B.Sc. DEGREE EXAMINATION,NOVEMBER 2018
III Year V Semester
Core Major - Paper XII
OPERATIONS RESEARCH - II

Time : 3 Hours **Max.marks :60**

Section A $(10 \times 1 = 10)$ Marks

Answer any **TEN** questions

1. Define LPP.
2. What do you mean by dual of a primal problem?
3. What is a transportation problem?
4. Define the degeneracy of a transportation problem.
5. Define an unbalanced assignment problem.
6. Define restricted assignment as far as your knowledge is concerned.
7. Define bottle neck activity.
8. Define PERT.
9. Define gradual failure.
10. Define the situation of group replacement with an example.
11. Define basic feasible solution.
12. Define activity and an event.

Section B $(5 \times 4 = 20)$ Marks

Answer any **FIVE** questions

13. Given the following primal problem, develop its dual problem
    Max $z = 4x_1 + 2x_2$
    subject to $x_1 + x_2 = 15$
    $x_1 \leq 4$
    $x_2 \geq 2; x_1, x_2 \geq 0$
14. Solve the following assignment problem.

	I	II	III	IV
A	8	10	12	16
B	11	11	15	8
C	9	6	5	14
D	15	14	9	7

15. Distinguish between PERT and CPM.

16. Determine the initial basic feasible solution to the following transportation problem by Row minima method.

	To				Availability
From	5	2	4	3	12
	4	8	1	6	15
	4	6	7	5	8
Demand	7	12	17	9	

17. Utility data for network are given below. Determine total, free, independent and interefering floats and identify the critical path.

Activity	0-1	1-2	1-3	2-4	2-5
Duration	2	8	10	6	3
Activity	3-4	3-6	4-7	5-7	6-7
duration	3	7	5	2	8

18. Describe about the strategies of replacement.

19. Write down the mathematical formulation of a Transportation Problem.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Solve the following L.P.P using Dual Simplex
Minimize $z = 10x_1 + 6x_2 + 2x_3$
subject to $-x_1 + x_2 + x_3 \geq 1$
$3x_1 + x_2 - x_3 \geq 2$
$x_1, x_2, x_3 \geq 0$

21. Obtain an optimal solution to the given TP

	D	E	F	G	Availability
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Requirements	200	225	275	250	

22. Five workers and available to work with the machines and respective cost (Rs) associates with each worker - machine are given below. A sixth machine is available to replace one of the existing one and the associated costs also are given below.

Machines							
Warehouse		M1	M2	M3	M4	M5	M6
	W1	12	3	6	-	5	9
	W2	4	11	-	5	-	8
	W3	8	2	10	9	7	5
	W4	-	7	8	6	12	10
	W5	5	8	9	4	6	1

(a) Determine whether the new machine can be accepted.

(b) Also determine optimal assignment and the associated saving in cost.

23. Explain the PERT and CPM network components and precedence relationships with diagram.

24. A firm is thinking of replacing a particular machine whose cost price is Rs.12,200. The sccap price of this machine is Rs.200. The maintenance costs are found to be as follows:

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

Determine when the firm should replace the machine.

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