GALGOTIAS UNIVERSITY

ADMISSION NUMBER

School of Computing Science and Engineering

Bachelor of Technology in Computer Science and Engineering
Semester End Examination - Jun 2024

Duration : 180 Minutes
Max Marks : 100

Sem VI - E2UC511T - Operational Research

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1)	Discuss the difference between: Balanced and unbalanced Transportation problems.	K1(3)
2)	Write dual of following problems:Min z =2x1+2x2 ,s/t 2x1+ x2=5 ; 3x1-x2 = 6 ; x1,x2>=0	K2(4)
3)	A firm manufactures two types of products A and b and sells them at profit of Rs. 2 on type A and Rs. 3 on type B. Each product is processed on two machines E and F. Type A requires one minute of processing on E and two minutes on F, Type B requires one minute of processing on E and one minutes on F. The machine E is available for not more than 6 hours and 40 minutes while machine F is available for 10 hours during any working day. Formulate this problem as LPP.	K2(6)
4)	Write Phase I for the following problem and then solve to show that the problem has no feasible solution. Max z =2x1+5x2 s/t 2x1+3x2 ≥12; 3x1+2x2≤5; x1 & x2 ≥0	K3(6)
5)	Write Phase I for the following problem and then solve to show that the problem has no feasible solution. Max z =x1+x2 s/t 2x1+3x2 ≥12; 4x1+2x2≤4; x1 & x2 ≥0	K3(6)
6)	A plant manager has four subordinates, and four tasks to be performed. The subordinates differ in efficiency and the tasks differ in their intrinsic difficulty. This estimate of the times each man would take to perform each task is given in the effectiveness matrix below. How should the tasks be allocated, one to a man, so as to minimize the total man hours?	K3(9)

	I	II	III	IV
A	8	26	17	11
B	13	28	4	26
C	38	19	18	15
D	19	26	24	10

7) Solve the assignement problem. K3(9)

	I	II	III	IV	V
A	160	130	175	190	200
B	135	120	130	160	175
C	140	110	155	170	185
D	50	50	80	80	110
E	55	35	70	80	105

8) Solve the following LPP Max Z =40x1+35x2 s/t 2x1+3x2≤ 60; 4x1+3x2≤ 96; x1,x2≥0 K4(8)

9) Consider the problem of assigning five jobs to five persons. The assignment costs are given as follows. Determine the optimum assignment schedule. K4(12)

		Job				
		1	2	3	4	5
Person	A	8	4	2	6	1
	B	0	9	5	5	4
	C	3	8	9	2	6
	D	4	3	1	0	3
	E	9	5	8	9	5

10) Solve the following assignment problem K5(10)

		machines			
		I	II	III	IV
jobs	A	10	12	19	11
	B	5	10	7	8
	C	12	14	13	11
	D	8	15	11	9

11) Solve the following assignment problem shown in Table using Hungarian method. The matrix entries are processing time of each man in hours.(rows and coloumns are J/M resp.) K5(15)

$$\begin{bmatrix} 32 & 25 & 22 & 34 & 22 \\ 22 & 38 & 35 & 41 & 26 \\ 22 & 30 & 29 & 30 & 27 \\ 37 & 24 & 22 & 26 & 26 \\ 33 & 0 & 21 & 28 & 23 \end{bmatrix}$$

OR

Solve the following assignment problem shown in Table using Hungarian method. The matrix entries are processing time of each man in hours. K5(15)

J/M	I	II	III	IV	V
1	9	22	58	11	19
2	43	78	72	50	63
3	41	28	91	37	45
4	74	42	27	49	39
5	36	11	57	22	25

12) Find an initial basic feasible solution of the following problem using north west corner rule. K6(12)

	D_1	D_2	D_3	D_4	Supply
O_1	5	3	6	2	19
O_2	4	7	9	1	37
O_3	3	4	7	5	34
Demand	16	18	31	25	

OR

Find an initial basic feasible solution of the following problem using Least Cost Method. K6(12)

	D_1	D_2	D_3	D_4	Supply
O_1	5	3	6	2	19
O_2	4	7	9	1	37
O_3	3	4	7	5	34
Demand	16	18	31	25	