Exam.Code:0944
Sub. Code: 7080

1048

B.E. (Mechanical Engineering)
Eighth Semester
MEC-802: Operation Research

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Group.

x-x-x

1 a	What are the various types of OR models?	1
b	What do you mean by non-degenerate basic feasible solution of a transportation problem?	1
c	What are the advantages and disadvantages of having inventories?	1
d	What is meant by critical path?	1
e	Define event float in CPM	1
f	What do mean by lead time?	1
g	Define Replacement model	1
h	What are the needs for Decision Tree Diagram?	1
i	What are the Applications of Dynamic Programming?	1
j	What is revised simplex method?	1
	Group-A	
2	Solve the following LP problem by two phase method: Max $Z=5x_1+8x_2$ Subject to the constraints: $3x_1+2x_2\geq 3$ $x_1+4x_2\geq 4$ $x_1+x_2\leq 5$ and $x_1,x_2\geq 0$	10
3	Solve the following LPP by simplex method : Maximize $Z = 100\ x_1 + 200\ x_2 + 50\ x_3$ Subject to $5x_1 + 5x_2 + 10\ x_3 \leq 1000$ $10\ x_1 + 8x_2 + 5x_3 \leq 2000$ $10\ x_1 + 5x_2 \leq 500$ and $x_1, x_2 \geq 0$.	10
4	A computer centr has three expert programmers. The centre wants three application programmes to be developed. The head of the computer centre, after studying carefully the programmes to be developed,estimates the computer time in minutes required by the experts for the application programmes as follows.	10

Programmes	Programmers		
	A	B	C
1	120	100	80
2	80	90	110
3	110	140	120

Assign the programmers to the programmes in such a way that the total computer time is minimum

P.T.O.

Group-B

5 The projects *X*, *Y*, *Z* require truck loads of 45, 60 and 20 respectively per week. The availabilities in plants *A*, *B*, *C* are 40, 40 and 40 of truck loads respectively per week. The cost of transport per unit of truck load from plant to project is given below. **10**

		Project		
		X	Y	Z
Plant	A	5	20	5
	B	10	30	8
	C	10	20	12

(i) Determine an initial solution by VAM.

(ii) Obtain an optimal solution by MODI method. The objective is to minimize the total cost of transportation?

6 Find the optimal transportation cost of the following problem. **10**

		Market					
		A	*B*	*C*	*D*	*E*	Available
Factory	*P*	4	1	2	6	9	100
	Q	6	4	3	5	7	120
	R	5	2	6	4	8	120
Demand		40	50	70	90	90	

7 Listed in the table are the activities and sequencing necessary for a maintenance job on the heat exchangers in a refinery. Draw a network diagram for the project. **10**

Activity	Description	Predecessor Activity
A	Dismantle pipe connections	-
B	Dismantle heater ,closure, and floating front	A
C	Remove tube bundle	B
D	Clean bolts	B
E	Clean heater and floating head front	B
F	Clean tube bundle	C
G	Clean shell	C
H	Replace tube bundle	F, G
I	Prepare shell pressure test	D,E,H
J	Prepare tube pressure test and reassemble	I

x-x-x