



PAY-161100010510 Seat No. _____
B. B. A. (Sem. V) (CBCS) (W.E.F. 2016) Examination
October / November - 2018
Statistics Grp. : Fundamentals of Operations Research
(New Course)

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) Attempt all questions.
(2) Each question carries equal marks.
(3) Use of calculator is permissible.

- 1 (a) Discuss the scope of Operation Research. 7
(b) Describe the characteristics of Operation Research. 7

OR

- 1 Explain in brief Research Methodology. 14
- 2 What is L.P.P. ? Write the assumptions, advantages and limitations of Linear Programming. 14

OR

- 2 Solve the following equations by Graphical Method. 14
- Maximise $Z = 30x_1 + 15x_2$

$$x_1 + \frac{3}{2}x_2 \leq 200$$

$$2x_1 + x_2 \leq 200$$

$$3x_1 \leq 200$$

$$x_1, x_2 \geq 0$$

- 3 (a) What do you mean by Duality Problem ? State the rules for formulation of a dual problem. 7

(b) Obtain the dual of the following LPP. 7

Minimize $Z = 20x_1 + 10x_2$

Subject to $2x_1 + 3x_2 \geq 18$

$$3x_1 + x_2 \geq 8$$

$$2x_1 - x_2 \leq 6$$

$$x_1, x_2 \geq 0$$

OR

3 A company produces two products A and B. These 14
products require three types of processing. The processing
time required for each unit and the profit per unit are given
in the following table :

	Process I	Process II	Process III	Profit per unit
Product A	1	1	2	50
Product B	1	2	1	70
Capacity	70	100	120	

How many units of each product should be produced to get
maximum profit ?

4 (a) What do you mean by Transportation Problem ? 7

(b) Explain the following : 7

(i) Matrix-Minima method

(ii) Vogel's Approximation method.

OR

- 4 Using North-West Corner Rule obtain an initial feasible solution to the problem given below : 14

Source	Destination			Supply
	D_1	D_2	D_3	
S_1	8	6	10	300
S_2	12	16	10	400
S_3	14	10	12	300
Demand	450	350	200	1000

- 5 (a) Describe the steps involved in Hungarian Method for solving minimization problems. 7
- (b) Explain briefly Travelling Salesman Problem. 7

OR

- 5 Apply Hungarian method to the following table and show how workers are assigned the tasks so that the total time for completion of all the four tasks is minimized. 14

Job \ Worker	A	B	C	D
W_1	5	3	1	5
W_2	6	6	2	7
W_3	5	5	3	8
W_4	8	2	4	3