PC - 484

(514) M.A./M.Sc. MATHEMATICS (FOURTH SEMESTER)

Examination JUNE 2020

Compulsory/Optional

Group-

Paper-V

OPERATION RESEARCH-II

Time:- Three Hours | Maximum Marks: 080

Minimum Passing Mark- 29

नोट : दोनों खण्डों से निर्देशानुसार उत्तर दीजिए। प्रश्नों के अंक उनके दाहिनी ओर अंकित हैं।

Note: Answer from Both the Section as Directed. The Figures in the right-hand margin indicate marks.

Section - A

1. Answer all the questions:

(a) Write Principle of Optimality due to Bellman in dynamic programming.

(b) Who suggested first the method of obtaining and optimum integer solution of an all integer programming problem.

(c) Differentiate between pure strategy and mixed strategy.

(d) Determine that following two person zero-sum game is strictly determinable or not.

$$A = \begin{bmatrix} -5 & 2 \\ -7 & -4 \end{bmatrix}$$

(e) Define term Inventory.

(f) In queneing system define transient and steady states.

(g) Give an example of non-linear programming problem.

(h) Who developed the method of obtaining solution of quadratic programming problem by classical calculus results.

(i) In solving of any non-linear programming problem when will one can apply Kuhn-Tucker Method.

(j) Define any two basic elements of a queneing system.

2. Answer the following questions: 2X5

(a) Write any 4 characteristics of dynamic programming.

(b) For what value of the λ_D game with following pay off matrix is strictly determinable

		Player B		
		B_1	B_2	B_3
Player A	A_1	λ	6	2
	A_2	-1	λ	-7
	A_3	-2	4	λ

(c) Write the set of necessary conditions for nlpp.

Maximize $z = {x_1}^2 + 3{x_2}^2 + 5{x_3}^2$ subject to

the constraints $x_1 + x_2 + 3x_2 = 2, 5x_1 + 2x_2 + x_3 = 5$

(d) Write the little's formula in queneing theory.

(e) What are the factors which affecting inventory control.

Section - B

Answer the following questions: 12X5

3. Use dynamic programming to solve

Minimize $z = {y_1}^2 + {y_2}^2 + {y_3}^2\ S.t.$

Constraints $y_1 + y_2 + y_3 \geq 15\ and\ y_1, y_2, y_3 \geq 0$

OR

Use dynamic programming to solve L.P.P.

Maximize $Z = 3x_1 + 5x_2$

$x_1 \leq 4, x_2 \leq 6, 3x_1 + 2x_2 \leq 18\ and\ x_1, x_2, x_3 \geq 0$

4. For any two-person zero sum game without saddle point having the pay-off matrix for player A

$A_1 \begin{bmatrix} a_{11} & a_{12} \\ A_2 & a_{21} & a_{22} \end{bmatrix}$ the optimum best strategies.

$$S_A = \begin{bmatrix} A_1 & A_2 \\ p_1 & p_2 \end{bmatrix} \& \quad S_B = \begin{bmatrix} B_1 & B_2 \\ q_1 & q_2 \end{bmatrix}$$

Then find p_1, p_2, q_1, q_2 & value of the game.

OR

Solve following game graphically and find the optimal strategies for both persons and the value of the game.

$$\begin{array}{c} \\ A \end{array} \begin{array}{c} B \\ \begin{bmatrix} 1 & -3 \\ 3 & 5 \\ -1 & 6 \\ 4 & 1 \\ 2 & 2 \\ -5 & 0 \end{bmatrix} \end{array}$$

5. find the solution for following mixed-integer programming problem.
Maximize $z = x_1 + x_2$ subject to the constraints
$3x_1 + 2x_2 \leq 5, x_2 \leq 2, x_1 \geq 0, x_2 \geq 0$ *and* x_1 *is an integer.*

OR

Use Branch and bound technique to solve the following LPP

Max $Z = x_1 + x_2$

St. $3x_1 + 2x_2 \leq 12$

$x_2 \leq 2, x_1, x_2$ *are integers and* $x_1 \geq 0, x_2 \geq 0.$

6. Solve the following NLPP
Minimize $Z = {x_1}^2 + {x_2}^2 + {x_3}^2$
Subject to constraints
$4x_1 + {x_2}^2 + 2x_3 = 14, \quad x_1, x_2, x_3 \geq 0$

OR

Solve the following NLPP by separable convex programming
Maximize $f(x) = 3x_1 + 2x_2$ subject to constraints
$g(x) = 4{x_1}^2 + {x_2}^2 \leq 16$ *and* $x_1, x_2 \geq 0$

7. Neon light in an industrial park are replaced at the rate of 100 units per day. The physical plant orders the Neon Light periodically. It costs Rs 100 to initiate a purchase order A neon light Kept in storage is estimated to cost about Rs 02 per day. The load time between placing and receiving and order is 12 days. Determine the optimal inventory policy for ordering the neon lights.

OR

(a) A contractor has to supply 10,000 bearings per day to an automobile manufacturer. He finds that, when be straits 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 a production run is Rs 1,800. How frequently should production run he made?

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