B.Sc. DEGREE EXAMINATION, APRIL 2018.

II YEAR IV SEMESTER

Core Major - Paper VIII - OPERATIONS RESEARCH – I

Time : 3 Hours Max. Marks: 60

SECTION A – (10 × 1 = 10 marks)

(Q. No. 1-12) Answer any *TEN* questions

1. Define operations research
2. State the assumptions of LPP
3. When the basic solution in a LPP is said to be degenerate?
4. How the opportunity loss values are calculated
5. Define decision under uncertainty
6. What do you mean by ‘Decision under risk’
7. Define decision tree
8. Define saddle point.
9. Explain the dominance rule in game theory.
10. Define two person zero sum game
11. What is objective of sequencing problem in OR.
12. Distinguish between pure and mixed strategy game.

SECTION B – (5 × 4 = 20 marks)

(Q. No. 13-19) Answer any *FIVE* questions

1. What is the role of OR in decision making.
2. State the characteristics of decision making problem.
3. A man has the choice of running hot-snack stall or an ice-cream stall at a seaside resort during summer   
    season. If it is a fairly cool summer, he should make `5,000 by running hot-snack stall, but if the   
    summer is quite hot he can only expect to make `1,000. On the other hand, if he operates the ice-  
    cream stall, his profit is estimated `6,500 in the summer, but only `1,000 if it is cool.There is 40%   
    chance of the summer being hot Should he opt for running the hot-snack stall or the ice-cream stall?   
    Give mathematical argument.
4. Solve the following game whose payoff matrix is given by

Player B

1 2 3

1 -2 15 2

Player A 2 -5 -6 -4

1. -5 20 -8
2. Find the sequence that minimizes the total elapsed time required to complete the following jobs on two machines M1, M2 in the order M1 M2.

Jobs : A B C D E F

M1 : 4 8 3 6 7 5

M2  : 4 3 7 2 8 4

1. Solve the following LPP by graphical method.

Max Z=3x+ 5y

Subject to the Constraints

2x + 5y≤15

6x≤ 30

X,Y≥0.

[P.T.O.]

1. Solve the following game by graphical method.

Player B

Player A

SECTION C – (3 × 10 = 30 marks)

(Q. No. 20-24) Answer any *THREE* questions

1. Solve the following LPP using simplex method.

Max Z=4x1+10x2

Subject to the constraints 2x1+ x2 ≤10,

2 x1+5 x2 ≤20

2 x1+3 x2 ≤18

x1, x2 ≥ 0

1. A farmer wants to decide which of the three crops he should plant on his 100 acre farm. The profit from each is dependent on the rainfall during the growing season. The farmer has categorized the amount of rainfall as high, medium and low. His estimated profit for each is shown in the following table. If the farmer wishes to plant only one crop, decide which should be his best crop using i) Maximax principle ii) Maximin principle iii) Laplace principle iv) Hurwitz principle (farmer’s degree of optimism is 0.6).

Rain fall Estimated conditional profit

Crop A Crop B Crop C

High 8000 3500 5000

Medium 4500 4500 5000

Low 2000 5000 4000

1. The demand for a seasonal product is given below.

Demand during season: 40 45 50 55 60 65

Probability : 0.10 0.20 0.30 0.25 0.10 0.05

The product costs `60/unit and sells at Rs.60/unit. If the units are not sold within the season, they will have no market value. Determine the optimum number of units to be produced and calculate EVPI

1. Solve the following game by using dominance property

Player B

I II III IV V VI

Player A 1 4 2 0 2 1 1

2 4 3 1 3 2 2

3 4 3 7 -5 1 2

4 4 3 4 -1 2 2

5 4 3 3 -2 2 2

[P.T.O.]

1. Solve the following sequencing problem. Each job has to go through Mi (i= 1 to 6) in the order M1, M2,…, M6. Processing time(in hours ) is given below.

M1 M2 M3 M4 M5 M6

Job A 18 8 7 2 10 25

Job B 17 6 9 6 8 19

Job C 11 5 8 5 7 15

Job D 20 4 3 4 8 12