R13

Code No: 812AK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA II Semester Examinations, July/August - 2021
OPERATIONS RESEARCH

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

Answer any five questions
All questions carry equal marks
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1. A company produces two types of hats. Each hat of first type requires twice as much as labour time as second type. If all hats are of the second type only, the company can produce a total of 500 hats a day. The market limits daily sales of the first and second type to 150 and 250 hats. Assuming that the profits per hat are Rs.8 for type A and Rs.5 for type B, formulate the problem as linear model in order to determine the number of hats to be produced of each type so as to maximize the profit. Use the graphical method and solve it. [12]

2. The cost of a machine is Rs.5000. The maintenance costs are given below. [12]

Year	1	2	3	4	5	6
Maintenance cost	100	250	400	500	1000	1500

Find when the machine is to be replaced.

3. Solve the following LPP problem by two-phase method [12]
Max = $2x_1 + 3x_2 + 5x_3$, Subject to
$3x_1 + 10x_2 + 5x_3 \leq 15$
$33x_1 - 10x_2 + 9x_3 \leq 33$
$x_1 + 2x_2 + 3x_3 \geq 4$, $x_1, x_2, x_3 \geq 0$

4. Solve the following transportation problem with initial basic feasible solution by North-West corner method. [12]

Demand / Factory	S_1	S_2	S_3	S_4	Supply
A	7	10	12	10	40
B	9	12	10	10	30
C	12	9	14	12	20
Requirement	25	15	30	10	

5. Solve the following traveling salesman problem
$c_{12}=4$, $c_{13}=7$, $c_{23}=6$, $c_{24}=3$ and $c_{34}=7$ where $c_{ij}=c_{ji}$ [12]

6. Six jobs are to be processed on three machines A, B, C with the order of processing jobs as CBA. [12]

Job	U	V	W	X	Y	Z
Proc,time on machine A	12	10	9	14	7	9
Proc,time on machine B	7	6	6	5	4	4
Proc,time on machine C	6	5	6	4	2	4

Find the sequence that minimized the total elapsed time. Find the total elapsed time. Also find the idle time on each machine.

7. Solve the following game graphically. [12]

	Player B		
Player A	B_1	B_2	B_3
A_1	1	3	11
A_2	8	5	2

8.a) Explain about behavior of various customers enter into queues.
b) State the assumptions of M/M/1 queue. [6+6]

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