MET

INSTITUTE OF COMPUTER SCIENCE

UNIVERSITY QUESTION PAPER (ICS)

EXAM PAPER DEC-2010 (REV)

SEM-III

MCA-8EM-III- Dec. 2010
Sub:-Database Management System.
Date:- 30/12/2010

n. 5994–10.

AP–5952

(3 Hours)

[Total Marks : 100

N.B. : (1) Q. No. 1 is **compulsory**.
(2) Answer any **four** from the remaining **six** questions.
(3) **All** questions carry **equal** marks.

Q1 a) A General Hospital consists of a number of specialized wards (such as Maternity, Pediatrics, Oncology, etc). Each ward hosts a number of patients, who were admitted on the recommendation of their own GP and confirmed by a consultant employed by the Hospital. On admission, the personal details of every patient are recorded. A separate register is to be held to store the information of the tests undertaken and the results of a prescribed treatment. A number of tests may be conducted for each patient. Each patient is assigned to one leading consultant but may be examined by another doctor, if required. Doctors are specialists in some branch of medicine and may be leading consultants for a number of patients, not necessarily from the same ward. (10)

Construct an ER Diagram for the above example. Document all assumptions made about mapping constraints.

b) Write the schema definition and normalize all tables to 3NF for the ER Diagram generated. (10)

Q2 a) Given the following relational schema, write SQL statements (10)

branch (branch_name, branch_city, assets)
customer (customer_name, customer_street, customer_city)
loan (loan_number, branch_name, amount)
borrower (customer_name, loan_number)
account (account_number, branch_name, balance)
depositor (customer_name, account_number)

i) Find the names of all branches in the *loan* relations, and remove duplicates
ii) Find the name, loan number and loan amount of all customers having a loan at the Perryridge branch.
iii) Find the names of all branches that have greater assets than some branch located in Brooklyn.
iv) Find the average account balance at the Perryridge branch.
v) Find the number of depositors for each branch.

b) Explain the Bell LaPadula model (10)

Q3 a) Explain briefly the different data models. (10)

b) i) What are views ? Discuss views in the context of security and logical data independence. (10)

ii) Explain the concept of triggers.

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Q4 a) What is serializability ? Explain conflict serializability and view serializability (10)

b) Describe the ways in which JOIN can be performed in SQL. Explain each type with an example (10)

Q5 a) What is a deadlock? Describe the various deadlock detection and prevention schemes (10)

b) What are functional dependencies? How do they help in removing redundancy from a database design? (10)

Suppose the relational schema R = (A,B,C,G,H,I) has a set of FDs

A -> B

A -> C

CG -> H

CG -> I

B -> H

For the above set of FDs apply the rule of transitivity, union, pseudotransitivity to obtain other FDs

Q6 a) Write a detailed note on Query Optimization. (10)

b) What is a locking protocol? Describe in detail the two-phase locking protocol and the strict two-phase locking protocol. (10)

Q7 a) Write short notes on (20)

i) Shadow Paging

ii) B+ Trees

iii) ACID

iv) WAL

MCA-SEM-III - Jan-2011
Sub. Data - Communication Network
DATE: 03/01/2011

Con. 5932-10. **AP-5962**

(REVISED COURSE)

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

N.B : a. Question No. 1 is compulsory.
b. Attempt **any four** out of remaining six questions.
c. Each question carries equal marks.
d. Figures to right indicate marks.

1. a. What are intermediate devices ? Discuss the various intermediate devices used at the various layers. 10
b. A CRC is constructed to generate a 4-bit FCS for an 11-bit message. The generator polynomial is $X^4 + X^3 + 1$ 10
i. Encode the data bit sequence 10011011100 using the generator polynomial and give the codeword
ii. Now assume that bit 7 (counting from LSB) in the code word is in error and show that the detection algorithm detects the error

2. a. Discuss the IEEE 802.3 - Ethernet 10
b. Explain the Optimality Principal. Explain in detail the Link State Routing Algorithm 10

3. a. What is network security ? Explain the DES algorithm as a method of symmetric key encryption. 10
b. What are collision free protocols? Explain the protocols used to eliminate collisions. 10

4. a. There are Five sources each creating 200 characters per second, If the interleaved unit is a character and 1 synchronization bit is added to each frame find : 10
i. The data rate of each source
ii. The duration of each character in each in each source
iii. The frame rate
iv. Duration of each frame
v. The number of bits in each frame and
vi. The data rate of each frame
b. Define Congestion. Discuss the various methods of preventing and detecting congestion. 10

5. a. Explain the various method used for modulation of digital data into analog signals. 10
b. What is switching ? Compare and contrast the various methods of switching . 10

6. a. Explain Hamming Code method used of error correction with a suitable example. 10
b. What are the different levels of addressing used in data communications ? Explain each of them. 10

7. a. Write short notes on any two of the following : 10
1. SMTP
2. HTTP
3. DNS
b. Explain the various access techniques used in satellite communication. 10

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MCA-SEM-III - Jan. 2011.
Sub:- Object Oriented Programming - C++.
DATE:- 05/01/2011

J Half-Exam-10-DD (A)

J. 5965-10.

(REVISED COURSE)

AP-5946

(3 Hours)

[Total Marks : 100

N.B. (1) Question No. 1 is **compulsory**.
(2) Solve any **four** from **remaining** questions.

Q1. A. What is Inheritance? Explain with suitable examples the relevance of the access specifiers Public, Private and Protected with reference to inheritance. **(10)**

B. Explain the use of 'new' and 'delete' operators. Explain their role in dynamic memory management. **(10)**

Q2. A. Discuss the process of Exception Handling in C++ with suitable examples. **(10)**

B. Write a program to create a class Student that includes data members to store the Name of Student, Class, Roll number, Marks of four subjects, Total marks, Percentage and Result (Pass / Fail). The class contains member functions to perform the following tasks: **(10)**

i) Students Data Entry
ii) Display Student details on entering Roll number
iii) Calculate Total marks and Percentage.
iv) Calculate Result (Pass if marks greater than 50 in all subjects otherwise Fail)
v) Display the result summary sheet of all students with the entire information of the student.

The program should be able to store data of around 1000 students. Records of students should be created dynamically at run-time.

Q3. A. Discuss the role of Constructors in a C++ program. Also explain the use of parameterised constructors with example. **(10)**

B. Explain the relevance of function overloading. **(10)**

Q4. A. Describe various methods by which the end of a file can be detected. Give relevant examples supporting every method. **(10)**

B. Create a Base class 'Figure'. This class should store two float values that would be used to store the area of different geometrical figures. Derive two classes 'Circle' and 'Rectangle' from the base class 'Figure'. Add to the base class, a member function 'getdata()' to initialize the base class data members and 'compute_area()' to compute and display the area of the respective figure. Make the function 'compute_area()' a virtual function and define this function in the derived classes to suit their requirements. **(10)**

Use these classes to design a program that will accept the dimensions of the figure as opted by the user and display its area.

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Q5. A. Discuss various forms of get() and put() functions supported by the input/output stream. (10)

B. Explain with examples the use of array of objects. (10)

Q6. A. Write a program which reads some text from the keyboard including spaces, special characters and line feed (Enter / Return Keystroke) and displays the following information about the text entered (10)

i) Number of Lines
ii) Number of spaces
iii) Number of Characters
iv) Number of Words

B. Explain the use of pointers to objects. (10)

Q7. Write short notes on any four of the following : (20)

A) Overriding
B) copy constructor
C) Name Spaces
D) Container class
E) *this* pointer
F) Inline functions.

Con. 5972–10.

DATE : 07/01/2011.

AP–5958

(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) A diet conscious housewife wishes to ensure certain minimum intake of vitamins A, B and C for the family. The minimum daily (quantity) needs of the vitamins A, B, C for the family are respectively 30, 20, and 16 units. For the supply of these minimum vitamin requirements, the housewife relies on two fresh foods. The first one provides 7, 5, 2 units of the three vitamins per gram respectively and the second one provides 2, 4, 8 units of the same three vitamins per gram of the foodstuff respectively. The first foodstuff costs Rs. 3 per gram and the second Rs. 2 per gram. The problem is how many grams of each foodstuff should the housewife buy everyday to keep her food bill as low as possible? Formulate the underlying L.P. problem and solve graphically. [10]

b) The following data is available on the crashing and costs of a project [10]

Activity	Normal Time (days)	Crash Time (days)	Normal Costs (Rs)	Crash Costs (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

The indirect cost is Rs 120 per day.
(i) Draw the network diagram for the above data and identify the critical path.
(ii) What is the total cost without any crashing. Also find the cost slopes.

[10]

2 a) Solve the following LPP by simplex method.

Maximize: $z = 3x_1+4x_2$
Subject to: $2x_1+x_2 \le 6$
$2x_1+3x_2 \le 9$
$x_1, x_2 \ge 0$

b) Find the initial basic feasible solution using Vogal's Approximation Method for the following transportation problem [10]

		Distribution Centre				Supply
		A	B	C	D	
Plant	1	2	3	11	7	6
	2	1	0	6	1	1
	3	5	8	15	9	10
Requirement		7	5	3	2	

[10]

3 a) Use big M-method to Minimize $z = 4x_1+x_2$
Subject to: $3x_1+x_2=3$
$4x_1+3x_2 \ge 6$
$x_1+2x_2 \le 4$
$x_1, x_2 \ge 0$

[TURN OVER

b) An airline has drawn up a new flight schedule involving five flights. To assist in allocating five pilots to the flights, they have asked them to state their preference scores by giving each flight a number out of 10. The higher the number the grater the preference is. Certain of these flights are unsuitable to some pilots due to domestic problems. These are marked with an (X).

Pilot		Flight No.				
		1	2	3	4	5
Men	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 the pilots to flights in order to meet as many preferences as possible?

4 a) Use the dual simplex method to solve the following LPP [10]

Minimize: $z= 10x_1+6x_2+2x_3$

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

$3x_1-x_2-x_3 \geq 2$

$x_1, x_2, x_3 \geq 0$

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]

Processing time

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) Neon lights on the U of A campus are replaced the rate of 100 units per day. The physical plant orders the neon lights periodically. It costs Rs 100 to initiate a purchase order. A neon light kept in storage is estimated to cost about Rs 0.02 per day. The lead time between placing and receiving an order is 12 days. Determine the EOQ and the associated cycle length of ordering. [5]

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

Maximize $z=7x_1+9x_2$

Subject to: $-x_1+3x_2 \leq 6$

$7x_1 + x_2 \leq 35$

$x_1, x_2 \geq 0$ and x_2 is an integer.

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

(i) Pure and mixed strategies in Game Theory.

(ii) Dual of a Primal LPP

b) A machine has been purchased at Rs 10,000. The maintenance cost of the machine is Rs 9000 per year and increases at the rate of Rs 1,000 per year. If breakeven rate is 12 %, what is the optimal replacement policy, given the fact that machine has nil salvage value. [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) Find the optimal strategies and value of the game where pay-off matrix of the two player is given by [10]

Player B

Player A	B_1	B_2	B_3
A_1	2	6	1
A_2	8	4	6
A_3	1	2	1

MCA-SEM-III. Dec-2010
Sub.- Software Engineering
DATE:- 10/01/2014

Con. 5974-10. **AP-5949**

(REVISED COURSE)

(3 Hours) [Total Marks : 100

N.B. : (1) Question No. 1 is **compulsory**.
(2) Attempt any **four** out of **remaining**.

1 (a) Consider a database application with following information 10
(i) It has 5 screen with 5 views each and 6 data tables for 3 servers and 4 clients.
(ii) It may generate 2 report of 5 section each from 6 data tables for 2 servers and 3 clients.
(iii) There is 10% reuse of object points.
Developers experience and capability in the similar environment is low. the maturity of organization in terms of capability is also low.
Calculate: the object point count ,new object points and effort to develop such a project.
(b) Compare hardware reliability with software reliability. 5
(c) Discuss infrastructure sector of COCOMO-II. 5

2. (a) What is requirements engineering ? List and explain different steps in requirement engineering. 10
(b) Define module coupling and module cohesion also explain different types of coupling in detail. 10

3. (a) What is software engineering ? Explain role of management in software development. 10
(b) What is size metrics ? How is function point metric advantages over LOC metric ? Explain. 10

4. (a) Explain the boundary value analysis testing technique with the help of an example. 10
(b) What are the components of use case diagram ? Give use case diagram for library management system. 10

5. (a) Explain McCall's software quality model in detail. 10
(b) What do you understand by system testing ? List and explain different kinds of system testing. 10

6. (a) List & Explain different team structures with suitable diagrams. 10
(b) What is SCM ? Why it is necessary ? Explain SCM process in detail. 10

7. Write short notes on (any **four**) :— 20
(a) Characteristics of SRS Document.
(b) Task network
(c) FAST
(d) Make buy decision
(e) Art of debugging.

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MCA-SEM-III - Dec. 2010.
Sub: Management Information System
DATE:- 12/01/2011.

Jri No-192

;on. 5985–10. (REVISED COURSE) AP–5955

(3 Hours) [Total Marks : 100

N.B:- 1) Question 1 is compulsory.
2) Attempt any Four out of remaining six Questions.
3) Answers to questions should be grouped and written together.

1.(a) Explain how quality of information improves the knowledge and decision making capability of the people? (10)

(b) What is business process? Explain types of Business Information systems from a functional perspective. (10)

2.(a) What is strategic planning? What are the different types of strategies? (10)
(b) What is MIS. "Development of MIS is linked with the business plan of organization" comment on this. (10)

3.(a) What is rational decision making? What are the problems in rational Decision making? (10)
(b) MIS support managers in his functional responsibilities explain? (10)

4.(a) Explain how Organization is a system? What are parameters on which an organization is structured? (10)

(b) Distinguish among top, middle and operational management plans in terms of goal, scope and content. (10)

5.(a) When would you resort to prototype approach and when would you resort to life cycle approach in development of MIS? (10)
(b) What problem does the System Analyst face in Ascertaining the information requirement at various level of management and how are these problems tackled? (10)

6.(a) The selection of Information Technology is a Strategic Decision in MIS development, explain it. (10)
(b) What is DSS? Explain various components of DSS? (10)

7. Write short notes on any four: - (20)
(a) Porter's Competitive Model
(b) push v/s pull based S.C.M
(c) Short range v/s Long Range Planning
(d) Analytical and Operational C.R.M.
(e) T.P.S.
