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MBAH 454

Second Semester M.B.A. Degree Examination, September 2020
BUSINESS ADMINISTRATION (Repeaters)
Operations Research

Time : 3 Hours

Max. Marks : 70

SECTION – A

Note : Answer **any two** questions. **Each** question carries **ten** marks. Answer to the question should **not** exceed **five** pages : (2×10=20)

1. Explain the steps involved in the formulation of LPP.
2. Explain various business applications of simulation.
3. What do you understand by a queue ? Give some important applications of queuing theory.

SECTION – B

Note : Answer **any three** questions. **Each** question carries **twelve** marks. Answer to the question should **not** exceed **six** pages : (3×12=36)

4. Find the optimal solution using graphical method.

$$\text{Max } Z = 3X_1 + 5X_2$$

$$\text{Subject to } 3X_1 + 6X_2 \leq 8$$

$$5X_1 + 2X_2 \leq 10$$

$$X_1, X_2 \geq 0.$$

5. The payoff matrix of a game is given. Find the solution of the game to the player A and B

		B				
		I	II	III	IV	V
A	I	-2	0	0	5	3
	II	3	2	1	2	2
	III	-4	-3	0	-2	6
	IV	5	3	-4	2	-6

P.T.O.



6. A company has three production facilities S1, S2 and S3 with production capacity of 7, 9 and 18 units (in 100s) per week of a product, respectively. These units are to be shipped to four warehouses D1, D2, D3 and D4 with requirement of 5, 8, 7 and 14 units (in 100s) per week, respectively. The transportation costs (in rupees) per unit between factories to warehouses are given below. Obtain an optimal solution.

	D1	D2	D3	D4	Capacity
S1	19	30	50	10	7
S2	70	30	40	60	9
S3	40	8	70	20	18
Demand	5	8	7	14	34

7. The following table gives the running cost per year and resale price of certain machine whose purchase price is Rs. 50,000.

Year	1	2	3	4	5	6	7	8
Running Cost (in 1000)	15	16	18	21	25	29	43	40
Resale value (in 1000)	35	25	17	12	8	5	5	5

At what year is the replacement due ?

8. A repair shop attended by single mechanic has an average of four customers per hour who brings small appliances for repair. The mechanic inspects them for defects and takes six minutes on an average. Arrivals are Poisson and the service rate has been exponential distribution. You are required to :
- Find the proportion of finding at least one customer in the shop.
 - What is the average number of customers in the system ?
 - Find the average time spent by a customer in the shop.

SECTION - C
(Compulsory)

Note : Answer to this question should **not** exceed **six** pages. **(1×14=14)**

9. The following table gives a list of jobs along with their duration in days.

Jobs	1-2	1-3	2-4	3-4	2-5	3-6	4-5	4-6	5-7	6-7	7-8
Duration	23	8	20	16	24	18	19	4	10	8	12

- Draw the project network and identify the critical activity.
- Find the total, free and independent float for each activity.