

(4)

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Roll No.....

Total No. of Units : 04

Total No. of Printed Pages : 04

OR

A contactor has to supply 10,000 bearings per day to an automobile manufacturer. He finds that, when he starts a production run, he can produce 25,000 bearings per day. The cost of holding a bearing in stock for one year is Rs.2 and the set-up cost of production run is Rs. 1800. How frequently should production run be made?

Unit - IV

Q.4 A. Define quadratic programming problem. (2)

Q.4 B. Explain non-linear programming problem. (2)

Q.4 C. Obtain the necessary conditions of the following NLPP : (4)

Minimize s.t.c.

$$x_1 + x_2 = 7, x_1, x_2 \geq 0$$

OR

Obtain the set of necessary conditions for the NLPP :

Minimize s.t.c.

$$x^2 + y^2 - a^2 = 0, x \geq 0, y \geq 0$$

Q.4 D. Determine and so as to (12)

Maximize s.t.c. :

$$x_1 + x_2 \leq 2, 2x_1 + 3x_2 \leq 12,$$

$$x_1, x_2 \geq 0.$$

OR

Use Wolfe's method to solve the QPP:

Maximize s.t.c. :

$$x_1 + 4x_2 \leq 4, x_1 + x_2 \leq 2$$

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Fourth Semester Examination, May 2019**M.Sc. MATHEMATICS****Paper - IV****OPERATIONS RESEARCH (II)**

Time : 3 Hrs.

Max. Marks : 80

- Part A and B of each question in each unit consist of very short answer type questions which are to be answered in one or two sentences.

Part C is short answer type and Part D is long answer type.

$$z = 3x_1 + 5x_2 \rightarrow \max$$

$$s.t. \quad 4x_1 + 6x_2 \leq 24$$

$$x_1, x_2 \geq 0$$

Unit - I

Q.1 A. Explain the backward computational procedure in dynamic programming. (2)

Q.1 B. Write Gomory's cut constraint. (2)

Q.1 C. Write fractional cut method for all integer linear programming problem. (4)

OR

Write the dynamic programming algorithm.

Q.1 D. Use dynamic programming to solve the following problem : (12)

Minimize subject to the constraints (s.t.c.)

and .

P.T.O.

(2)

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OR

Use branch and bound method to solve the following L.P.P. :

Minimize s.t.c. : $5x_1 + 3x_2 \geq 30$
and are integers.

Unit - II

Q.2 A. Write the dominance property. (2)

Q.2 B. Explain saddle point of a game. (2)

Q.2 C. Consider the game . Determine the frequency of optimum strategies by matrix addment method and find the value of game. (4)

OR

Let be the payoff matrix for a two-person zero-sum game. If denotes the maximin value and the minimax value of the game, then prove that .

Q.2 D. Solve the following game graphically : (12)

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OR

Determine the range of value of p and q that will make the payoff element saddle point for the game whose payoff matrix is :

Unit - III

Q.3 A. Explain the shortage cost. (2)

Q.3 B. Explain the Little's formulae. (2)

Q.3 C. Explain the problem of with several production runs of unequal length. (4)

Player A $\begin{bmatrix} 4 & 0 & 2 & 1 & 0 \\ 4 & 2 & 1 & 0 & 2 \end{bmatrix}$
Player B $\begin{bmatrix} 1 & p & 0 & 8 & 3 & 2 \end{bmatrix}$

OR

A T.V. repairman finds that the time spent on his jobs has an Exponential distribution with mean 30 minutes. If he repairs sets in the order in which they came in and if the arrival of sets is approximately Poisson with an average rate of 10 per 8-hour day, what is his expected idle time each day? How many jobs are ahead of the average set just brought in?

Q.3 D. Assume that the goods trains are coming in a yard at the rate of 30/day and suppose that the inter-arrival times follow an exponential distribution. The service time for each train is exponential with an average of 36 minutes. If the yard can admit 9 trains at a time, calculate the probability that the yard is empty and find the queue length. (12)