

MCA - III CBGS 9/5/14
Network Security

QP Code : GJ-2394

Time :3hrs

Total Marks: 80

Note: 1) Question No. 1 is compulsory.
2) Attempt any **four** from Q No. 2 to Q No. 7

- Q.1(a) What are key principles of Network security (10)
(b) Distinguish between symmetric and asymmetric cryptography. (10)
- Q2 (a) Explain in details the DES algorithm with reference to its overview and a DES Round. (08)
(b) Name the methods used for encrypting large messages. Explain output feedback mode (OFM). (07)
- Q3 (a) Explain with the help of a diagram the working of Kerberos version 4. (08)
(b).How are Kerberos ticket lifetimes in V5 different from V4? (07)
- Q 4 (a)What is man in middle attack? Explain with the help of an example. (08)
(b) Discuss Diffie-Hellman crypto system. (07)
- Q.5(a)Compare SHA1 and MD5. (08)
(b). Discuss MD4 in detail. (07)
- Q.6(a) Explain password based and address based authentication. (08)
(b) Discuss Secure Socket Layer in e-commerce. (07)
- Q7. Short notes on any three of the following:- (15)
a. Email security
b. Smart Cards
c. Biometrics
d. Honey pots
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(3 Hours)

[Total Marks : 80

Note:

1. Question No. 1 is compulsory
2. Attempt any four questions from the remaining

Q1	A. Explain the four frames of organizations. How can they help project managers understand the organizational context for their projects	10
	B. What is the purpose of project charter? Give its template	10
Q2	A. Discuss Project Cost Management and different types of cost estimates and methods for preparing them	8
	B. Describe the project metrics in detail	7
Q3.	A. What is IT project methodology and explain 5 phases of the IT project methodology	8
	B. Describe change management in detail	7
Q4.	A. What is project implementation and Three general tactical implementation plans	8
	B. Define Polarity management /mapping	7
Q5.	A. Explain briefly the Project Procurement Management and its importance.	8
	B. What is conflict? Explain three different views of conflict	7
Q6.	A. Describe the top ten risk item tracking approaches for qualitative risk analysis	8
	B. Explain briefly the WBS with example	7
Q7.	<p>Write short note on (any 3)</p> <ol style="list-style-type: none"> 1. Leavitt's Model of organizational change 2. Project closure 3. MOV 4. Ethics in projects 5. Outsourcing in Project management 	15

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

2) Attempt any four from the remaining Questions No.2 to No.7

- Q1. Design a database for the following situation: 20
 The Motor Vehicle Branch administers driving tests and issues driver's licenses. Any person who wants a driver's license must first take a learner's exam at any Motor Vehicle Branch in the province. If he/she fails the exam, he can take the exam again any time after a week of the failed exam date, at any branch. If he passes the exam, he is issued a license (type = learner's) with a unique license number. The person may take his driver's exam at any branch any time before the learner's license expiry date (which is usually set at six months after the license issue date). If he passes the exam, the branch issues him a driver's License.
- a) Construct an ER diagram for the above. Document all assumptions that you make for designing.
- b) Write a schema definition and normalized all tables to 3NF for the above ER diagram.
- Q2. a) What is B tree and B+ tree? How it is used in maintain indexes in database? How concurrency in index structured is handled? 8
- b) Discuss the various steps of processing a high level query. 7
- Q3. a) Explain the architecture of database system and also explain how it is different from the conventional file system. 8
- b) What is a locking protocol? Describe the two phase locking protocol and strict two phase locking protocol. 7
- Q4. a) Explain the terms Lossless join decomposition and dependency preservation decomposition. 8
- b) What is data model? Explain network model with its advantages and disadvantages? 7
- Q5. a) Differentiate between the following 8
 1) Logical data independence and physical data independence
 2) Sophisticated users and specialized users
- b) Explain Bell-LaPadula model of database security 7
- Q6. a) What is transaction? Explain the ACID properties of transaction. 8
- b) Explain the responsibilities of DBA. 7
- Q7. Write a short note on (any 3) 15
 1) Shadow paging
 2) Hash based indexing
 3) Serializability
 4) Closure of set of FD

(3 Hours)

[Total Marks : 80

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

(2) Solve any four from Question 2 to Question 7.

(3) Use of non-programmable calculators allowed.

(4) Mixing of sub-questions is not allowed.

1. (a) Derive Bresenham's line drawing algorithm. Rasterise a line A = (3,6), B = (9,14) using the same. 10
(b) Explain the boundary fill algorithm to fill closed regions. List its advantages and disadvantages. 10
2. (a) Explain the process of reflecting an object across an arbitrary line $y = mx + c$. 7
(b) Explain any two methods for visible surface detection. 8
3. (a) Deduce the mid-point Ellipse algorithm. 7
(b) A rectangle ABCD is reflected across the origin and then reduced to half its size by keeping a point P = (15,15) fixed. Calculate the new transformed co-ordinates. What would happen in case the sequence of the above transformations is reversed. The co-ordinates of the rectangle are A (10,10), B = (30,10), C = (30,30), D = (10,30). 8
4. (a) What is a Histogram ? Explain the technique of Histogram Equalisation for enhancing an image. 7
(b) Explain with an example the mid-point subdivision line clipping algorithm. 8
5. (a) Discuss any two Spatial Domain filter approaches for image enhancement. 7
(b) Derive a single matrix which when applied to an image, will perform the following transformations at once in three dimensional space :- 8
 - (i) Rotate by 30° around X and Y axis.
 - (ii) Scale by 3 units in X axis and 4 units in Z axis.
6. (a) Explain the basic components of a digital image processing system. 7
(b) Clip the following lines using the Cohen sutherland algorithm :- 8
 - (i) A = (50,200), B = (220,60)
 - (ii) C = (270,80), D = (270,330)
 - (iii) E = (200,200), F = (330,200)
 - (iv) G = (170,220), H = (220,370)The co-ordinates of the upper left corner and the lower right corner are X = (100,100) and Y = (300,300) respectively.

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7. Write short notes on (any three) :-

15

- (a) Constant intensity shading
 - (b) Image averaging
 - (c) Koch curve
 - (d) Perspective projection
 - (e) Shear transformation
-

- 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 marks.
 (5) Use of calculator is allowed.

1. (a) Bombay Paints produces both interior and exterior paints from two raw materials M1 and M2. Table below provides the basic data of the problem :- 10

Raw Material	Exterior Paint	Interior Paint	Maximum daily available
M1	5	3	20
M2	2	3	8
Profit (in thousands ₹ per tonne)	5	4	—

A market survey indicates that the daily demand for the interior paint can't exceed that for the exterior paint by 2 tonnes. Moreover, the maximum daily demand for the interior paint is 3 tonnes. Bombay Paint wants to determine the optimum product mix of interior and exterior paints that maximizes the total daily profit. Formulate an LPP for the same and solve graphically.

- (b) The list of activities for erecting a canteen in a factory in the table below along with relevant details. The indirect cost is ₹300 per day. Find the minimum possible duration of the project and the associated cost. 10

Activity	Predecessor	Normal cost (₹)	Crash cost (₹)	Normal duration (days)	Crash duration (days)
A	—	3000	4000	5	4
B	A	1200	2000	6	2
C	A	1000	1800	4	3
D	A	1200	2000	5	3
E	B,C,D	1600	1600	3	3

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2. (a) Solve the LPP by Big M Method :-

8

$$\text{Min } z = 5x_1 + 4x_2 + 6x_3$$

Subject to conditions

$$x_1 + x_2 + x_3 \geq 350$$

$$x_1 \geq 125$$

$$2x_1 + x_2 + x_3 \geq 600$$

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

(b) A computer center has 5 expert programmers. The center wants 3 application programs to be developed. The head of the computer center, after carefully studying the programs to be developed, estimates the time (in minutes) required by the experts for the developing the application programs as given in the table. Assign the programmers to the programs in such a way that the minimum total time is taken for developing the programs.

7

Program	Programmer				
	A	B	C	D	E
I	120	10	80	90	130
II	80	90	110	70	110
III	110	140	120	130	160

3. (a) Solve the LPP by Two Phase Method :-

8

$$\text{Min } z = 45x_1 + 28x_2$$

Subject to conditions

$$20x_1 + 50x_2 \geq 3600$$

$$80x_1 + 50x_2 \leq 6000$$

$$x_1, x_2 \geq 0$$

(b) Find the optimal solution by MODI method. () indicates cost of the cell.

7

Plant	Market			Total availability
	D	E	F	
A	40(6)	30(4)	(1)	70
B	(3)	60(8)	(7)	60
C	(4)	25(4)	65(2)	90
Total requirement	40	115	65	220

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4. (a) Solve the LPP by Dual Simplex Method :-

8

$$\text{Min } z = 4x_1 + 5x_2 + 6x_3$$

Subject to conditions

$$2x_1 + 3x_2 + 5x_3 \geq 20$$

$$3x_1 + x_2 + 7x_3 \leq 30$$

$$x_1 + 4x_2 + 6x_3 \leq 50$$

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

- (b) Ten jobs are to be processed on two machines M1 and M2. Determine optimal sequence and evaluate total elapsed time. The job processing time in (hours) are given in the table :-

7

Machine	Job									
	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10
M1	8	9	10	4	8	5	6	9	6	7
M2	5	3	7	7	6	8	3	7	8	7

5. (a) Solve the following 3×3 payoff matrix. Find the value of the game :-

8

A	B		
	B1	B2	B3
A1	7	1	7
A2	9	-1	1
A3	5	7	6

- (b) A firm is using a machine whose purchase price is Rs.150000. The maintenance and repair cost for various years are as given in the table.

7

Year	1	2	3	4	5	6	7	8	9	10
Cost (in ₹ Thousands)	3.5	9.5	12	18	21	26	34	42	55	62

The firm wants to determine after how many years the machine should be replaced considering the overall cost?

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6. (a) 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 is given in the table. Which sequence of cities minimizes his total cost ? 8

To → From ↓	A	B	C	D	E
A	—	3	6	8	2
B	7	—	4	9	3
C	9	8	—	5	8
D	13	5	7	—	6
E	2	4	3	9	—

- (b) The marketing department of the company worked out the payoff in terms of yearly net profit for each course of action for these events. This is shown in below :- 7

State of nature	Course of action		
	S1	S2	S3
S1	220	180	100
S2	160	190	180
S3	140	170	200

Which strategy the company should choose on the basis of (a) maximin criterion (b) maximax criterion (c) minimax regret criterion.

7. (a) Explain the following term with suitable example :- 8
 (i) Branch and Bound algorithm to solve the Travelling Sales Man problem.
 (ii) Steps to construct Dual of Primal LPP.
- (b) A small maintenance project consist of following jobs whose precedence relationships given below :- 7

Job	1-2	1-3	2-3	2-5	3-4	3-6	4-5	4-6	5-6	6-7
Duration (day)	15	15	3	5	8	12	1	14	3	14

- (i) Draw network diagram.
 (ii) Find free, independent, free float
 (iii) Find critical path and total project duration.