

**MCA (SEM - III)**  
**Object Oriented Programming C++**  
**(Paper – I) MAY: - 2016**

**QP Code : 26593**

**(3 Hours)**

**[Total Marks : 100**

Note: [1] Question no.1 is compulsory.  
[2] Attempt any four from remaining six.

- Q.1:(a)What is meant by object initialization? What is its need? Explain with the help of a suitable example. 10  
(b)What is a friend function? Explain its need and importance in object oriented programming 10
- Q.2:(a)Write a short note on operator overloading & function overriding with examples. 10  
(b)What is Inheritance? What are the different visibility modes observed while deriving a class from a base class? 10
- Q.3: (a)Write a program to overload the + operator to concatenate two strings. 10  
(b)What are virtual functions and pure virtual functions? Explain their utility with the help of an example. 10
- Q.4:(a)What is Exception Handling and how is it implemented in C++? Elaborate it with the help of an example. 10  
(b)Write a C++ program to store temperature of two different cities for a week and display it. 10
- Q.5:Differentiate between the following with examples: 20  
I. Constructors and destructors  
II. call-by-value and call-by-reference  
III. try, catch &throw  
IV. this pointer
- Q.6:(a)What do you mean by templates? Explain the creation and usage of function templates for executing linear search on an array. 10  
(b)What is the concept of polymorphism in object oriented programming? Explain with the help of an example. 10
- Q.7:(a)Create a class student containing data members as Roll-no, Stu\_name, Stu\_address, Stu\_class, Stu\_dob, Stu\_percentage. 20  
Include member functions to accomplish the following :  
(i) Design a constructor to automatically generate Roll\_no for the students.  
(ii) Accept student details from the user.  
(iii) Calculate the student age from his birth year.  
(iv) Assign grade to the student as follows :
- Grade percentage criteria  
A - 100 < Percentage => 90%  
B - 90 < percentage => 80%  
C - 80 < percentage => 70%  
D - 70 < percentage => 60%  
E - percentage < 60

Write appropriate main function for the above.

**MCA (SEM - III)**  
**Data Base Management Systems**

**(Paper – II)**

**MAY: - 2016**

**QP Code : 26586**

**(3 Hours)**

**[Total Marks: 100**

N.B.: (1) Question No. 1 is **Compulsory**.

(2) Attempt any **four** questions from the remaining **six** questions.

(3) Answers to questions should be **grouped** and written **together**.

(4) Draw the **diagrams** wherever **required**.

- Q.1 (a) A local authority wishes to keep a database of all its schools and the school children that are attending each school. The system should also be able to record teachers available to be employed at a school and be able to show which teachers teach which children and in which school. Each school has one head teacher whose responsibility is to manage their individual school. 10

Construct an ER diagram for the above school system. Document all assumptions that you make for designing.

- (b) Write schema definition and normalize all tables to 3NF for the above ER diagram. 10

- Q.2 (a) What is transaction? Explain the ACID properties of transaction. 10

- (b) Explain Bell-LaPadula model with example 10

- Q.3 (a) Discuss the various steps of processing a high level query. 10

- (b) What is serializability? Explain conflict serializability. 10

- Q.4 (a) Explain the architecture of DBMS. 10

- (b) What is deadlock? Discuss deadlock detection and prevention techniques. 10

- Q.5 (a) What is normalization? What are the two required conditions for normalization through decomposition of data? 10

- (b) Discuss hash based indexing in detail. 10

- Q.6 (a) Find the candidate keys and closure for given set of functional dependencies. 10

Consider the relation R(A, B, C, D, E) with following functional dependencies

$A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A.$

- (b) Differentiate the following 10

(i) Physical and Logical data independence

(ii) Generalization and Specialization

- Q.7 Write short notes on any **four** of the following:-- 20

(a) Triggers

(b) Views

(c) Strict 2PL

(d) Network model

(e) Outer Join

**MCA (SEM - III)**  
**Data Communication Networks**  
**(Paper – III)**  
**MAY: - 2016**

**QP Code : 26588**

(3 Hours)

[Total Marks :100]

**Note:**

- a) Question No. 1 is compulsory
  - b) Attempt any four from the remaining six questions
  - c) Answers to sub questions should be answered together
  - d) Illustrate answers with diagrams wherever necessary
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- Q1. (a) Why OSI model was created? How it works? Explain the difference between OSI and TCP/IP model. 10
- (b) What are wired transmission impairments? Discuss different types of impairments that can affect the wired transmission. 10
- Q2. (a) Describe ALOHA multiple access techniques and its different forms with performance. 10
- (b) What are the salient features of IEEE 802.5 and 802.11? 10
- Q3. (a) What are error correction codes? Construct the hamming code for the bit sequence 10011101. 10
- (b) Differentiate between distance vector routing and link state routing. 10
- Q4. (a) With respect to the IP address - Discuss Class A,B,C,D and E addresses, sub-netting, masking and super-netting. 10
- (b) Explain Sliding Window Protocol with example. Explain the concept of Go Back n and Selective Repeat. 10
- Q5. (a) Discuss the use of hub, bridges, switch, router and gateway in networking. Also specify the layers in which they are used. 10
- (b) Explain PCM (Pulse code Modulation) 10
- Q6. (a) What is network security? Explain the DES algorithm for symmetric encryption. 10
- (b) Discuss various collision free protocols. 10
- Q7. Write short notes on: (Any Four) 20
- a. DHCP
  - b. GEO,LEO and MEO
  - c. Flooding
  - d. DNS
  - e. HDLC

**MCA (SEM - III)**  
**Operation Research**  
**(Paper – IV)**  
**MAY: - 2016**

**QP Code : 26595**

**(3 Hours)**

**Total Marks: - 100**

**N.B.**

1. Question no.1 is compulsory.
2. Attempt any four questions from the remaining six questions.
3. Figures to the right indicate full marks

- 1 (a) A factory manufactures two articles A and B. To manufacture article A, a certain machine has to be worked for 1.5 hours and in addition a craftsman has to work for 2 hours. To manufacture article B, the machine has to be worked for 2.5 hours and in addition the craftsman has to work for 1.5 hours. In a week the factory can avail of 80 hours of machine time and 70 hours of craftsman's time. The profit on each article of A is Rs.5 and that on each article B is Rs. 4. If all the articles produced can be sold away, find how many of each kind should be produced to earn maximum profit per week. Formulate and solve the linear programming problem. (10)

- (b) A project consists of 8 activities with the following information (10)

Activity	Immediate Predecessor	Estimated duration (days)		
		Optimistic	Most Likely	Pessimistic
A	----	1	1	7
B	----	1	4	7
C	----	2	2	8
D	A	1	1	1
E	B	2	5	14
F	C	2	5	8
G	D,E	3	6	15
H	F,G	1	2	3

- Draw the PERT network
- Find expected project completion time
- Find the latest and earliest expected times for each node
- Find the critical path

- 2 (a) Use Simplex method to solve the following LPP: (10)  
 Maximize  $z = 50x_1 + 70x_2$   
 Subject to  
 $x_1 + x_2 \leq 70$   
 $x_1 + 2x_2 \leq 100$   
 $2x_1 + x_2 \leq 120$   
 $x_1, x_2 \geq 0$

**[TURN OVER**

- 2 (b) Obtain an initial basic feasible solution to the following transportation problem using (10)
- North-West Corner Method
  - Least Cost Method

Warehouse	Stores				Availability
	I	II	III	IV	
A	7	3	5	5	34
B	5	5	7	6	15
C	8	6	6	5	12
D	6	1	6	4	19
Demand	21	25	17	17	80

- 3 (a) An automobile dealer wishes to put four repairmen to four different jobs. The repairmen have different kinds of skills and exhibit different levels of efficiency from one job to another. The dealer has estimated the number of manhours that would be required for each job-man combination. This is given as follows: (10)

Man	Job	A	B	C	D
1		5	3	2	8
2		7	9	2	6
3		6	4	5	7
4		5	7	7	8

Find the optimum assignment that will result in minimum manhours needed

- (b) Solve using Big M method the following LPP (10)

$$\text{Maximize } z = 2x_1 + 3x_2 + 4x_3$$

Subject to

$$3x_1 + x_2 + 6x_3 \leq 600$$

$$2x_1 + 4x_2 + 2x_3 \geq 480$$

$$2x_1 + 3x_2 + 3x_3 = 540$$

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

- 4 (a) XYZ manufacturing company is using a machine whose purchase price is Rs 65000. The installation charges amount to Rs 18000 and the machine has a scrap value of Rs 8000. The maintenance cost in various years is given as following (10)

Year	1	2	3	4	5	6	7	8	9
Maintenance Cost in Rs	1250	3750	5000	7500	10500	14500	20000	24000	30000

Determine after how many years should the machine be replaced?

**[TURN OVER**

- 4 (b) Use two phase method to (10)  
 Maximize  $z = 2x_1 + 3x_2 - 5x_3$   
 Subject to  
 $x_1 + x_2 + x_3 = 7$   
 $2x_1 - 5x_2 + x_3 \geq 10$   
 $x_1, x_2, x_3 \geq 0$

- 5 (a) Six jobs have to be processed at three machines A, B and C in the order ABC. The time taken (10)  
 by each job on each machine is indicated below. Each machine can process only one job at  
 a time

Job	J1	J2	J3	J4	J5	J6
Machine						
A	12	8	7	11	10	5
B	7	10	9	6	10	5
C	3	4	2	5	1.5	4

Determine the sequence for the jobs so as to minimize the processing time

- (b) Solve the following problem by dual simplex method (10)  
 Minimize  $z = x_1 + 2x_2 + 3x_3$   
 Subject to  
 $2x_1 - x_2 + x_3 \geq 4$   
 $x_1 + x_2 + 2x_3 \leq 8$   
 $x_2 - x_3 \geq 2$   
 $x_1, x_2, x_3 \geq 0$

- 6 (a) Write short notes on (10)  
  - Inventory Problem
  - Branch and Bound algorithm for Travelling Salesman Problem

- (b) Find the optimal strategies and the value of the game where payoff matrix of the two (10)  
 players are given by

	B1	B2	B3
A1	2	6	1
A2	8	4	6
A3	1	2	1

[TURN OVER

- 7 (a) A small assembly plant assembles PCs through 9 interlinked stages according to the following process (10)

Activity	1-2	1-3	1-4	2-4	2-5	3-6
Duration	4	12	10	8	6	8
Activity	4-6	5-7	6-7	6-8	7-8	8-9
Duration	10	10	0	8	10	6

Draw a network and find the critical path. Tabulate total float, free float and Independent float

- (b) Solve using Gomory's cutting plane method (10)

Maximize  $z = 5x_1 + 7x_2$

Subject to

$$-2x_1 + 3x_3 \leq 6$$

$$6x_1 + x_2 \leq 30$$

$$x_1, x_2 \geq 0 \text{ and integer}$$

**MCA (SEM - III)**  
**Software Engineering**  
**(Paper – V)**  
**MAY: - 2016**

**Q.P. Code : 26599**

(3 Hours)

[ Total Marks : 100

- 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

- |        |  |    |
|--------|--|----|
| 1. (A) | Explain the Agile model and concurrent model?  | 10 |
| (B)    | Explain COCOMO -I model in detail.   | 10 |
| 2. (A) | Explain WBS in detail with example.  | 10 |
| (B)    | What is structured walkthrough and how they are carried out?   | 10 |
| 3. (A) | Describe any two software size estimation techniques.  | 10 |
| (B)    | Compare and contrast White box and black box testing.  | 10 |
| 4. (A) | What is meant by Software reliability? Explain different reliability metrics.<br>Explain any one reliability growth model. | 10 |
| (B)    | What are the components of use case diagram? Explain the usage with Suitable diagram.                                      | 10 |
| 5. (A) | Explain McCall's software quality model in details.  | 10 |
| (B)    | Explain SEI Capability Maturity Model (CMM).   | 10 |
| 6. (A) | Explain in brief module coupling and module cohesion.  | 10 |
| (B)    | List and explain different decomposition techniques with suitable example.   | 10 |
| 7.     | Write short notes on (any <b>four</b> ):   | 20 |
| (a)    | RAD model  |    |
| (b)    | SRS  |    |
| (c)    | Reverse Engineering  |    |
| (d)    | Formal technical review  |    |
| (e)    | Putman Model   |    |



**MCA (SEM - III)**  
**Management Information System**  
**(Paper – VI)**  
**MAY: - 2016**

Q.P. Code : **26602**

(3 Hours)

[ Total Marks : 100

**N.B. :** (1) Question No.1 is **compulsory**.

(2) Attempt any **FOUR** out of the remaining **SIX** questions.

(3) **Figures** to the right indicate **full marks**

1. a) What is Information? Explain the concept of Information? Explain the contemporary approach to information. 10  
(b) What is MIS? Explain the major types of system in organization. 10
2. (a) Explain the Porter's Competitive model. 10  
(b) What are the different functions of a manager and how MIS helps to achieve them? 10
3. (a) What is Business process? Explain the types of Business information from a functional perspective 10  
(b) What are the contents of MIS plan? What is the purpose of each of them? 10
4. (a) What are the difference between top management, middle management and operation management plan in terms of goal, scope and content ? 10  
(b) What is bullwhip effect? How supply management helps to reduce the bullwhip effect? 10
5. (a) Distinguish between long-range and short-range planning? Why a long-range plan is necessary in development of MIS? 10  
(b) "The selection of Information Technology is a Strategic Decision in MIS development". Explain it. 10
6. (a) What are the parameters used in the evaluation of IT before decision is made? 10  
(b) What are the problems does the System Analyst face in Ascertaining the information requirement at various level of management and how these problems tackled? 10
7. Write short notes on 20
  - (i) Expert system
  - (ii) Simon's Decision model
  - (iii) CRM
  - (iv) Levitt's model