



MET

INSTITUTE OF COMPUTER SCIENCE

UNIVERSITY QUESTION PAPERS (ICS)

EXAM PAPER NOV-2011

SEM-III

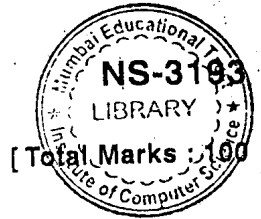
SR.NO	SUBJECT	REMARK
1	OBJECTED ORIENTED PROGRAMMING C++	✓
2	DATABASE MANAGEMENT SYSTEM	✓
3	DATA COMMUNICATION NETWORKS	✓
4	OPERATION RESEARCH	✓
5	SOFTWARE ENGINEERING	✓
6	MANAGEMENT INFORAMTION SYSTEM	✓

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5: 2nd Half-Exam.-11 mins (a).

Con. 5922-11.

(3 Hours)



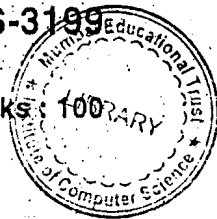
- N. B. : (1) Question No. 1 is compulsory.
(2) Solve any four from the remaining questions.
(3) Answers to sub-questions should be grouped together.

- Q.1 A. What are inline functions? Explain its use with an example. (10)
B. Describe various modes available in C++ to open files. (10)
- Q.2 A. Explain the use of pointers to objects. Give an example. (10)
B. Explain how run-time errors can be handled using exceptions in C++. (10)
- Q.3 A. What are manipulators? Explain various types of manipulators in C++. (10)
B. A company wants to implement an automated attendance monitoring system for its employees. The work timings for every employee is 8 hours per day, five days a week. The employees have the flexibility to work for 8 hours anytime in between 8AM and 8PM. For every full day of work, the employees are paid rupees one thousand. Salary on a pro-rata basis is deducted for less work.
Write a C++ program to accept the information about employees (Name, Employee ID, Department, Date of Work and Hours worked on that date). Calculate the salary of each employee and print a salary sheet, department wise. Create at least two classes with two functions each. (10)
- Q.4 A. What is a constructor? How are they useful? Explain with an example the use of constructor overloading. (10)
B. Write a program to store the logs of calls made by prepaid customers of a telephone company. Store the data in a file and display the call summary and balance, customer wise. (10)
- Q.5 A. Write a C++ program to overload the operator '*' to concatenate two strings. Do not use any standard library string handling functions. (10)
B. Explain the use of Class Templates. Design a class template to multiply three numbers. The numbers to be multiplied should be accepted as input from the user. (10)
- Q.6 A. Explain different types of inheritance supported by C++ with examples of each. (10)
B. Discuss the use of making a member function static. How are they defined and accessed. (10)
- Q.7. Write short notes on any four of the following: (20)
i) *new* operator
ii) Container Class
iii) *seekg* function
iv) *this* pointer
v) STL
vi) *protected* visibility specifier

FOR REFERENCE USE ONLY

(3 Hours)

[Total Marks: 100]



- N. B. :
- (1) Question No. 1 is compulsory.
 - (2) Attempt any four out of remaining six questions.
 - (3) Assumptions made should be clearly stated.
 - (4) Answers to questions should be grouped and written together.
 - (5) Draw diagrams wherever required.

Q1: A large bank has several branches at different places. Each branch is managed by a manager, each branch maintains the account details of the customer. The customer may open the saving, current and FD accounts as single and joint operations. The bank also provides the loan for various purposes. Bank keeps record of each transaction by the customer to his account. All the branches have employees for different operations. (20)

- (a) Construct an ER diagram for the Banking application. Document all assumptions that you make for designing.
- (b) Write schema definition and normalize all tables to 3NF for the above diagram.

Q2 (a): Consider the following relational schema: (10)

Employee (person name, street, city)
Works (person name, company name, salary)
Company (company name, city)
Underlines indicates key.

Write SQL Query for the following:

- (i) Find the names of all employees who earn more than employee of SBI Bank.
- (ii) Find the names street address and cities of residence of all employees who work for SBI Bank and earn more than \$ 15,000.
- (iii) Find the company with the most employees.
- (iv) Give all employee of Canara Bank a 15 percent salary hike.
- (v) Find the names of all employees who live in the same city as the company for which they work.

Q2 (b): Differentiate Any Two of following: (10)

- (i) Strong v/s Weak Entity.
- (ii) Aggregation and Association.
- (iii) Structured indexing and Hash Based Indexing

Q3 (a): Briefly explain the architecture of database system. Explain how it is different from the conventional file system. (10)

Q3 (b): What is transaction? Explain ACID properties of transaction. (10)

Q4 (a): What is locking protocol? Explain strict two phase and rigorous two phase protocol. (10)

Q4 (b): Explain the terms Lossless join decomposition and Dependency preservation Decomposition with suitable examples (10)

Q5 (a) : Write a detail note on Query Optimization. (10)

Q5 (b): Explain the roles and responsibilities of DBA? (10)

Q6 (a): What is data model? Explain network model with its advantages and disadvantages. (10)

Q6 (b): What is deadlock? Describe and compare deadlock detection and prevention techniques. (10)

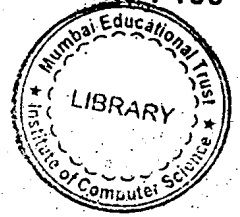
Q7: Write short notes on any four--- (20)

- | | |
|-------------------|-------------------|
| (a) Candidate key | (b) Shadow paging |
| (c) RAID | (d) Views |
| (e) Triggers | |

(3 Hours)

[Total Marks : 100

- Note : 1) Question No. 1 is compulsory
 2) Attempt any four from Q No. 2 to Q No. 7
 3) Figures to right indicate marks
 4) All questions carry equal marks
 5) Answers to sub questions should be answered together
 6) Make assumptions wherever required and state them clearly



- Q1. A. Explain any two IEEE 802 standards with the format of the frames. 10
- B. What is a window? Explain the concept of sliding window. Explain in short the two methods used in sliding window protocol along with the window sizes required at the sender and the receivers side and why? 10
- Q2. A. Discuss the unguided transmission medium. 10
- B. i) Calculate the VRC, LRC and checksum for the following bit stream
 1101101 1110001 0010101 1011010
 ii) Calculate the CRC for 100101000111 using the generator divisor 110011 10
- Q3. A. Define congestion. Discuss the various methods of preventing and reducing the in congestion in the network 10
- B. What is network security? Explain symmetric and asymmetric methods to make the data secure and explain the RSA algorithm in detail. 10
- Q4. A. Explain any two application layer protocols 10
 i. SMTP ii) FTP iii) E-mail
- B. What is a satellite? Discuss the various categories of satellites 10
- Q5. A. What are the services provided by the network layer? Explain the Bellman Ford Routing algorithm. 10
- B. Explain the protocols that are used for resolving the addresses at the network layer. 10
- Q6. A. Discuss the concept of layered communication model. Explain the OSI reference model and compare it with the TCP/IP 10
- B. What is signaling? What layer does the job of signaling and how? Explain 4 methods to convert digital data to digital signal. 10
- Q7. Write short notes on any four of the following 20
 i) Multiplexing ii) Switching
 iii) Multicasting iv) IPv6 v) Four-way handshake in TCP

Subj. Operation-Research
Date: 8/12/2011

V.T. (cb-11) Con-1

Con. 5761-11.

(REVISED COURSE)

(3 Hours)

[Total Marks : 100]



- 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) An advertising company wishes to plan an advertising campaign in three different media, television, radio and magazines. The purpose is to reach as many potential customers as possible. Results of market study are as follows: [10]

	Television		Radio (Rs.)	Magazine (Rs.)
	Prime day (Rs.)	Prime time (Rs.)		
Cost of an advertising Unit	40,000	75,000	30,000	15,000
Number of potential Customer reached per unit	4,00,000	9,00,000	5,00,000	2,00,000
Number of women Customer reached per unit	3,00,000	4,00,000	2,00,000	1,00,000

Company doesn't want to spend more than 800000 on advertisement. It is further required that-

- (i) At least 2 million exposures take place among women.
- (ii) Advertising on television should be limited to Rs. 5,00,000.
- (iii) At least 3 advertising units be bought on prime day and two units during prime time.
- (iv) The number of advertising units on radio and magazine should each be between 5 & 10.

Formulate the LP model. (Do not solve)

b) A project is composed of 7 activities whose time estimates (in weeks) are given in the table below:- [10]

Activity	1-2	1-3	1-4	2-5	3-5	4-6	5-6
Optimistic time estimate	1	1	2	1	2	2	3
Most likely time estimate	1	4	2	1	5	5	6
Pessimistic time estimate	7	7	8	1	14	8	15

Draw the project network and find the expected duration and variance of each activity. What is the expected project length? Calculate the variance and standard deviation of the project length. What due date has about 90% chance of meeting the date? [Given $P(0 \leq Z \leq 1.28) = 0.40$]

2 a) Use simplex method to Maximize $z = 3x_1 + 5x_2 + 4x_3$ [10]

Subject to:

$$2x_1 + 3x_2 \leq 8,$$
$$2x_1 + 5x_3 \leq 10,$$
$$3x_1 + 2x_2 + 4x_3 \leq 15$$
$$x_1, x_2, x_3 \geq 0$$

[TURN OVER

FOR REFERENCE USE ONLY

b) Find the initial basic feasible solution using Vogel's Approximation Method for the following transportation problem with three warehouses and four markets. The warehouse capacities are $a_1=3$, $a_2=7$, and $a_3=5$. The market demands are $b_1=4$, $b_2=3$, $b_3=4$ and $b_4=4$. The unit costs of shipping are given by the following table. [10]

		Market			
		M ₁	M ₂	M ₃	M ₄
Warehouse	W ₁	2	2	2	1
	W ₂	10	8	5	4
	W ₃	7	6	6	8

3 a) Use big M-method to minimize $Z = 40x_1 + 24x_2$ [10]

Subject to: $20x_1 + 50x_2 \geq 4800$

$80x_1 + 50x_2 \geq 7200$

$x_1, x_2 \geq 0$

b) There are four professors each of capable of teaching any one of the four different courses. Class preparation time in hrs for different topics varies from professor to professor and is given in the table below. Each professor is to be assigned exactly one course. Assign the courses to professors so as to minimize the total course preparation time for all of them: [10]

Professor	Class Preparation Time			
	Linear Programming	Queuing Theory	Dynamic Programming	Regression Analysis
A	2	10	9	7
B	15	4	14	8
C	13	14	16	11
D	4	15	13	9

4 a) Solve the problem below by dual simplex method. [10]

Minimize: $z = 3x_1 + 2x_2$

Subject to: $x_1 + x_2 \geq 1$

$x_1 + x_2 \leq 7$

$x_1 + 2x_2 \geq 10$

$x_1, x_2 \geq 0$

b) Six jobs have to be processed at three machines A, B, C in order ACB. The time (in hrs) taken by each job on each machine is indicated below. [10]

	Jobs					
	I	II	III	IV	V	VI
M/C A	12	8	7	11	10	5
M/C B	7	10	9	6	10	5
M/C C	3	4	2	5	5	4

Determine the sequence for the jobs so as to minimize the processing time. Determine total elapsed and idle time of each machine A, B, C.

5 a) (i) What is Inventory problem. Explain the following terms associated with inventory problem. (1) Setup cost (2) holding cost. [5]

(ii) Write the dual of the following LPP. [5]

$$\text{Minimize: } z = x_1 + x_2 + x_3$$

$$\text{Subject to: } x_1 - 3x_2 + 4x_3 = 5$$

$$x_1 - 2x_2 \leq 3$$

$$2x_2 - x_3 \geq 4$$

$$x_1, x_2 \geq 0, x_3 \text{ is unrestricted in sign.}$$

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

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

$$\text{Subject to: } 3x_1 + 2x_2 \leq 5$$

$$x_2 \leq 2$$

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

6 a) Explain the following with suitable example [10]

(i) Redundant constraints in LPP. (ii) Pure and mixed strategies in game theory.

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 this rate.

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

The engineer learns that "in the field" replacement costs Rs. 80 per hose while it costs 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]

7 a) Draw the network diagram. Find total, free and independent floats. [10]

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

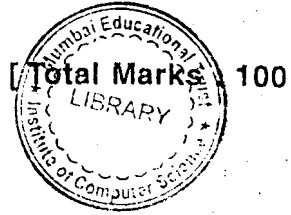
b) Consider the following two-person zero sum game, player A being maximizing player and matrix elements represent gains of player A. Find the optimum strategies and value of the game. [10]

	Player B		
Player A	7	3	1
	1	7	3
	0	1	7

Con. 5760-11.

Sub:- Software Engineering
MCA - Sem - III - Nov - 11
(3 Hours)

NS-3196



- Note: 1. Q.1 is compulsory.
2. Attempt any four out of remaining.

Q.1	A	Compare hardware reliability with software reliability	05
	B	Discuss infrastructure sector of COCOM-II	05
	C	Consider a project with the following functional units: 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.	05
	D	An application has the following: 10 low external inputs, 12 high external outputs, 20 low internal logical files, 15 high external interface files, 12 average external inquiries, and a value of complexity adjustment factor of 1.10. What are the unadjusted and adjusted function point counts?	05
Q.2.	A	What is software reliability? Explain Capability Maturity Model	10
	B	What is path testing? Explain cyclometric complexity with suitable example.	10
Q.3	A	What are the components of use case diagram? Explain their usage with the help of example.	10
	B	List and explain different decomposition techniques with suitable examples.	10
Q.4	A	Describe the equivalence class testing method. Compare this with boundary value analysis techniques	10
	B	What do you understand by system testing? List and explain different kinds of system testing.	10
Q.5	A	What is requirements engineering? List and explain different steps in requirement engineering.	10
	B	Describe any two software size estimation techniques.	10
Q.6	A	What is software engineering? explain role of management in software development.	10
	B	Define module coupling and module cohesion also explain different types of coupling in detail.	10
Q.7		Write short notes on (any four):	20
	A	RMMM plan	
	B	WBS	
	C	Software reliability	
	D	Make buy decision	
	E	Status reporting	

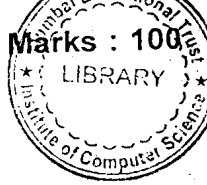
Con. 5762-11.

(REVISED COURSE)

(3 Hours)

[Total Marks : 100]

NS 3205

**N.B.:**

1. Question 1 is compulsory.
2. Answer any four out of remaining six Questions.
3. Answers to questions should be grouped and written together.

- 1 a) Explain the terms business function and business process. What are the different types of Business information System? Explain giving suitable example/s. 10
- b) What are the different stages in decision making process? State the difference between structured and unstructured decisions 10
- 2 a) Explain the relationship between organisation and system. What is behavioral view and features of the organisations? 10
- b) Explain the role of Systems Analyst in development of MIS 10
- 3 a) Distinguish between Top, Middle and Operational Management in terms of focus on planning, focus on control, time frame, scope of activity, level of complexity and type of information required. 10
- b) Define the terms data and information. What are the attributes of quality information? 10
- 4 a) "The selection of Information Technology is a strategic decision in MIS development". Explain. 10
- b) Define CRM. Describe the features of Analytical and operational CRM 10
- 5 a) What is DSS? Explain various components of DSS. 10
- b) What is an Enterprise System? Describe various business processes that can be supported through enterprise system. 10
- 6 a) What is the bull whip effect? How supply chain management system help reduce the bullwhip effect and how they provide value for a business. 10
- b) What do you mean by exceptions? What are different types of reports generated in MIS that help managers identify the exceptions? 10
- 7 Write Short Notes on (Any Four); 20
- a) Expert System
 - b) Strategic Planning
 - c) Knowledge Management System
 - d) Prototype Approach for developing MIS
 - e) TPS