



PR-010-1022001

Seat No. _____

P. G. D. H. M. (Sem. II) (CBCS) Examination

August - 2020

Operations Research

Faculty Code : 010

Subject Code : 1022001

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

[Total Marks : 70

Instructions : (1) Attempt all questions.

(2) Each question carries equal marks.

1 Define following terms : (Any Seven)

14

- (1) The variables which are added to the objective function z for solving LPP by simplex method are called _____
- (2) What is assignment Problem?
- (3) CPM means _____
- (4) PERT means _____
- (5) The Transportation Problem is solved by using _____ method.
- (6) The Assignment Problem is solved by using _____ method.
- (7) What is Simplex method ?
- (8) What is linear programming ?
- (9) Define : Sensitive analysis
- (10) Define : Objective Function

- 2** Answer the following : **14**
- (1) Write down the characteristics of linear programming.
 - (2) A company owns two flour mills, A and B, which have different production capacities for high, medium and low grade flour. This company has entered a contract to supply flour to a firm every week with 12, 8 and 24 quintals of high, medium and low grade respectively. It costs the company Rs. 1,000 and Rs. 800 per day to run mill A and B respectively. On a day, mill A produces 6, 2 and 4 quintals of high, medium and low grade flour respectively; mill B produces 2, 2 and 12 quintals of high, medium and low grade flour respectively. How many days per week should each mill be operated in order to meet the contract order most economically? Using Graphical method.

OR

- 2** Answer the following : **14**
- (1) Define the general structure of the transportation problem.
 - (2) Draw the flow chart for the transportation problem.
- 3** Answer the following : **14**
- (1) Discuss the assignable problem with mathematical model.
 - (2) An agriculturist has a 125 acre farm land and he wishes to produce radish, peas and potato. Whatever he raises is fully sold in the market. He gets Rs. 5 per kg of radish, Rs. 4 per kg for peas and Rs. 5 per kg for potato. The average yield/acre is 1500 kg of radish, 1800 kg of peas and 1200 kg of potato. To produce each 100 kg of radish and peas and 80 kg potato, a sum of Rs. 12.50 has to be used for manure. Labour required to each acre to raise the crop is 6 man-days for radish and potato each and 5 man-days for peas. A total of 500 man-days of labour at a rate of Rs. 40 per man-days are available. Formulate this as LPP model to maximize the agriculturist's total profit.

OR

3 Answer the following : 14

- (1) A company manufactures two products, A and B. Each unit of B takes twice as long to produce as one unit of A and if the company were to produce only A it would have time to produce 2000 units per day. The availability of raw material is sufficient to produce 1500 units per day of both A and B combined. Product B requires a special ingredient and only 600 units can be made per day. If A fetches Rs. 2 as profit per unit and B profit of Rs. 4 per unit, find the optimum product-mix. By the graphical method of LPP.
- (2) Discuss the advantages of linear programming.

4 Answer the following : 14

- (1) Solve the following LPP by graphical method :
 Maximize : $Z = 100x_1 + 40x_2$
 Subject to $5x_1 + 2x_2 \leq 1000, 3x_1 + 2x_2 \leq 900, x_1 + 2x_2 \leq 500$
 and $x_1, x_2 \geq 0$.
- (2) Explain briefly Degeneracy in Transportation Problem (TP).

OR

4 Answer the following : 14

- (1) State the limitations of the linear programming.
- (2) Explain the working rule of Hungarian Method.

5 Answer the following : 14

- (1) Determine the initial basic feasible solution to the following transportation problem by using North - West Corner Method :

<i>Factory Warehouse</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>Requirement</i>
1	50	40	80	400
2	80	70	40	400
3	60	70	60	500
4	60	60	60	400
5	30	50	40	800
<i>Availability</i>	800	600	1100	

(2) Explain Simplex method in detail by its flow - chart.

OR

5 Answer the following : **14**

- (1) What is operation research? State the objectives of operation research with example.
- (2) Find the optimal assignment schedule of the following matrix :

<i>Task</i>	<i>Man</i>			
	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>
<i>A</i>	18	36	27	21
<i>B</i>	23	38	14	36
<i>C</i>	48	29	28	25
<i>D</i>	29	36	34	20
