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## MATHS

# BOOKS - MODERN PUBLICATION 

## LINEAR PROGRAMMING

## Exercise

1. Define objective function.

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2. State the feasible solution.

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3. State the extreme point theorem.

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4. To which coordinate axis the line $x=1$ and $y=2$ is parallel.

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5. An animal feed company must produce 200 kg of a mixture consisting of ingredients $A$ and $B$. The-ingredient A costs Rs. 3 per $k g$ and B costs 5 per $k g$. No more than 80
$k g$ of A can be uséd and at least 60 kg of B must be used.
Formulate the problem to minimise the cost of mixture.

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6. A merchant sells two models $X$ and $Y$ of TV with cost price ₹ 25000 and ₹ 50000 Per set respectively. He gets a profit of ₹ 1500 on model $X$ and $₹ 2000$ on model $Y$. The sales connot exceed 20 sets in a month. If he cannot invest more than 6 lakh rupees, formulate the problem of determining the number of sets of each type he must keep in stock for maximum profit.

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7. A factory uses three different respurce for the manufacture of two different products, 20 units of the resource $A, 12$ units of $B$ and 16 unit of $C$ being available.

One unit of the first product requires 2,2 and 4 units of the resources and one unit of the second product requires

4,2 and 0 units of the resources taken in order. It is known that the first product gives a profit of ₹ 20 per unit and the second ₹ 30 prt uniy. Formulate the LPP so as to earn maximum profit.

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8. An agro-based company produces tomato souce and tomato jelly. The quantity of material, machine hour,
labour (man hour) required to to produce one unit of each product and the avilability of raw material one given is the following table.

|  | souce | Jelly | availability |
| :---: | :---: | :---: | :---: |
| Mann hour | 3 | 2 | 10 |
| Machinehour | 1 | 2.5 | 7.5 |
| Raw material | 1. | 1.2 | 4.2 |

Assume
that one unit of source and of unit of jelly, yield a profit of Rs 2 and Rs 4 respectively. Formulate the L.P.P so as to yield maximum profit.

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9. (Allocation Problem.)A farmer has 5 acres of land on which he wishes to grow two crops X and Y . He has to use

4 cart loads and 2cart loads of manure per acre for crops X
and Y respectively. But not more than 18 cart loads of manure is available. Other expenses are ₹200 and ₹500 per acre for the crops $X$ and $Y$ respectively. He estimates profit from crops $X$ and $Y$ at the rates ₹ 1000 and ₹ 800 per acre respectively. Formulate the LPP as to how much land he should allocate to each crop for maximum profit.

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10. Maximise $Z=5 x_{1}+7 x_{2}$

Subject to $x_{1}+x_{2} \leq 4$,
$5 x_{1}+8 x_{2} \leq 24$
and $10 x_{1}+7 x_{2} \leq 35, x_{1}, x_{2} \geq 0$.

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11. Solve the following LPP

Minimise $Z=20 x_{1}+10 x_{2}$

Subject to $x_{1}+2 x_{2} \leq 40$
$3 x_{1}+x_{2} \geq 30$
$x_{1}, x_{2} \geq 0$.

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12. Solve the following LPP graphically Optimize

$$
\begin{aligned}
& Z=5 x_{1}+25 x_{2} \\
& -0.5 x_{1}+x_{2} \leq 2, x_{1}+x_{2} \geq 2,-x_{1}+5 x_{2} \geq 5, x_{1}, x_{2} \geq 0
\end{aligned}
$$

