Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐   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
Paper ID : [A2423]

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) Define key row and degeneracy.

b) Write the limitations of OR Models.

c) What do you understand by balanced and unbalanced assignment problem?

d) Write the applications of Dynamic Programming.

e) Define PERT and CPM.

f) What are the limitations of network techniques?

g) Define total float and free float.

h) What is the difference between linear programming and non-linear programming?

i) List two uses of replacement model.

j) Write two characteristics of OR.

SECTION-B

2. Using graphical method

Maximize $Z = 2X_1 + X_2$

Subject to :

$X_1 + 2X_2 <= 10$

$X_1 + X_2 <= 6$

$X_1 - X_2 <= 2$

$X_1 - 2X_2 <= 1$

3. Using Big-M method :

Minimize $Z = 12 X_1 + 20X_2$

Subject to :

$6X_1 + 8X_2 >= 100$

$7X_1 + 12 X_2 >= 120$

$X_1, X_2 >= 0$

4. The cost of a new machine is rupees 5000. The maintenance cost during the nth year is given by M_n = rupess 500 (n-1) where n= 1, 2, 3 …..if the discount rate per year is 0.05, after how many years will it be economical to replace the machine by a new one?

5. Write various assumptions of queuing model.

6. What is the need for dynamic programming? How does it differ from linear programming?

SECTION-C

7. Explain two phase method in detail.

8. 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

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