M.C.A. IInd Year First Semester (CGS)

15523 : Computer Oriented Optimization Techniques : 3 MCA 5

P. Pages : 3 | **AV - 3278**

Time : Three Hours | Max. Marks : 80

* 0 8 9 6 *

Notes : 1. Assume suitable data wherever necessary.
2. Illustrate your answer necessary with the help of neat sketches.

1. a) The cost of machine is Rs.6,100 and its scrap value is Rs.100. The maintenance cost found from experience are – 7

Year	1	2	3	4	5	6	7	8
Maintenance	100	250	400	600	900	1200	1600	2000

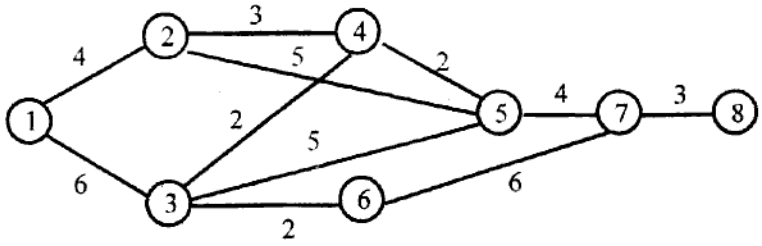
when should the machine be replaced?

b) Describe what do you mean by operation research. Explain classification of problem in operation research. 7

OR

2. a) What is dynamic programming problem? List out the types of problem you can solve with dynamic programming and state Bellman's principle of optimality. 7

b) Find shortest path in the given network. from (1) to (8) 7



3. a) Solve the following by dual Simplex method. 7

Minimize $z = 8x_1 + 10x_2$

Subject to $3x_1 + 5x_2 \geq 20$

$8x_1 + 2x_2 \geq 24$

$x_1 + x_2 \geq 0$

b) Explain the following terms: 6

i) Basic solution ii) Feasible solution

OR

4. a) Solve the following L. P. P. using big M method. 7

Maximize $z = 6x_1 - 3x_2 + 2x_3$

Subject to $2x_1 + x_2 - x_3 \leq 16$

$3x_1 + 2x_2 + x_3 \leq 18$

$x_1 - 2x_3 \geq 8$

$x_1, x_2, x_3 \geq 0$

b) Explain the properties of simplex method in details. 6

5. a) Obtain the initial basic feasible solution to the following transportation problem by 8
i) NWCR & ii) LCM

	D_1	D_2	D_3	D_4	Supply
O_1	15	Ø	2Ø	1Ø	5Ø
O_2	12	8	11	20	5Ø
O_3	Ø	16	14	18	1Ø Ø
Demand	3Ø	4Ø	6Ø	7Ø	

b) Distinguish between Degenerate and non degenerate basic solution. 5

OR

6. a) A company has one surplus truck in each of cities A, B, C, D & E and deficit truck in each of cities 1, 2, 3, 4, 5 & 6. The distance between the cities in kilometer is given below matrix. Find the assignment of truck from cities in surplus to cities in deficit so that the total distance covered by vehicles is minimum cities with deficit. 13

	1	2	3	4	5	6
A	10	12	15	22	20	08
B	12	18	25	15	16	17
C	19	13	18	17	15	09
D	06	17	24	15	18	22
E	19	08	03	10	13	21

7. a) What is integer programming problem? Explain types of integer. 6

b) Explain the various steps in n-jobs three machine problem. 7

OR

8. Solve the following Integer programming problem using Gomary's cutting plan algorithm. 13
Maximize $z = x_1 + x_2$
Subject to $3x_1 + 2x_2 \leq 5$
$x_2 \leq 2$
and $x_1, x_2 \geq 0$

9. a) What is probability of event? If a card is drawn from a pack of 52 cards what is the probability that it is 6
i) Heart card and ii) Acc card

b) Consider the decision maker problem with the following loss table. 7

θ_1	θ_2	θ_3	Actions
3	8	1	a_1
9	6	5	a_2
7	4	8	a_3
5	5	8	a_4

if $P(\theta = \theta_1) = 0.25$, $P(\theta = \theta_2) = 0.6$ & $P(\theta = \theta_3) = 0.15$ find the Bayes decision.

OR

10 a) State the law of addition and multiplication of probability. **7**

b) Describe and explain the following terms **6**
i) Conditional probability
ii) Joint probability

11. A small, project is composed of 'g' activities whose item estimate are. **14**

Activities	$t_o = a$	$t_p = b$	$t_m = m$
1 – 2	6	11	8
1 – 3	19	23	20
1 – 4	27	41	33
2 – 5	17	21	18
2 – 6	16	26	20
3 – 6	7	13	9
4 – 7	8	13	10
5 – 7	8	10	8
6 – 7	4	6	4

i) Construct the network for above.
ii) Determine mean and variance of completion time of each activity.

OR

12. a) Describe the steps involved in Brown's Algorithm. **7**

b) From the following loss table obtain regret table and using regret table find minimax action. **7**

$$\begin{array}{c} \\ A_1 \\ A_2 \\ A_3 \\ A_4 \end{array} \begin{array}{c} \begin{array}{cccc} \theta_1 & \theta_2 & \theta_3 & \theta_4 \end{array} \\ \begin{bmatrix} 2 & -5 & 8 & 4 \\ 4 & 7 & -3 & 5 \\ 6 & 3 & 2 & -1 \\ -1 & 0 & 3 & 2 \end{bmatrix} \end{array}$$

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