Total No. of Questions : 6]

SEAT No. :

P205

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Oct./BE/Insem. - 521
B.E. (Mechanical)
OPERATION RESEARCH
(2015 Pattern) (Semester - I) (402045B) (Elective - II)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) *Answer Q.1 or Q.2, Q.3 or Q.4, and Q.5 or Q.6.*
2) *Answers in One answer Books.*
3) *Figures to the right indicate full marks*
4) *Assume suitable data, if necessary.*

Q1) Solve the following LPP by Simplex Method **[10]**

Maximize $Z = 2X_1 + X_2$

Subject to Constraints

$4X_1+3X_2 \leq 12;$

$4X_1+X_2 \leq 8;$

$4X_1-X_2 \leq 8;$

$X_1,X_2 \geq 0;$

OR

Q2) a) Discuss various decision making environment. **[4]**

b) A TV dealer finds that the cost of a TV in stock for a week id RS 30 and the cost for the unit shortage id RS 70. For one particular model of TV the probability distribution of weekly sales are as follows: **[6]**

Weekly Sales	0	1	2	3	4	5	6
Probability	0.1	0.1	0.2	0.25	0.15	0.15	0.05

How many units per week should the dealer order? Also find EPVI?

P.T.O.

Q3) A pharmaceutical company is producing a single product and it selling it through five agencies situated in different cities. All of a sudden, there is a demand for the product in another five cities not having any agency of the company. The company placed with a problem of deciding on how to assign the existing agencies to dispatch the product to needy cities in such a way that the travelling distance in minimized. The distance between the surplus and deficit cities in km is given below. **[10]**

Deficit Cities

Surplus Cities	P	Q	R	S	T
A	11	17	8	16	20
B	9	7	12	6	15
C	13	16	15	12	16
D	21	24	17	28	26
E	14	10	12	11	13

OR

Q4) a) Find out the initial feasible solution by using VAM method. **[6]**

		Stores I	II	III	IV	Availability
Warehouse	A	21	16	15	13	11
	B	17	18	14	23	13
	C	32	27	18	41	19
Requirement		6	10	12	15	

b) Discuss the following related to the transportation model. **[4]**

i) Feasible solution

ii) Optimum Solution

iii) Non-degenerate Basic feasible Solution

iv) Degenerate basic feasible solution.

Q5) a) Define what is operation research (Any four definition). **[4]**

b) Players A and B play a game in which each has three choice, A 5P, 10P and the 20P. Each selects a coin without the knowledge of the other's choice. If the sum of the three coins is an odd amount then A wins B's Coin. But if the sum is even then B wins A's Coin. Find the best strategy for each player and the value of game. For player A the payoff matrix is

Player A	Player B		
	5P:B1	10P:B2	20P:B3
5P:A1	–5	10	20
10P:A2	5	–10	–10
20P:A3	5	–20	–20

[6]

OR

Q6) a) Explain in brief following (Any four) **[4]**

i) Gradual failure

ii) Sudden failure

iii) progressive failure

iv) Retrogressive failure

v) Random failure

b) A truck owner finds from his past records that the maintenance cost per year of a truck whose purchase price is Rs. 8,000 are as follows:

Year	1	2	3	4	5	6	7	8
Maintenance Cost (Rs)	1000	1300	1700	2000	2900	3800	4800	6000
Resale price (Rs)	4000	2000	1200	600	500	400	400	400

Determine at which time it is profitable to replace the truck **[6]**