QP Code : **17889**

(3 Hours) | Total Marks 80

N.B. : (1) Question no. **1** is **compulsory**
(2) Attempt any **four** questions from Question No.2 to 7.
(3) **Assume** any **necessary** data but justify the same.
(4) **Figures** to the **right** indicate **marks**.
(5) **Use** of **calculator** is allowed.

1 (a) The following table gives data on normal time. and cost and crash time and cost for The Project. **10**

Activity	Normal		Crash	
	Time (weeks)	Cost (₹)	Time (weeks)	Cost(₹)
1 - 4	10	200	7	300
1-2	8	150	6	200
2-4	5	80	4	140
2-3	6	110	4	150
3-4	0	0	0	0
2-5	8	90	5	150
4-6	12	30	8	40
5-6	5	50	4	80

Indirect cost is ₹ 4 per week

(a) Draw the network diagram for the project and identify the critical path.
(b) What are the normal project duration and associated cost.
(c) Crash the relevant activities systematically and determine the optimal project completion time and cost.

(b) Find an optimal sequence for the following sequencing problem of six jobs and three Machines (order ABC), when passing is not allowed. Its processing time (in hours) is given below : **10**

Jobs	A	B	C
1	8	3	8
2	3	4	7
3	7	5	6
4	2	2	9
5	5	1	10
6	1	6	9

Also find total elapsed and idle time of each machine.

2 (a) Solve the problem below by simplex method 8

Maximize : $z = 6x_1 + 4x_2$

Subject to : $x_1 + 2x_2 \leq 720$

$2x_1 + x_2 \leq 780$

$x_1 \leq 320$

$x_1, x_2 \geq 0$

(b) Five different machines can do any of the five required jobs, with different profits resulting from each assignment as shown in the table below. Find out the maximum profit possible through optimal assignment. 7

Job	Machine				
	A	B	C	D	E
1	30	37	40	28	40
2	40	24	27	21	36
3	40	32	33	30	35
4	25	38	40	36	36
5	29	62	41	34	39

3. (a) A project is composed of 7 activities whose time estimates are given in the table. 8

Activity i - j	Estimated duration in weeks		
	Optimistic	Most likely	Pessimistic
1-2	3	6	15
2-3	6	12	30
3-5	5	11	17
7-8	4	19	28
5-8	1	4	7
6-7	3	9	27
4-5	3	6	15
1-6	2	5	14
2-4	2	5	8

(i) Determine the expected time and variance of each activity.

(ii) Draw the network and determine project duration and critical path.

(iii) Find the probability of completing the project before 31 days.

(iv) What is the chance of project duration exceeding 40 days?

(b) Solve the problem below by Big M method 7

Minimize $z = 4x_1 + 3x_2$

Subject to : $200x_1 + 100x_2 \geq 4000$

$x_1 + 2x_2 \geq 50$

$40x_1 + 40x_2 \geq 1400$

$x_1, x_2 \geq 0$

4. (a) Solve the problem below by Two Phase method 8

Maximize $z = 2x_1 + 3x_2 + 4x_3$

Subject to : $3x_1 + x_2 + 6x_3 \leq 600$

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

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

$x_1, x_2, x_3 \geq 0$

(b) Solve the following transportation problem, cell entries represent unit cost of shipping. 7

	1	2	3	4
A	21	16	25	13
B	17	18	14	23
C	32	27	18	41

The availability at resources 1 ,2,3,4 are 6, 10, 12, 15 respectively. The requirement at destination A, B and Care 11, 13, 19 respectively.

(i) Find transportation cost using V AM Method.

(ii) Find optimum solution using MODI method.

5. (a) (i) Write steps in decision theory approach and different types of decision. 4

(ii) What are the properties of competitive game. 4

(b) XYZ farm is engaged in breeding cows. The cows are fed on various products grown on the farm. Because of the need to ensure certain nutrient constituents. it is necessary to buy additional one or two products. which we shall call A and B. the nutrient constituents (Vitamins and proteins) in each unit of product are given below: 7

Nutrient constituents	Nutrient constituent in the product		Minimum requirements of nutrient constituents
	A	B	
1	36	6	108
2	3	12	36
3	20	10	100

[TURN OVER

Product A costs ₹ 20 per unit and product B costs ₹ 40 per unit. Determine how much of products A and B must be purchased so as to provide the cow nutrients not less than the minimum required, at the lowest possible cost. Solve the LP problem graphically

6. (a) A machine shop has a press which is to replaced as it wears out. A new press is to be installed now and an optimal replacement plan is to be for next 7 years which the press is no longer required. Following data are available. 8

Years	1	2	3	4	5	6	7
Cost of new machine	5000	5250	5500	6000	6500	7250	8000
Salvage value	2500	1250	750	500	400	250	0
Operating cost	1500	2000	2500	3000	3750	4500	5750

Find an optimal replacement policy.

(b) A travelling salesman has to cover 5 cities in his tour. He has to visit the cities one by one and return to the starting city. The travelling cost (in thousand rupees) to each city from different cities in given in the table. Which sequence of cities minimizes his total cost. 7

	A	B	C	D	E
A	--	4	7	3	4
B	4	--	6	3	4
C	7	6	--	7	5
D	3	3	7	--	7
E	4	4	5	7	--

7. (a) Use Dual simplex method 8

Min $z = 2x_1 + x_2$ subject to the constraints

$3x_1 + x_2 \geq 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \geq 3$

$x_1, x_2 \geq 0$

(b) Find the optimal strategies and value of game where pay-off matrix of the two player is given by : 7

	B1	B2	B3	B4
A1	7	6	8	9
A2	-4	-3	9	10
A3	3	0	4	2
A4	10	5	-2	0

- MCA sem III (Rev)
Management Information System.

17/12/2014

QP Code 17876

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

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** from remaining **six**.
(3) **All** question carry **equal 20** marks.

1. (a) What is MIS ? How is it different from TPS and DSS ? Why is MIS looked upon as a strategic need of Management today ? **10**
(b) What is Decision Support System ? Describe various component of DSS ? **10**

2. (a) Distinguish between top management plan, middle management plan and operation management plan in terms of goal, scope and content. **10**
(b) What is Strategic Planning ? What are the different types of strategy ? **10**

3. (a) Can you automate the process of Decision Making ? The answer is 'Yes' or 'No' Explain. **10**
(b) What are factors contributing success and failure of MIS ? **10**

4. (a) What are the content of the MIS plan ? What is the purpose of each of them ? **10**
(b) Which are the parameters used in the evaluation of the IT before decision is made ? **10**

5. (a) What is enterprise system ? How does it work ? Explain e-business enterprise with e-commerce, e-communication and e-coliaboration. **10**
(b) Compare Prototype approach with Life cycle approach in the development of the MIS. **10**

6. (a) What is information ? What are the concepts of Information? Explain the methods to avoid misuse of Information. **10**
(b) Explain how Organization is as system ? What are parameters on which an organization is structured ? **10**

7. Write short note : (any **four**) :— **20**
(a) Supply Chain Management
(b) Artificial intelligence system in DSS
(c) Knowledge based Expert System
(d) Push vs. Pull Model
(e) Strategic Planning
(f) Prototype Approach for Developing MIS.

MCA Sem (3). 12/12/14
Software Engg.

QP Code : 17873

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

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

1. (a) General motor is a leader in the business of car manufacturing. It announces its "Car Manufacture to order" system. It provides the customers with an online customization option for ordering car with special features. Customer can design a car model online by referring e-catalog. Customer car model may include Order no, Price, Fuel type, Body type, Color, Accessories, Approximate date of delivery and other shipment details. All details of customer are stored in database for future reference. Once the online payment is accepted the designed car model is dispatched and intimated to the customer. Customer is able to modify his order within a week from the order placed. For the above system draw CLD, DFD up to second level, and data dictionary. **15**
(b) Explain Formal technical Review. **5**

2. (a) Explain in brief all levels of COCOMO model. Assume that the size of an organic software product has been estimated as 52000 lines of code. Determine the effort required to develop the software product and the nominal development time. **10**
(b) Explain McCall's Software quality model in detail. **10**

3. (a) What are structured walkthroughs and how they are carried out? **10**
(b) Define module Coupling and module cohesion. Also explain different types of coupling in detail. **10**

4. (a) What do you mean by software reliability? Explain capability maturity model. **10**
(b) List and explain different type of system testing. **10**

5. (a) Enumerate Boehm's top ten software risk. **10**
(b) What is WBS and WBS dictionary? What are different methods to develop WBS ? Explain mind mapping method to develop WBS with a suitable example. **10**

6. (a) What do you mean by configuration management of software product ? Why is software configuration management so crucial for success of large software project development. **10**
(b) What are size metrics ? Explain advantages of function point metric over LOC metric with justification. **10**

7. Write short notes on (any **four**):— **20**
(a) Make Buy Decision
(b) Degree of Rigor
(c) RMMM plan
(d) SRS
(e) Four P's In Software Management
(f) SEI CMM

SY BMCA SEM-III (R) DBMS 2nd Dec 2014

Q.P. NO : 17862

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

N.B. : (1) Question **No. 1** is **Compulsory**.
(2) Attempt any **four** out remaining **six** questions.

1. A General Hospital consists of a number of specialised 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 seperate 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. 20
   i) Construct an ER diagram for the above systems. Document, all assumptions that you make for designing.
   ii) Write schema definition and normalize all tables to 3NF for the above ER diagram.

2. (a) What is date model ? Discuss Hierarchical model in DBMS with the advantages and disadvantages. 10
   (b) Explain the various states of transaction in database. 10

3. (a) Explain the shadow paging recovery technique. 10
   (b) Differentiate the following (any two) 10
      i) Dense Index vs Sparse Index
      ii) Weak vs Strong Entity
      iii) 3NF vs BCNF

4. (a) How serializability is ensurd in 2 PL protocol. Discuss locks, granting of locks and implementing locks. 10
   (b) What is timestamp protocol and how it is used for concurrency control? 10

5. (a) Write a detailed note on query optimization. 10
   (b) What is deadlock? Discuss deadlock detection and prevention techniques. 10

6. (a) What is normalization? Explain the two conditins required during normalization through decomposition of data. 10
   (b) Explain Bell LaPadula model. 10

7. Write short note on the following **(any four)** 20
   (i) Super key, Candidate key, Primary key
   (ii) Natural Join
   (iii) Aggregation
   (iv) MVD
   (v) DBA

MCA Sem III

8/12/14

OOP c++

QP Code : 17868

(3 Hours) **[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 as required.

1. Differentiate between the following : **20**
   (a) Call by address / Call by reference
   (b) Inheritance / Composition
   (c) Inline function / Macros
   (d) Static cast / Dynamic cast

2. (a) What is inheritance? What do you mean by private, protected, public inheritance? Explain with example. **10**
   (b) Write a program to create an employee class that has data members - id, name. Create 3 records of employee. Write them to a file and read them back. **10**

3. (a) What are static data members in a class? How are they defined and accessed? Explain with an example. **10**
   (b) What are abstract classes? How can we create them and why are they used? **10**

4. (a) Write a program to overload operator + and += for complex class. Data members of complex class are -real, imaginary. **10**
   (b) What is STL and what are its components. Explain each in brief. **10**

5. (a) What are function templates? Write a program to create a function template that finds absolute vale of its parameter. Instantiate it for integer and float data. **10**
   (b) Explain the use of new and delete operators. **10**

6. (a) Define a class string and perform following operations : **10**
      (i) Whenever new object is created, an empty string should be created or initialize string at time of creation. Ex. String s1, s2("C++") ;
      (ii) Copy one sting to another
      (iii) String Concatenation
   (b) Explain constructor overloading with example. **10**

7. Write short notes on any **four** of the following : **20**
   (a) Encapsulation
   (b) Data Abstraction
   (c) Explicit
   (d) Multiple Inheritance
   (e) 'this' pointer.

MCA Sem III

4/12/14.

DCN.

QP Code : **17865**

(3 Hours) [Total Marks : 100

N. B. : (1) Question No. **1** is **compulsory**.
(2) **Each** question carries **equal** mark.
(3) Attempt any **four** from remaining **six** questions.

1. (a) Explain the OSI model and compare it with the TCP/IP. **10**
   (b) Explain the difference between packet, circuit and message switching. **10**

2. (a) What is footprint of a satellite? Explain different types of satellites. **10**
   (b) Compare distance vector and link state routing algorithm? Explain link state routing algorithm in detail. **10**

3. (a) What is multiplexing? Explain different methods of different methods of multiplexing. **10**
   (b) What is unguided transmission medium? Describe different types of medium used in networks. **10**

4. (a) Explain different types of intermediate devices used in networks. **10**
   (b) What is congestion? Describe different ways to handle congestion in the network. **10**

5. (a) What is symmetric and asymmetric-key cryptography? Explain DES algorithm in detail. **10**
   (b) Describe the IEEE 802.3 and IEEE 802.5 standards for communication. **10**

6. (a) What is error control? Which layer is responsible for doing error control? **10**
   (b) What is IPv6? Explain transition methods from IP v4 to IP v6. **10**

7. Write short note on any four of the following :– **20**
   (i) ARP
   (ii) HTTP
   (iii) UDP
   (iv) FTP
   (v) E-mail

Research 10/12/14

QP Code : 17869

(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.

Q.1) a) Solve the following LPP Using Graphical Method (10 Marks)

Maximize $Z = 3X_1 + 4X_2$

Subjected to, $X_1 + X_2 <= 450$

$2X_1 + X_2 <= 600$

And $X_1 , X_2 >= 0$

Q.1) b) For the following set of activities and different time estimates for a project (10 Marks)

Activity	Optimistic Time (days)	Pessimistic Time (days)	Most Likely Time (days)
1-2	3	15	6
1-3	2	14	5
1-4	6	30	12
2-5	2	8	5
2-6	5	17	11
3-6	3	15	6
4-7	3	27	9
5-7	1	7	4
6-7	2	8	5

Find i) Draw a network
ii) Determine the expected task times and their variences
iii) Find the Earliest and latest expected times to reach each node
iv) Find Critical Path

Q.2 a) Solve the following LPP Using Simplex Method (10 Marks)

Maximize $Z = 4X_1 + 10X_2$

Subjected to, $2X_1 + X_2 <= 50$

$2X_1 + 5X_2 <= 100$

$2X_1 + 3X_2 <= 90$ and $X_1 , X_2 >= 0$

[TURN OVER

Q.2 b) Determine basic feasible solution to transportation problem using North West Corner Method (10 Marks)

Sink

ORIGIN	A	B	C	D	E	Supply
P	2	11	10	3	7	4
Q	1	4	7	2	1	8
R	3	9	4	8	12	9
Demand	3	3	4	5	6	

Q.3 a) Solve the following LPP Using Big M Method (10 Marks)

Maximize $Z= 3X_1 + 2X_2$

Subjected to, $2X_1 + X_2 <= 2$

$3X_1 + 4X_2 >= 12$

And $X_1 , X_2 >= 0$

Q.3 b) Consider the problem of assigning five jobs to five persons. The assignment costs are given as follows : (10 Marks)

Job

Person	I	II	III	IV	V
A	8	4	2	6	1
B	0	9	5	5	4
C	3	8	9	2	6
D	4	3	1	0	3
E	9	5	8	9	5

Determine the optimum assignment schedule and optimum assignment cost.

Q.4 a) Solve the following LPP Using Dual-Simplex Method (10 Marks)

Maximize $Z= 2X_1 + 2X_2 + 4X_3$,

Subjected to, $2X_1 + 3X_2 + 4X_3 >= 2$,

$3X_1 + X_2 + 7X_3 <= 3$,

$X_1 + 4X_2 + 6X_3 <= 5$,

and $X_1 , X_2, X_3 >= 0$

Q.4 b) There are five jobs,each of which is to be processed through two machines M_1,M_2 in the order M_1M_2. Processing hours are as follows: (10 Marks)

Job	1	2	3	4	5
M_1	3	8	5	7	4
M_2	4	10	6	5	8

Determine the optimum sequence for the five jobs,and minimum total elapsed time. Find also idle time of machines M_1 and M_2

Q.5 a) i) Write a short note on Inventory problem. Explain the different costs associated with inventory Problem. (5 Marks)

Q.5 a) ii) Obtain the dual of the following (5 Marks)

Maximize $Z= 40X_1 + 50X_2$

Subjected to: $2X_1 + 3X_2 <= 3$

$8X_1 + 4X_2 <= 5$

And $X_1, X_2 >= 0$

Q.5 b) Solve Using Gomory's Cutting Plane Method of the Following : (10 Marks)

Minimize $Z=2X_1 +X_2$

Subjected to: $2X_1 + 5X_2 <= 17$

$3X_1 + 2X_2 <= 10$

And $X_1, X_2 >= 0$ and X_1 integer .

Q.6 a) Explain the following with Suitable example (10 Marks)

i) Redundant constraints in LPP

ii) Pure and mixed strategies in game theory

Q.6 b) A machine owner finds from his past records that the costs per year of maintaining a machine whose purchase price is Rs. 6000 are as given below: (10 Marks)

Year	1	2	3	4	5	6
Maintenance Cost(Rs)	1000	1200	1400	1800	2300	2800
Resale Value (Rs)	3000	1500	750	375	200	200

Determine at what age replacement due?

Q.7 a) Draw the network diagram.Find total,free and independent floats (10 Marks)

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

Q.7 b) Find the optimal strategies and value of the game of following (10 Marks)

Player B

Player A		I	II	III
	I	7	3	1
	II	1	7	3
	III	0	1	7

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