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A – 1159

Reg. No. : .....

Name : .....

**Third Semester Integrated B.B.A. LL.B. (Five Year) Degree  
Examination, April 2016**

**Paper – III : OPERATIONS RESEARCH**

Time : 3 Hours

Max. Marks : 80

- I. Answer **any five** of the following. **Each** question carries **2** marks. Answer should **not** exceed **50** words **each**. **(5×2=10 Marks)**

- 1) What is operations research ?
- 2) What do you mean by maximin and minimax criteria ?
- 3) What do you mean by pure strategy ?
- 4) Define principle of dominance.
- 5) Define activity.
- 6) What is PERT ?
- 7) What do you mean by network analysis ?
- 8) Write any four advantages of linear programming.

- II. Answer **any four** of the following. **Each** question carries **4** marks. Answer should **not** exceed **120** words **each**. **(4×4=16 Marks)**

- 1) What are the main characteristics of Operations Research ?
- 2) Explain the application of LPP in management.
- 3) Explain the importance of game theory.
- 4) What do you mean by value of the game ?





- 5) Form the dual of the following primal programme :

$$\text{Minimize } Z = 20X_1 + 40X_2$$

$$\text{Subject to } 2X_1 + 20X_2 \geq 40$$

$$20X_1 + 3X_2 \geq 20$$

$$4X_1 + 15X_2 \geq 30$$

$$X_1 \text{ and } X_2 \geq 0.$$

- 6) The following is a pay off matrix :

		Y
X	1	2
	1	-2
	2	-1

What is the value of game ? Who will be the winner of the game ? Why ?

- III. Answer **any four** of the following. **Each** question carries **6** marks. **(4×6=24 Marks)**

- 1) Explain the limitations of game theory.
- 2) What is a feasible region ? What will be the shape of a feasible region ? Illustrate graphically.
- 3) What is a general transportation problem ? Explain with examples.
- 4) Explain the Hungarian assignment method.
- 5) A marketing manager wishes to allocate his annual advertising budget of Rs. 20,000 in two media vehicles X and Y. The unit cost of a message media X is Rs. 1,000 and Y is Rs. 1,500. Media X is a monthly magazine and not more than one insertion is desired in one issue. X atleast 5 message should appear in the media Y. The expected effective audience for unit message in media X is 40000 and for media B is 55000. Develop a mathematical model.

- 6) Solve the following game and determine the value of game :

		Y
X	1	2
	4	1
	2	3





IV. Answer **any three** of the following. **Each** question carries **10** marks. **(3×10=30 Marks)**

- 1) What are the different types of models used in Operations Research ?
- 2) A firm manufacturers produces 3 products A, B and C. The profits are Rs. 3, Rs. 2 and Rs. 4 respectively. The firm has 2 machines and below is the required processing time in minutes for each machines on each product.

	Products		
	A	B	C
<b>Machine C</b>	4	3	5
<b>Machine D</b>	2	2	4

Machine C and D have 2000 and 2500 machine minutes respectively. The firm must manufacture 100 A's, 200 B's and 50 C's but not more than 150m A's. Set up an LPP to maximize profit.

- 3) Activity Predecessor time series estimates (weeks) :

Activity	Preceeding	To	Tm	tp
A	--	2	3	10
B	--	2	3	4
C	A	1	2	3
D	A	4	6	14
E	B	4	5	12
F	C	3	4	5
G	D, E	1	1	7

- a) Find the expected duration and variance of each activity.
- b) What is the expected project length ?
- c) Calculate the variance and standard deviation of the project length.





- 4) A factory produces 3 varieties of fountain pens. The fixed and variable costs are given below :

	Fixed Cost	Variable Cost
Type I	Rs. 2,00,000	Rs. 10
Type II	Rs. 3,20,000	Rs. 8
Type III	Rs. 6,00,000	Rs. 6

The likely demands under 3 situations are :

Poor : 25,000, Moderate : 1,00,000, High : 1,50,000

If the price of each type is Rs. 20, prepare the pay off table after showing necessary calculations.

- 5) Solve graphically :

$$\text{Minimize : } Z = 2x + 4y$$

$$\text{Subject to } x + y \leq 14$$

$$2x + 2y \leq 30$$

$$2x + y \leq 18$$

$$x, y \geq 0.$$

Activity	Preceding To
A	-
B	A
C	A, B
D	B, C
E	C, D
F	D, E
G	E, F