



ISL Engineering College,
Hyderabad

Internal - I exam - 2021-22

Subject: OR

Year: Second Year - Fourth Semester

Marks:20

SET-A

Faculty: MD BAHAUDDIN

Duration:60Minutes

PART-A

Answer All the questions

2*3=6M

Q1):Define operation research .and explain scope of operation research. (BTL: 2, CO: 1, PO: 3)

Q2):-Explain characteristics of operation research. (BTL: 2, CO: 2, PO: 4)

Q3):-Primal to dual conversion. (BTL: 6, CO: 1, PO:3)

$$\text{Max } z=3x_1+4x_2$$

$$\begin{aligned} \text{subject to } & 2x_1+6x_2 \leq 16 \\ & 5x_1+2x_2 \geq 20 \\ & x_1, x_2 \geq 0 \end{aligned}$$

PART-B

Answer any Two of the following questions

7*2=14M

Q4):-A small scale industry produce three rubber products. These products are processed on three different machines. The time required to manufacture one unit of each of the three different machines, the time required to manufacture one unit of each of the three products and the daily capacity of the three machines is given in the table below

Machine	Time per unit (min.)			Machine Capacity (Minutes / day)
	Product 1	Product 2	Product 3	
M ₁	2	3	2	440
M ₂	4	-	3	420
M ₃	2	5	-	430

It is required to Determine the daily number of units to be manufactured for each product. The profit per unit for product 1, 2 and 3 are RS.4, RS.5, RS.6 respectively. It is assumed that all the quantities produced are consumed in the market. Formulate this as an LP problem. (BTL: 3, CO: 2, PO: 3)

Q5):-Solve the L.P.P by graphical method. (BTL: 3, CO: 2, PO: 3)

$$\text{Minimize } Z=20X_1+10X_2$$

$$\begin{aligned} \text{Subject to } & x_1+2x_2 \leq 40 \\ & 3x_1+x_2 \leq 30 \\ & 4x_1+3x_2 \leq 60 \\ & X_1, x_2 \geq 0 \end{aligned}$$

Q6):-solve the following linear programming problem. (BTL: 3, CO: 1, PO: 3)

$$\begin{aligned} \text{Max } z &= 80x_1 + 55x_2 \\ \text{Subject to } & 4x_1 + 2x_2 \leq 40 \\ & 2x_1 + 4x_2 \leq 32 \\ & \text{and } x_1, x_2 \geq 0 \end{aligned}$$



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PART-A

Answer All the questions

2*3=6M

Q1): Difference between primal to dual. (BTL: 2, CO: 3, PO: 2)

Q2):-Explain phases of operation research. (BTL: 2, CO: 2, PO: 4)

Q3):-Solve the LPP by Graphical method. (BTL: 3, CO: 2, PO: 3)

$$\max Z=3X_1+2X_2$$

SUBJECT TO $x_1+x_2 \geq 4$

$$x_1+x_2 \leq 1$$

$$x_1, x_2 \geq 0$$

PART-B

Answer any Two of the following questions

7*2=14M

Q4):-A small scale industry produce three rubber products. These products are processed on three different machines. The time required to manufacture one unit of each of the three different machines. The time required to manufacture one unit of each of the three products and the daily capacity of the three machines is given in the table below

Machine	Time per unit (min.)			Machine Capacity (Minutes / day)
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It is required to Determine the daily number of units to be manufactured for each product. The profit per unit for product 1, 2 and 3 are RS.4, RS.6 respectively. It is assumed that all the quantities produced are consumed in the market. Formulate this as an LP problem. (BTL: 3, CO: 1, PO: 3)

Q5):-Solve the LPP by Graphical Method. (BTL: 3, CO: 1, PO: 3)

$$\begin{aligned} \text{maximize } & Z=100X_1+40X_2 \\ \text{Subject to } & 5X_1+2X_2 \leq 1000 \\ & 3X_1+2X_2 \leq 900 \\ & X_1+2X_2 \leq 500 \\ & X_1, X_2 \geq 0 \end{aligned}$$

Q6):-Solve the following LPP by Simplex method. (BTL: 3, CO: 1, PO: 3)

$$\begin{aligned} \text{Max } & z=80x_1+55x_2 \\ \text{subject to } & 4x_1+2x_2 \leq 40 \\ & 2x_1+4x_2 \leq 32 \\ & \text{and } x_1, x_2 \geq 0 \end{aligned}$$



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SET-C

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PART-A

Answer All the questions

2*3=6M

Q1):Difference between primal to dual. (BTL: 2, CO: 3, PO: 2)

Q2):-Primal to dual conversion. (BTL: 3, CO: 1, PO: 3)

$$\text{MIN } Z = 2X_2 + 5X_3$$

$$\begin{aligned} \text{Subject to } & x_1 + x_2 \geq 2 \\ & 2x_1 + x_2 + 6x_3 \leq 6 \\ & x_1 - x_2 + 3x_3 = 4 \\ & \text{and } x_1, x_2, x_3 \geq 0 \end{aligned}$$

Q3):-Primal to dual conversion. (BTL: 3, CO: 1, PO: 3)

$$\text{max } z = x + 2y$$

$$\text{subject to } 2x + 3y \geq 4$$

$$3x + 4y = 5$$

$$x \geq 0, y \text{ is unrestricted}$$

PART-B

Answer any Two of the following questions

7*2=14M

Q4):-A small scale industry produce three rubber products. These products are processed on three different machines. The time required to manufacture one unit of each of the three different machines, the time required to manufacture one unit of each of the three products and the daily capacity of the three machines is given in the table below

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It is required to Determine the daily number of units to be manufactured for each product. The profit per unit for product 1, 2 and 3 are RS.4, RS.6 respectively. It is assumed that all the quantities produced are consumed in the market. Formulate this as an LP problem. (BTL: 3, CO: 1, PO: 3)

Q5):-solve the LPP by simplex method. (BTL: 3, CO: 1, PO: 3)

$$\text{min } Z = x_1 - 3x_2 + 2x_3$$

$$\text{Subjected to } 3x_1 - x_2 + 3x_3 \leq 7$$

$$-2x_1 + 4x_2$$

$$\leq 12$$

$$-4x_1 + 3x_2 + 8x_3 \leq 10$$

$$x_1, x_2, x_3 \geq 0$$

Q5):-Solve the L.P.P by graphical method. (BTL: 3, CO: 1, PO: 3)

$$\text{Max } z = 3x_1 + 2x_2$$

$$\text{Subject to } x_1 - x_2 \geq 1$$



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$$x_1 + x_2 \geq 3$$

$$x_1, x_2 \geq 0$$

