



Reg. No. : .....

Name : .....

**Third Semester B.B.A. LL.B. (Five Year Integrated) Degree Examination,  
March 2015  
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) Define Operations Research.

2) Define Linear Programming.

3) What is net work analysis ?

4) What is meant by critical path ?

5) Define 'Saddle Point'.

6) Define 'game'.

7) What are assignment problems ?

8) What is dummy activity ?

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

1) Explain the methods of Operations Research.

2) Distinguish between Slack and Float.

3) What are the application areas of Operations Research ?

4) From the following game matrix, find the saddle point and state the game value.

	M	N
P	6	2
Q	-1	-4



- 5) Express the following game problem into an LPP.

		Player B		
Player A	A <sub>1</sub>	6	2	7
	A <sub>2</sub>	1	9	3

- 6) An animal feed company must produce at least 200 kgs of a mixture consisting of ingredients  $X_1$  and  $X_2$  daily.  $X_1$  costs Rs. 3 per kg and  $X_2$  Rs. 8 per kg. Not more than 80 kg of  $X_1$  can be used and at least 60 kgs of  $X_2$  must be used. Formulate a mathematical model to the problem.

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

- 1) Explain the advantages of operations research.
- 2) Comment on the following statement : operations research is the art of winning war without actually fighting it.
- 3) What are the uses of Network techniques for management ?
- 4) A company produces two types of cow boy hats. Each hat of the first type requires twice as much labour time as the 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 types to 150 and 250 hats. Assuming that the profit per hat are Rs. 38 and for type 1 and Rs. 5 for type 2, formulate the problem as a linear programming model in order to determine the number of hats to be produced of each type so as to maximize the profit.
- 5) You are given the following pay-off matrix.

State of nature	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>
S <sub>1</sub>	25	-10	-125
S <sub>2</sub>	400	440	400
S <sub>3</sub>	650	740	750

The probabilities of the states of nature are respectively, .1, .7 and .2. Calculate and tabulate the EMV and conclude which of the acts can be chosen as the best.





6) A project consists of six activities (jobs) designated from A to F, with the following relationships.

- i) A is the first job to be performed
- ii) B and C can be done concurrently and must follow A
- iii) B must precede D
- iv) E must succeed C but it can not start until B is completed
- v) The last operation F is dependent on the completion of D and E
- vi) Draw the network diagram.

IV. Answer **any three** of the following. **Each** question carries **10** marks.

(3×10=30 Marks)

1) Define Operations Research and discuss its scope. Explain the role of Operations Research in decision making.

2) Solve the following Linear programming problem

Max :  $Z = 60x_1 + 40x_2$

Subject to :  $2x_1 + x_2 \leq 60$

$x_1 \leq 25$

$x_2 \leq 35$

$x_1 \geq 0, x_2 \geq 0$

3) A management is faced with the problem of choosing one of the products for manufacturing. The probability matrix after market research for the two products was as follows :

Act	State of nature		
	Good	Fair	Poor
Product A	0.75	0.15	0.10
Product B	0.60	0.30	0.10



The profit that the management can make for different levels of market acceptability of the products are as follows :

State of nature (Profit in rupees)

Act	Good	Fair	Bad
<b>Product A</b>	35,000	15,000	5,000
<b>Product B</b>	50,000	20,000	Loss of 3,000

Calculate expected value of the choice of alternatives and advice the management.

- 4) The following table gives the activities in a construction project and other relevant information.

<b>Activity</b>	: 1-2	1-3	2-3	2-4	3-4	4-5
<b>Duration</b>	: 20	25	10	12	6	10

Draw a network and find critical path, determine total float, free float and independent float of activities.

- 5) Find the initial solution of the following transportation problem using north-west corner method.

	D	E	F	G	Supply
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Demand	200	225	275	250	