

Code No: **R31032**

R10

Set No. 1

III B.Tech I Semester Supplementary Examinations, May-2017

OPERATIONS RESEARCH

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions

All Questions carry equal marks

- 1 Maximize $Z=5x_1-4x_2+3x_3$ Subject to
 $2x_1+x_2-6x_3=20$
 $6x_1+5x_2+10x_3 \leq 76$
 $8x_1-3x_2+6x_3 \leq 50$
 $x_1, x_2, x_3 \geq 0$
- 2 A production cycle involves the manufacturing of 5 products namely, A, B, C, D and E. The set-up costs (in Rupees) are given below:

To

	A	B	C	D	E
From A	----	7	6	8	4
B	7	----	8	5	6
C	6	8	----	9	7
D	8	5	9	----	8
E	4	6	7	8	----

Find the optimal setup cost and its corresponding cycle.

- 3 A machine costs Rs.10, 000/-. Its operating cost and resale values are given below:

Year	1	2	3	4	5	6	7
Operating cost	1000	1200	1400	1700	2000	2500	3000
Resale value	6000	4000	3200	2600	2500	2400	2000

Determine at what time it could be replaced?

- 4 Solve the following 2 x 3 game graphically.

	Player A		
Player B	1	3	11
	8	5	2

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- 5 a) Explain briefly the characteristics of a queuing system.
- b) A TV repairman finds that the time spent on his jobs has an exponential distribution with mean 30 minutes. If he repairs sets in the order in which they come in, and if the arrival of sets is approximately Poisson with an average rate of 10 per 8 hour day, what is repairman's expected idle time each day? How many jobs are ahead of the average set just brought in?
- 6 Find the optimal economic order quantity for a product having the following characteristics:
Annual demand=2400 unit
Ordering cost=Rs.100
Cost of storage=24% of unit cost

Price break quantity	Unit cost (Rs)
$0 \leq q \leq 500$	10.00
$q \geq 500$	9.00

- 7 a) What are the demerits of dynamic programming?
- b) What are the pre-requisites for applying dynamic programming?
- 8 a) What do you understand by simulation? Explain briefly its advantages and disadvantages.
- b) Discuss the types of simulation models.

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