MCA/ Sem.-III (CBSGS)/Data Base Management System/ Nov-16

(3 Hours)   Total marks: 80

Note:

1. **Q1 is compulsory**
2. **Attempt any four from remaining six questions**

Q1: (a) Draw an E R Diagram for the following,

"Saboo car rental services" is a car rental showroom, who want to automate their business.

1. They offer different types of cars on rent as small car, SUV,MUV
2. Each types of car has the maximum seating available and the tariff per kilometer.
3. The management wants the system to show availability of the number of cars of each type for serving the inquiry.
4. The system should have a provision for booking the ear. Before the booking is made, the customer needs to provide personal information and driving license details
5. Booking is typically stored as booking date, date of rent, duration in hours and type of vehicle.
6. Once the booking is done a unique booking number is provided to the customer for their reference which they need to produce at the time they come to collect the car.
7. A new transaction record is created for each booking after the car is returned, specifying the kilometers used and the amount to be paid date of payment.   10

(b) Write schema definition of above E-R diagram and Normalize up to 3NF   10

Q2: (a) Briefly explain architecture of DBMS.   8
    (b) Define deadlock? Describe deadlock prevention techniques.   7

Q3: (a) Explain Tree based indexing and Hash based indexing.   8

    (b) Explain Bell-La Pedula model for security implementation.   7

Q4: (a) Define Decomposition? Explain Lossless and Dependency preserving decomposition. 8
    (b) Briefly explain working of Query Optimizer.   7

Q5: (a) Explain Codd's Rule for designing Relational Database.   8
    (b)Define Locking Protocol. Explain Strict Two phase Locking protocol   7

Q6:(a) Differentiate the following.   8
    i)   Hierarchical and Network model
    ii)   DBMS Vs RDBMS.
    (b) Explain in brief Granularity in Locks.   7

Q7: Write short notes on any three of the following: 15
    a. Shadow paging
    b. Serializability
    c. Types of databases
    d. Crash recovery using checkpoint

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QP Code: 514902

(3 Hours) Total Marks: 80

N.B. (1) Question No. 1 is compulsory.
(2) Figures to the right indicate maximum marks.
(3) Attempt any four questions from Question No 2 to 7.

Q.1 (a) What are projections? Explain various types of projections. [10]
(b) Rasterize the line whose endpoints are A(-2,5), B(-9,7) using DDA [05] algorithm.
(c) Find out the dynamic range of an image if all the slopes in the contrast [05] stretched algorithm l, m, n are given as 0.2, 0.5, 0.2 respectively. The initial dynamic range of the original image is [0 - 10], a=4 and b=8.

Q.2 (a) What are the properties of the curve? Derive quadratic and cubic Bezier [08] curve.
(b) Consider the object with coordinates A(2,4), B(3,1) C(5,3). Transform it [07] by first reflecting it about x-axis and then rotating it by 60 deg.

Q.3 (a) Write an algorithm for a midpoint circle generation. And Plot a circle [08] centered at (10,5) having a radius of 15 units.
(b) What is visible surface detection? Differentiate between the object space [07] method and image space method of detecting visible surface. Explain the Depth buffer method for visible surface detection.

Q.4 (a) Use Liang - Barsky line clipping algorithm to find the visible [08] portion of the line P1(-10,50) to P2(30,80) against window
(Xwmin=-3, Ywmin=10) (Xwmax=20, Ywmax=60).
(b) What is 2D viewing transformation. Derive the window to viewport [07] transformation equation.

Q.5 (a) Reflect the triangle ABC about the line 3x-4y+8=0. The position vector [08] of the coordinate ABC is given as A(4,1), B(5,2) and C(4,3).
(b) Explain Halftone shading technique and compare this with the Dithering [07] technique.

{TURN OVER

Q.6 (a) For the following image data of 8 bits per pixels . Obtain   [08]
  i)   Image negative
  ii) Thresholding result (Threshold value = 150)

120	135	215	220	125
135	20	187	50	80
250	115	55	120	45
30	180	200	46	20
60	119	120	255	135

(b) Equalize the given histogram.   [07]

Grey Level	0	1	2	3	4	5	6	7
No. of Pixels	790	1023	850	656	329	245	122	81

Q.7 Write short notes on the following (any 3)   [15]

(a) Low pass Median Filter   **(b)** Flood Fill Algorithm
(c) Koch Curve   **(d)** Animation

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QP CODE : 515000

(3 Hours) [total Marks: 80]

N. B.: (1) Question number 1 is compulsory
      (2) Attempt any 4 from question Nos. 2 to 7.
      (3) Illustrate answers with sketches wherever necessary.

1. A] What is Key Distribution Center? How does the key distribution work   10
with multiple KDC domains?

   B] What do you mean by Hash function? How will you define SHA1 and   10
Explain message digest algorithm of MD5.

2. A] Define Network Security. What are the services and mechanisms   08
provided by Network Security?

   B] What is man in the middle attack? Alice and Bob establish a secret key   07
using Diffie – Hellman key exchange using g = 7, n = 13. Alice takes x
as 3 & Bob takes y as 9. Tom an intruder selects x as 8 and y as 6.
Show the working of the man-in-middle attack.

3. A] What do you mean by IDEA algorithm and also explain the detailed   08
working principle of IDEA.

   B] What are the algorithm modes uses for secret key cryptography?   07

4. A] What is password based authentication? How the authentication   08
mechanism works? Explain various problems associated with
password based authentication. Suggest some solutions.

   B] Explain how SET ensures a secure e – commerce transaction.   07

5. A] Define Firewall. What are the types of Firewall? Explain in brief.   08

   B] Explain RSA algorithm with a suitable example.   07

6. A] What is Kerberos? Explain the working procedure of Kerberos? Define   08
Kerberos V5.

   B] What is a digital certificate? Explain the stepwise process of certificate   07
generation?

7. Write short notes on: (any three)   15
    a) IPSec
    b) Integrity check
    c) PEM in E-mail Security
    d) Honey Pots

Q. P. Code : 515102

Duration: 3 Hrs   Marks: 80

N.B: (1) Question 1 is compulsory.
   (2) Attempt any **four** out of remaining **six questions**.
   (3) Assume any additional data, if required, but justify the same.
   (4) Figures to the right indicate full marks for that question.
   (5) Use of calculator is allowed.

Q.1) a) Solve the following LPP using graphical method   [10]

   Maximize $Z = 5X_1 + 8X_2$

   Subject to $15X_1 + 10X_2 \leq 180$

   $10X_1 + 20X_2 \leq 200$

   $15X_1 + 20X_2 \leq 210$

   and $X_1, X_2 \geq 0$

b) Solve the following assignment problem and find the optimum assignment that will result in   [10]
   minimum man hours needed:

<div align="center">Jobs</div>

		A	B	C	D	E
	P	10	12	15	12	8
Workers	Q	7	16	14	14	11
	R	13	14	7	9	9
	S	12	10	11	13	10
	T	8	13	15	11	15

Q.2) a) Solve the following LPP by Simplex Method   [8]

   Maximize $Z = 300X_1 + 200X_2$

   Subjected to, $5X_1 + 2X_2 \leq 180$

   $3X_1 + 3X_2 \leq 135$

   And $X_1, X_2 \geq 0$

b) Find the initial basic feasible solution for the following transportation problem by Vogel's   [7]
   approximation Method.

To				Supply
3	1	7	4	300
2	6	5	9	400
8	3	3	2	500

Demand   250   350   400   200

[TURN OVER]

Q.3) a) Solve the following LPP using Big-M Method. [8]

Minimize $Z = 2X_1 + X_2 + X_3$

Subjected to, $4X_1 + 6X_2 + 3X_3 \leq 8$

$3X_1 - 6X_2 - 4X_3 \leq 1$

$2X_1 + 3X_2 - 5X_3 \geq 4$

and $X_1, X_2, X_3 \geq 0$

b) Suppose the following estimates of activity times (days) are provided [7]

Activity	Optimistic time	Most Likely time	Pessimistic time
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) Draw a network ii) Find the expected duration and variance for each activity.

ii) Find the critical path of the project

Q.4) a) Five jobs are to be processed at three machines A,B and C in the order ABC. The time taken [8] by each job on the three machines is given below. each machine can process one job at a time Determine the optimum sequence for the jobs and total elapsed time .also find the idle time for Each machine.

Task	1	2	3	4	5
A	7	12	12	9	8
B	8	9	5	6	7
C	11	13	9	10	14

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

Player B

Player A		B1	B2	B3
	A1	-1	2	1
	A2	1	-2	2
	A3	3	4	-3

[TURN OVER]

Q.5) a) Solve the following using Dual Simplex Method.   [8]

  Minimize $Z = 2X_2 + 5X_3$

  Subjected to , $X_1 + X_2 \geq 2$

  $2X_1 + X_2 + 6X_3 \leq 6$

  $X_1 - X_2 + X_3 \geq 4$

  and $X_1, X_2, X_3 \geq 0$

b) A company has a machine whose cost is Rs 80,000/- Its maintenance cost and resale value [7]
   at the end of different years are given below.

Year	1	2	3	4	5	6	7
Maintenance cost (Rs.)	1000	1200	1600	2400	3000	3900	5000
Resale price (Rs.)	75000	72000	70000	65000	58000	50000	45000

  At what time interval in your opinion, should the machine be replaced?

Q.6) a) A salesman wants to visit cities A,B,C,D and E.he does not want to visit any city twice before   [8]
      completing his tour of all the cities and wishes to return to the point of starting journey. Cost
      of going from one city to another (in Rupees) is shown in the following table. Find the least route

<div align="center">To City</div>

		A	B	C	D	E
	A	-	2	5	7	1
	B	6	-	3	3	2
From City	C	8	7	-	4	7
	D	12	4	6	-	5
	E	1	3	2	8	-

b) i) Explain in brief 'Pure and mixed strategies in game theory.'   [7]

  ii) Obtain the dual of the following

    Maximize $Z = 6X_1 + 3X_2$

    Subjected to, $6X_1 - 3X_2 + X_3 \geq 2$

    $3X_1 + 4X_2 + 4X_3 \geq 5$

    and $X_1, X_2, X_3 \geq 0$

[TURN OVER]

Q.7) a) Draw the network diagram. Find total, free and independent floats. [8]

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

b) The states of natures and strategies of a Food Products Company are as Follows: [7]

States of Nature

Strategies	N1	N2	N3
S1	7,00,000	3,00,000	1,50,000
S2	5,00,000	4,50,000	0
S3	3,00,000	3,00,000	3,00,000

Which strategy should the concerned executive choose on the basis of i) Maximin criterion

ii) Maximax criterion iii) Minimax criterion iv) Laplace criterion ?

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QP CODE : 515200

(3 Hours)

[Total Marks : 80]

N.B. : 1) Question No.1 is **compulsory**.
2) Attempt any **four** from the remaining **six** questions.

1. (a) What is WBS? Explain with help of example. (10)
   (b) What is project procurement management? Explain different (10) processes involved in it.

2. (a) What are the four frames of organization? How are they helpful to (07) understand organization?
   (b) What is project charter explain with example. (08)

3. (a) What is Ishikawa diagram? What is. the use of this diagram? (07) Explain with example.
   (b) What is Project scope management? Write a short note on (08) collecting requirements.

4. (a) Write a short note on Project Life Cycle. (07)
   (b) What is Conflict? What are the three different views of conflict? (08)

5. (a) What are the main types of contracts? Explain advantages and (07) disadvantages.
   (b) Describe common sources of risks and risk register. (08)

6. (a) What is the role of Project Manager in IT project? What skills are (07) required for good project manager?
   (b) What is cost and Project Cost Management? (08)

7. Write Short Notes on **_any three_** :-
   a) Gantt Chart (15)
   b) MOV
   c) Ethics in project
   d) Matrix organization
   e) Request for proposal

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