SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN(AUTONOMOUS)

(Affiliated to the University of Madras and Re-accredited with A+ Grade by NAAC)

Chromepet,Chennai — 600 044.

B.Sc. END SEMESTER EXAMINATION APRIL/NOV – 2021

SEMESTER - V

13USTCT5012 - **Operations Research - II**

Total Duration	**: 3 Hrs**	**Total Marks**	**: 75**
MCQ	: 30 Mins	MCQ	: 15
Descriptive	: 2 Hrs.30 Mins	Descriptive	: 60

Section B

Answer any ***SIX*** questions ($6 \times 5 = 30$ Marks)

1. Explain briefly the various steps involved in the formulation of primal- dual pair.

2. Obtain the dual problem of the following primal problem:
   Minimize $z = x_1-3x_2-2x_3$
   Subject to $3x_1-x_2 + 2x_3 \leq 7$
   $2x_1-4x_2 \geq 12$
   $-4x_1 + 3x_2 + 8x_2 = 10$; $x_1, x_2 \geq 0$ and x_3 is unrestricted.
3. Explain transportation problem and show that it can be considered as an LPP.

4. Find the initial basic feasible solution to the following transportation problem using least cost method.

	D_1	D_2	D_3	D_4	Supply
S_1	11	13	17	14	250
S_2	16	18	14	10	300
S_3	21	24	13	10	400
Demand	200	225	275	250	

5. Solve the following ssignment problem:

Tasks	Men			
	E	F	G	H
A	18	26	17	11
B	13	28	14	26
C	38	19	18	15
D	19	26	24	10

6. State the rules of network construction.
7. Distinguish between PERT and CPM.
8. A firm is considering replacement of a machine, whose cost price is Rs.12,200 and the scrap value Rs.200. The running cost in rupees are found from experience to be as follows:

Year	1	2	3	4	5	6	7	8
Running cost	200	500	800	1200	1800	2500	3200	4000

When should the machine be replaced?

Contd…

Section C

Answer any **THREE** questions (3 × 10 = 30 Marks)

9. Use dual simplex method to solve the following LPP:
Minimize $z = 3x_1 + x_2$
subject to $x_1 + x_2 \geq 1$
$2x_1 + 3x_2 \geq 2, \quad x_1, x_2 \geq 0.$

10. Find the optimal solution to the following transportation problem:

Source	D_1	D_2	D_3	D_4	Supply
1	21	16	25	13	11
2	17	18	14	23	13
3	32	27	18	41	19
Demand	6	10	12	15	43

11. Explain the nature of travelling salesman problem and give its mathematical formulation.

12. A project consist of eight activities with the following relevant information:

Activity	Immediate predecessor	Estimated duration (days)		
		Optimistic	Most likely	Pessimistic
A	----	1	1	7
B	----	1	4	7
C	----	2	2	8
D	A	1	1	1
E	B	2	5	14
F	C	2	5	8
G	D, E	3	6	15
H	F, G	1	2	3

Draw the PERT network and find out the expected project completion time.

13. Develop a model for the replacement of items whose maintenance costs increase with time and value of money remains same during the period.