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INSTITUTE OF COMPUTER SCIENCE
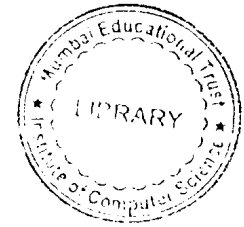
UNIVERSITY QUESTION PAPERS (ICS)

RE-EXAM PAPER MAY-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	✓

-Exam.—May–11–242

Jon. 2931–11.

(REVISED COURSE)

(3 Hours)

CD–1404

[Total Marks : 100

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

(2) Answer any four questions from Q.2 to 7.

(3) All questions carry equal marks.

Q 1 a) What is Multiple Inheritance? How the ambiguities in implementing multiple inheritances can be solved? What are disadvantages of Multiple inheritance   10

b) Write a program that emulates the DOS COPY command. That is, it should copy the contents of a text file (such as any .CPP file) to another file.   10

Q 2a) Create a class that imitates part of the functionality of the basic data type int. Call the class Int. The only data in this class is an int variable. Include Constructors to initialize an Int to 0, to initialize it to an int value and provide following operations   10

- Primitive to object type conversion
- Object to primitive type
- Overload + operator to add Int objects

b) Explain the difference between :   10

i)   Pointer to an Array and Array of Pointers

ii)   Inline Function and a Macro

Q 3a) Imagine a publishing company that markets both book and audiocassette versions of its works. Create a class publication that stores the title (a string) and price (type float) of a publication. From this class derive two classes: book, which adds a page count (type int); and tape, which adds a playing time in minutes (type float). Each of these three classes should have a getdata() function to get its data from the user at the keyboard, and a putdata() function to display its data.   10

Write a main () program to test the book and tape classes by creating instances of them, asking the user to fill in data with getdata(), and then displaying the data with putdata().

b) What is Data Encapsulation? Explain the Importance of Encapsulation. How Encapsulation ensures Data Security. Explain with suitable example.   10

[TURN OVER

Q 4   Write notes on(Any Four) :

         a)   Function Templates
         b)   Data Types in C++
         c)   Static and Constant Functions
         d)   Friend functions
         e)   Exception Handling

Q 5a)   Customers often have to wait during the acquiring and consuming many   10
products and services.
Two banks Alfa Bank and Beta Bank participated in an experiment testing
customer's satisfaction with waiting in the line. The experiment produced the
following data:
Waiting times of bank customers at different banks [in minutes]

| Alfa Bank | 6.5 6.6 5 7.1 7.3 8 6.3 7 7.5 6 |
| Beta Bank | 4.3 5 7.5 4 4.1 8 8.2 6.5 5.2 10 |

Write a program to analyze the waiting time situation for these two banks
based on the results in Table 1.
         1)   Design two classes alpha and beta with Functions to input the values
         2)   Add Functions to calculate standard Deviation And Mean
         3)   Write a main function to show the results.

    b)   What is Difference between Shallow copy and Deep Copy of an Object?   10
Explain both methods with an example of each.

Q 6a)   What is Dynamic Memory Allocation? Explain new and delete operator with a   10
suitable example.
    b)   Consider a class hierarchy Class A inherits Class B and Class B inherits Class C.   10
Explain the execution of constructors and destructors wrt this hierarchy.
Consider both default and parameterized constructors.

Q 7a)   What are different file opening modes? What is File Pointer? Explain the file   10
pointers available in C++.
    b)   What is constructor? Explain Parameterized constructor, Default Constructor
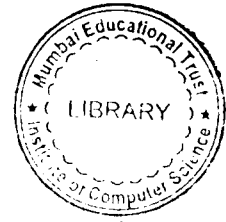and Constructor Overloading with a suitable programming example.

Jn. 3002-11.

(REVISED COURSE)   CD-1402

(3 Hours)   **[Total Marks : 100**

N.B. : (1). Q. 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 the diagrams whenever required.

Q1: A University Registrar's office maintains the data about following entities: (20)

- Course includes number, title and credits
- Course offering includes course number, year, semester, instructor, time and class room.
- Students includes student id, name and program opted
- Instructor includes id no. name , department and designation.

(a) Construct an ER diagram for the registrar office. 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 ICICI Bank.

(ii)   Fine the names street address and cities of residence of all employees who work for Canara Bank and earn more than $ 15,000.

(iii)   Find the company with the most employees.

(iv)   Give all employee of Canara Bank a 10 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 is it 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): What is functional dependency? How is it different from multi.valued dependency when are two sets of functional dependencies are equivalent?   (10)

Q5 (a): What is normalization? What are the two required conditions for normalization through decomposition of data?   (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)
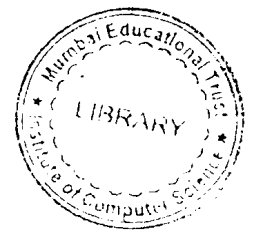
(a) Candidate key   (b) Shadow paging

(c) RAID   (d) Views

(e) Triggers

P4-Exam.-May-11-244

Con. 2932-11.

CD-1410

(3 Hours)

[Total Marks : 100

N.B: 1) Question No 1 is compulsory.
2) Attempt any <u>four</u> from the remaining.
3) Figures to the right indicate marks.
4) Illustrate answers with sketches wherever necessary.
5) Answers to sub question should be answered together.

Q1.] Write short notes on(any 4) :
   i.) DHCP   20
   ii) FTP
   iii) UDP header
   iv) Modulation
   v) PCM

Q2 a] Differentiate between (any 2):
   i) subnetting/supernetting   10
   ii) Circuit switching/packet switching
   iii) TCP reference model/ISO OSI reference model

Q2 b] For a noisy channel assume that $SNR_{dB} = 36$ and the channel bandwidth is 2 MHz.
Calculate channel capacity?
          5

Q2 c] The Subnet mask 255.255.240.0 and IP address 150.215.017.009
Calculate subnet address how many subnet could you form?
          5

Q3 a] Compare Symmetric-key cryptography and Asymmetric-key cryptography?
Explain DES algorithm in detail?
          10

Q3 b] Explain TCP/IP connection termination process in detail?
          10

Q4 a] Compare Distance vector and link state routing algorithm? Explain Link state
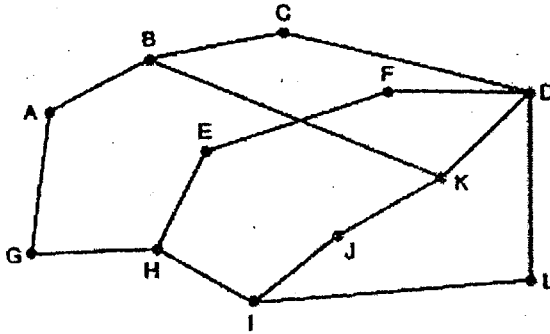routing algorithm in detail?
          10

Q4 b] Explain persistence, non persistence and p persistence CSMA protocol in detail?10

[TURN OVER

Q5 a] Compute a multicast spanning tree for router C in the following subnet for a group with members at routers A, B, C, D, E, F, I, and K. 5

Q5 b] The codeword 11110101101 was received. Correct errors ,if any using Hamming code algorithm. 5

Q5 c] With respect to satellite define orbit, period, footprint? Discuss categories of satellite network? 10

Q6 a] Explain sliding window concept? Explain go back n and selective repeat protocol in detail? 10

Q6 b] Explain the concept of piggy backing its advantage and disadvantage in detail? 5

Q6 c] Using the RSA public key cryptosystem If p = 13, q = 31, and d = 7, find e. 5

Q7 a] Discuss any 2 IEEE standards for communication ? 10

Q7 b] What is congestion? Discuss methods to overcome congestion ? 10

(3 Hours)   [Total Marks : 100

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

1 a) The manager of an oil refinery has to decide upon the optimal mix of two possible blending processes of which the inputs and outputs per production run are as follows:

Process	Input		Output	
	Crude A	Crude B	Petrol X	Petrol Y
1	5	3	5	8
2	4	5	4	4

The maximum amount available of crude A and B is 200 units and 150 units respectively. Market requirements show at least 100 units of Petrol X and 80 units of Petrol Y must be produced. The profits per production run from process 1 and process 2 are Rs. 3 and Rs. 4 respectively. Formulate as LPP and solve it graphically.   [10]

b) The utility data for a network is given below. The activity durations are in days and the cost in rupees. The indirect cost per day is Rs. 250.

Activity	Normal		Crash	
	Time (Days)	Direct cost(Rs.)	Time (Days)	Direct cost(Rs.)
1 – 2	4	600	2	800
1 – 3	2	500	1	900
2 – 4	6	1000	3	1750
2 – 5	4	1200	4	1200
3 – 5	5	1000	3	1200
3 – 7	10	2500	5	3500
4 – 5	5	1300	5	1300
5 – 6	8	2000	6	2100
5 – 7	0	0	0	0
6 – 8	7	2000	7	2000
7 - 8	8	1600	5	1780

i)   Draw the network of the project.
ii) Determine the critical path and the normal duration and cost of the project.
iii) Find the optimum duration and minimum project cost.   [10]

2 a) Use Big M method to solve the following LPP

Max $z = 3x_1 - x_2$ subject to the constraints

$2x_1 + x_2 \leq 2$

$x_1 + 3x_2 \geq 3$

$x_2 \leq 4$

$x_1, x_2 \geq 0$

[10]

b) A company is faced with the problem of assigning six different machines to five different jobs. The costs estimated in hundreds of rupees are given in the table below.

		Jobs				
		1	2	3	4	5
Machines	1	2.5	5	1	6	2
	2	2	5	1.5	7	3
	3	3	6.5	2	8	3
	4	3.5	7	2	9	4.5
	5	4	7	3	9	6
	6	6	9	5	10	6

Solve the problem assuming that the objective is to minimize the total cost.   [10]

3 a) Use two-phase simplex method to solve the following LPP

Max $z = 5x_1 - 4x_2 + 3x_3$ subject to the constraints

$2x_1 + x_2 - 6x_3 = 20$

$6x_1 + 5x_2 + 10x_3 \leq 76$

$8x_1 - 3x_2 + 6x_3 \leq 50$

$x_1, x_2, x_3 \geq 0$

[10]

b) A production control superintendent finds the following information on his desk: In departments A, B and C, the number of surplus pallets is 18, 27 and 21 respectively. In departments G, H, I and J, the number of pallets required is 14, 12, 23 and 17 respectively. The time in minute to move a pallet from one department to another is given below.

From \ To	G	H	I	J
A	13	25	12	21
B	18	23	14	9
C	23	15	12	16

What is the optimal distribution plan to minimize the time of shipment?   [10]

4 a) Use the dual simplex method to solve the following LPP

Min $z = 2x_2 + 5x_3$ subject to the constraints

$x_1 + x_2 \geq 2$

$2x_1 + x_2 + 6x_3 \leq 6$ [10]

$x_1 - x_2 + 3x_3 = 4$

$x_1, x_2, x_3 \geq 0$

b) Find the sequence for the following eight jobs that will minimize the total elapsed time for the completion of all the jobs. Each job is processed in the same order CAB. Entries given the time in hours on the machines. Find idle time of machine A, B and C. Find total elapsed time.

Jobs		1	2	3	4	5	6	7	8
Times	A	4	6	7	4	5	3	6	2
On	B	8	10	7	8	11	8	9	13
Machines	C	5	6	2	3	4	9	15	11

[10]

5 a) Use the short cut matrix method to solve the rectangular game whose payoff matrix to A . is given

	I	II	III
I	7	1	7
II	9	-1	1
III	5	7	6

[10]

b) The cost of a new machine is Rs. 5000. The maintenance cost during the nth year is given by R_n = 500 * (n – 1), n = 1, 2, ... Suppose that the discount rate per year is 0.05. After how many years it will be economical to replace the machine by a new one? [10]

6 a) Write short notes on :-
   i) Inventory problem
   ii) Branch and Bound algorithm to solve Travelling Salesman Problem [10]

b) Use Gomory's Cutting Plane Method to solve the following LPP

Max $z = 2x_1 + 20x_2 - 10x_3$

Subject to the constraints

$2x_1 + 20x_2 + 4x_3 \leq 15$

$6x_1 + 20x_2 + 4x_3 = 20$ [10]

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

[TURN OVER

7 a) Explain the following with suitable example

   i) Payoff matrix with saddle point and without saddle point

   ii) Dual of a Primal LPP.   [10]

b) Suppose the following estimates of activity times (days) are provided

Activity	Optimistic	Most Likely	Pessimistic
1 - 3	1	3	5
1 - 2	3	4	5
3 - 5	4	5	6
2 - 4	3	5	7
4 - 5	5	6	13
5 - 6	4	7	10
4 - 6	6	8	10

   i)   Determine the expected completion and variance for the project.

   ii)   What is the probability that the project will be completed within 20 days?

   iii)   What due date has about 90% chance of being met?
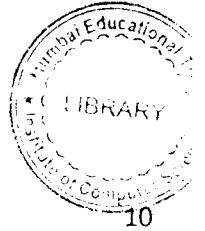
Given $z(1.28) = 0.9$, $z(1.73) = .9582$ [10]

P4–Exam.–May–11–74

Software Engineering

Con. 2974–11.

CD–14(

(3 Hours)

[Total Marks : 1

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)   Consider the software to be developed for automating railway reservation system. The user requirements are as follows: The software should help customer to check ticket for reservation online. The user can check the availability of class in each train. The system should also provide customer to enter the personal details such as email id, age, name and address. It should have facility to do online transaction. If a ticket is booked software should be auto-updated and show the status of booking confirmation and a confirmation should be intimated through a mail. Perform structured analysis for above description and draw the context level diagram, level 1 and level 2 diagrams .Also design data dictionary

     b)   Explain the advantages of developing the prototype of a System?   10

2   a)   What are size metrics? How is a function point metric advantage over LOC metric? Explain.   10

     b)   What are the quality Management steps? What are the costs involves in implementing a quality management system.   10

3   a)   Define software design. Explain the features of good software design. Explain the relationship of cohesion and coupling with functional independence?   10

     b)   Explain boundary Value analysis testing technique with the help of an example.   10

4   a)   Explain Degree of Rigor, Task set selector and Task Network.   10

     b)   What is meant by RMMM plan? Develop a RMMM plan for any IT risk and explain its contents.   10

5   a)   Discuss the infrastructure sector of COCOMO II.   10

     b)   Explain Software Requirement Analysis and characteristics of a good SRS?   10

6   a)   Explain configuration Audit Version Control Source Control System.   10

     b)   Define various key process areas CMM at various maturity levels.   10

7   a)   Explain the Putman resource allocation models. What are the limitations of this model?   10

     b)   Write short notes on:-   10
         A)Software Reengineering
         B) Four P's in software Management.

P4-Exam.-May-11-74

Con. 2974-11.

CD-14(

(3 Hours)

[**Total Marks : 1**

N.B: (1) Question No.1 is **compulsory.**
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(3) Figures to the **right** indicate full marks.

1 a) Consider the software to be developed for automating railway reservation system. The user requirements are as follows: The software should help customer to check ticket for reservation online. The user can check the availability of class in each train. The system should also provide customer to enter the personal details such as email id, age, name and address. It should have facility to do online transaction. If a ticket is booked software should be auto-updated and show the status of booking confirmation and a confirmation should be intimated through a mail. Perform structured analysis for above description and draw the context level diagram, level 1 and level 2 diagrams .Also design data dictionary

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b) Explain boundary Value analysis testing technique with the help of an example.   10

4 a) Explain Degree of Rigor, Task set selector and Task Network.   10

b) What is meant by RMMM plan? Develop a RMMM plan for any IT risk and explain its contents.   10

5 a) Discuss the infrastructure sector of COCOMO II.   10

b) Explain Software Requirement Analysis and characteristics of a good SRS?   10

6 a) Explain configuration Audit Version Control Source Control System.   10

b) Define various key process areas CMM at various maturity levels.   10

7 a) Explain the Putman resource allocation models. What are the limitations of this model?   10

b) Write short notes on:-
A)Software Reengineering
B) Four P's in software Management.   10

am -May -11 -157

Jn. 3175-11.

(REVISED COURSE)

CD-1416

(3 Hours)

[Total Marks : 100

N.B. : (1) Q. no. 1 is compulsory.

    (2) Attempt any four out of remaining six Questions.

    (3 Answers to questions should be grouped and written together

    (4) Draw the diagrams whenever required.

Q1 (a)-What is MIS? Compare MIS with Transaction processing system and Decision Support System. (10)

Q1 (b)- Distinguish between long range and short range planning. Why a long range plan is necessary in development of MIS? (10)

Q2 (a)-What is information? Explain t he concepts of information. How MIS help to improve the quality of information. (10)

Q2 (b)- What is organization? Explain the Levitt's model in detail. (10)

Q3 (a) - What is Business process? Explain types of Business information systems from a functional perspective. (10)

Q3 (b) - Explain Simon's decision model and Porter's competitive model in detail. (10)

Q4 (a)-What do you mean by business strategy? What are different kinds of strategy only name them and also explain can an organization have more than one strategy? (10)

Q4 (b) - What is rational decision making? Can a decision be called as right or wrong? What problem a decision maker has to face in making rational decision? (10)

Q5 (a)-What do you mean by value of information? What is perfect information? Is it worth to invest for obtaining the perfect information? (10)

Q 5(b) - What are the different functions of a manager and how MIS help to achieve them? (10)

Q6 (a) - Explain prototype and life cycle approach in development of MIS? (10)

Q6 (b) - Is it possible to automate the decision making? Justify your answer. (10)

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

    (a) Supply Chain Management

    (b) Customer relationship management

    (c) Expert System

    (d) Types of Information

    (e) Matrix Organization