIS. **10**
6. (a) Explain the role of MIS in Enterprise Organization at differentstrategic Management Level. **10**  
(b) Write case study on role of MIS in Insurance Sector. **10**
7. Write Short notes on following.( Any Four) **20**
  - (a) Supply Chain Management
  - (b) Artificial Intelligence
  - (c) Knowledge based Expert System
  - (d) Information System Concepts
  - (e) ERP in Decision Making.