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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ME) (E-I 2011 Onwards) (Sem.–6)

OPTIMIZATION TECHNIQUES

Subject Code : DE/ME-3.2

M.Code : 71264

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. **Answer briefly :**
   a) List three steps for critical path analysis.
   b) What is duality in LP?
   c) Name the two fundamental conditions that are the basis of the simplex method.
   d) What is proportionality in linear programming?
   e) Name different methods to solve transportation problem.
   f) Name the three major constituents of a queuing model.
   g) Explain term Pessimistic Time Estimate in PERT/CPM.
   h) List two uses of replacement model.
   i) Name assumptions made in linear programming model.
   j) What are the applications of dynamic programming?

SECTION B

2. Explain Big M method.
3. Using Graphical Method Maximize $Z = 3X_1 + 4X_2$

   subject to : $5X_1 + 4X_2 \leq 200$;

   $3X_1 + 5X_2 \leq 150$;

   $5X_1 + 4X_2 \geq 100$;

   $8X_1 + 4X_2 \geq 80$;

   $X_1, X_2 \geq 0$

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

	1	2	3	4	5	6
A	12	10	15	22	18	8
B	10	18	25	15	16	12
C	11	10	3	8	5	9
D	6	14	10	13	13	12
E	8	12	11	7	13	10

5. Find the cost per period of individual replacement policy of an installation of 300 lights bulbs, given the following :

   a) Cost of replacing individual bulb is Rs. 2.

   b) Conditional probability of failure :

Week No.	0	1	2	3	4
Conditional probability of failure :	0	0.1	0.3	0.7	1

   Also calculate the number of light bulbs that would fail during each of the four weeks.

6. State assumptions made in transportation model.

SECTION-C

7. The cost of a machine is Rs. 6100/- and its scrap value is Rs. 100. The maintenance costs found from experience are as follow :

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

   When should the machine be replaced?

8. Discuss seven elements of queuing system.

9. Explain the similarities and differences between CPM and PERT.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

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