

1-12-15

MCA sem III - CBSGS, NOV/Dec-2015  
sub - Software Project Management

QP Code : 25278

(3 Hours)

[Total Marks: 80]

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

1. (a) What are the different organizational structures? Explain briefly with suitable diagram. 10  
(b) Explain the payback, ROI and NPV method with advantages and disadvantages of each method. 10
2. (a) What is project scope management? Explain benefits of scope control. 08  
(b) What is cost estimation? Explain various cost estimation tools and techniques. 07
3. (a) What is Work Break Down (WBS) structure? Discuss various approaches to build WBS. 08  
(b) What is project communication plan? What are different things addressed in it? 07
4. (a) Explain in detail Six Sigma quality control. 08  
(b) What are the processes involved in project procurement management? Explain. 07
5. (a) What are the different approaches to do risk analysis and assessment. 08  
(b) What is change management? Explain how to deal with conflict and resistances. 07
6. (a) What are the steps required for project closure. 08  
(b) Explain ethics and ethical leadership. 07
7. Write short note on (Any Three):- 15  
(a) Business Case.  
(b) Outsourcing.  
(c) Project Charter.  
(d) Project Life Cycle.

## Operation Research

QP Code : 25276

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) A firm manufactures two products A and B on which the profits earned per unit are Rs. 3 and Rs.4 respectively. Each product is processed on two machines M1 and M2. Product A requires One minute of processing time on M1 and two minutes on M2 while B requires one minute on M1 and one minute on M2. Machine M1 is available for not more than 450 minutes while M2 is Available for not more than 600 minutes during any working day. Find the number of units of Products A and B to be manufactured to get maximum profit. Formulate the above as a LPP and solve by graphical method. [10]

b) The processing time in hours for the jobs when allocated to the different machines are indicated below. Assign the machines for the jobs so that the total processing time is minimum by using Hungarian method. [10]

		Machines			
		M1	M2	M3	M4
Jobs	J1	5	7	11	6
	J2	8	5	9	6
	J3	4	7	10	7
	J4	10	4	8	3

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

$$\text{Maximize } Z = 300X_1 + 200X_2$$

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

$$3X_1 + 3X_2 \leq 135$$

$$\text{And } X_1, X_2 \geq 0$$

[8]

b) Find the initial basic feasible solution for the following transportation problem by Least Cost Method.

		To				Supply
		1	2	3	4	
From	3	3	3	2	1	50
	4	4	2	5	9	20
	Demand	20	40	30	10	

[7]

[TURN OVER

Q.3) a) Solve the following LPP using Two-Phase Method.

$$\begin{aligned} &\text{Minimize } 2X_1 - X_2 \\ &\text{Subjected to, } X_1 + X_2 \geq 2 \\ &\quad \quad \quad X_1 + X_2 \leq 4 \\ &\quad \quad \quad \text{and } X_1, X_2 \geq 0 \end{aligned}$$

[8]

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

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	

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

ii) What is the probability that the project will be completed with in 20 days  
(Given  $P(Z \leq 1.64) = 0.9495$ )

[7]

Q.4) a) Find the sequence that minimizes the total elapsed time required to complete the following task  
On the machines in the order 1-2-3. Find also the minimum total elapsed time (hours) and the  
idle times on the machines.

Task	A	B	C	D	E	F	G
M1	3	8	7	4	9	8	7
M2	4	3	2	5	1	4	3
M3	6	7	5	11	5	6	12

[8]

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

		Player B		
		B1	B2	B3
Player A	A1	2	6	1
	A2	8	4	6
	A3	1	2	1

[7]

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

$$\begin{aligned} &\text{Minimize } Z = 2X_2 + 5X_3 \\ &\text{Subjected to, } X_1 + X_2 \geq 2 \\ &\quad \quad \quad 2X_1 + X_2 + 6X_3 \leq 6 \\ &\quad \quad \quad X_1 - X_2 + X_3 \geq 4 \\ &\quad \quad \quad \text{and } X_1, X_2, X_3 \geq 0 \end{aligned}$$

[8]

[TURN OVER

- b) A truck owner finds from his past records that the maintenance cost per year of a truck whose purchase price is Rs.8,000 are given below

Year	1	2	3	4	5	6	7	8
Maintenance cost (Rs.)	1000	1300	1700	2200	2900	3800	4800	6000
Resale price (Rs.)	4000	2000	1200	600	500	400	400	400

Determine at which time it is profitable to replace the truck.

[7]

- 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 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

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

[8]

- b) i) Explain in brief 'Redundant constraints in LPP'

- ii) Obtain the dual of the following

$$\text{Maximize } Z = 40X_1 + 50X_2$$

$$\text{Subjected to, } 2X_1 + 3X_2 \leq 3$$

$$8X_1 + 4X_2 \leq 5$$

$$\text{and } X_1, X_2 \geq 0$$

[7]

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

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

[8]

- b) The states of nature and strategies of a Food Products Company is as follows:

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 ?

[7]

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QP Code : 25268

(3 Hours)

[Total Marks : 80

NOTE:

- I. Question No. 1 is Compulsory
- II. Attempt any FOUR question from 2 to 7

- Q.1 (a) A large bank has several branches at different places. Each branch maintains the account details of customer. The customer may open joint as well as single accounts. The bank also provides the loan to the customer for different purposes. Bank keeps record of each transaction by the customer to his account. All of the branches have employees and some employees are manager. Construct an ER diagram for the above banking system. Document all assumptions that you make for designing. (20)
- (b) Write a schema definition and normalize all tables to 3NF for the above ER diagram.
- Q.2 (a) What is deadlock? Describe deadlock detection and prevention technique. (8)
- (b) Discuss the three steps in crash recovery in ARIES (7)
- Q.3 (a) Define minimal cover and closure for functional dependencies. (8)
- Consider the relation R(P,Q,R,X,Y,Z) and set of functional dependencies are  
 $P \rightarrow Q$ ,  $RX \rightarrow Y$ ,  $RX \rightarrow Z$   
 $P \rightarrow R$ ,  $Q \rightarrow Y$
- Obtain other functional dependencies and compute closure of  $PX^+$ .
- (b) Write a detailed note on query optimization. (7)
- Q.4 (a) Explain hash based indexing. Discuss the use of hash function in identifying a bucket to search. (8)
- (b) Explain the responsibilities of DBA. (7)
- Q.5 (a) Explain the architecture of database system and also explain how it is different from conventional file system. (8)
- (b) Explain the terms Lossless join decomposition and Dependency preserving decomposition. (7)
- Q.6 (a) What is locking protocol? Describe the 2 phase locking protocol and strict two phase locking protocol. (8)
- (b) What is Bell-LaPadula model? Explain the intuition behind its two rules. (7)
- Q.7 Write a short note on following (any Three) (15)
- (a) ACID Property
  - (b) Grant and Revoke Command
  - (c) Shadow Paging
  - (d) Aggregation and Ternary relationship.

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QP Code : 25274

Time: 3 hours

Marks: 80

Note:

- Question No. 1 is compulsory
- Attempt any four from the remaining six questions
- Assumptions should be made whenever required and should be clearly stated
- Answers to sub questions should be answered together
- Illustrate answers with diagrams wherever necessary

Q1 a) What are key principles of security?

(20)

- Explain digital signature.
- Distinguish between symmetric and asymmetric cryptography.
- Explain what is meant by E\_mail security.

Q2 a) What do you understand by Cryptography. Explain its types. (8)

b) What is Hash? Discuss briefly SHA-1. (7)

Q3 a) What is the importance of message digest? Explain MD2 (8)

b) Give an overview of DES. Explain DES round. (7)

Q4 a) Differentiate between :- (8)

- DES and IDEA
- ECB and CBC

b) In an RSA system the public key of a given user is  $c=31, n=3599$ . What is a private key of the user? Perform encryption and Decryption using RSA for following  $P=3, d=11, e=7, m=5$ .

Q5 a) How does Kerberos version 4 work? How is Kerberos V5 different from Kerberos V4. (8)

b) Discuss inter\_realm authentication in Kerberos. (7)

Q6 a) Explain how SET ensures a secure e-commerce transaction. (8)

b) What is a Digital Certificate? Explain the stepwise process of certificate generation. (7)

Q7 Write short notes on any three of the following

i. Honey pots

ii. SSL

iii. KDC.

iv. Intrusion Detection and Its types

(15)

QP Code : 25270

(3 Hours)

Total Marks 80

N.B. (1) Question 1 is compulsory

(2) Attempt any four questions from question 2 to 7

(3) Use of Scientific calculator is not allowed.

(4) Use of simple calculator is allowed.

(5) Figures to right indicate full marks.

- Q.1(a) Explain DDA Line Drawing Algorithm and Rasterize the line whose end points are A (1, 6) and B (9,12) using DDA line drawing algorithm. (10)
- (b) Explain in brief the process of Bit Plane Slicing. (5)
- (c) Explain Z Buffer algorithm for Hidden Surface Removal. (5)

- Q.2. (a) Find the transformation matrix that transform the given square ABCD to half its size with center still remaining at the same position. The coordinates of the square are A(10,10), B(30,10), C(30,30), D(10,30) and center at (20,20), Also find the resultant coordinates of the square. (8)
- (b) Explain with example Cohen Sutherland technique for line clipping. (7)

- Q.3. (a) Find the clipping coordinates for line  $P_1P_2$  where  $P_1 = (-1,7)$  and  $P_2 = (11,1)$  against window with  $(X_{wmin}, Y_{wmin}) = (1,2)$  and  $(X_{wmax}, Y_{wmax}) = (9,8)$  using Liang Barsky algorithm. (8)
- (b) Discuss any two spatial domain filter approaches for image enhancement. (7)

- Q.4. (a) Derive a single 4 X 4 matrix for the following transformation
- Rotate by 180 around y axis
  - Translate by 3 units in x axis and 4 units in z axis
  - Scale by 4 units in y axis
- (b) Compare Boundary fill and Flood fill algorithm. Write a procedure to fill region bounded by different color used 4 connected approach. (7)

- Q.5 (a) Equalized the given Histogram. (8)

Gray Level	0	1	2	3	4	5	6	7
Number of Pixel	790	1023	850	656	329	245	122	81

- (b) Explain Half toning and Dithering techniques. (7)
- Q 6 (a) Construct the Bezier curve of order 3 with 4 polygon vertices A(1,1) B(2,3) C(4,3) D(3,1) (8)
- (b) Explain with algorithm Bresenham's circle drawing algorithm. (7)

- Q.7 Write a short note on (any Three) (15)
- Difference between Random Scan and Raster Scan
  - inside Outside test & Winding number method
  - Image Digitizer
  - 2D rotation about arbitrary point

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Correction:

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Q.4. (a) Derive a single 4 X 4 matrix for the following transformation

II. Translate by 3 units in x axis and 4 units in z axis

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