MATHS

BOOKS - NEW JYOTHI MATHS (TAMIL ENGLISH)

LINEAR PROGRAMMING

Example

1. A company manufactures two proudcts. A and B on which the profits erarned per unit areRs.

30 and Rs. 40 respectively. Each product is procced on two machines M_1 and M_2. One unit of product A requires on hour of processing time on M_1 and 2 hours on M_2 While one unit of product B requires one hour each on M_1 and M_2. Machines M_1 and M_2 are availabe atmost 10 hours and 12 hours respectivrely during working day. The company wants to know how many units of proudcts A and B should be produced to maximise the profit.

to formulate a linearprogramming problem

(i) Write the objective function.

(ii) Write all contraints.

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2. Condier the following problem. A manufacture produced tables and chairs. It takes 3 hours of work on machine A mind 1 hour of work on machine B to produce one table and 2 hours of work on machine A and 3 hours on machine B to produce 1 chair . He erars a profit fo Rs. 50 per table and Rs 40 per chair. Hoperates the machines a and B for atmost 12

hours hours respectively. how many tables and chairs should be produce each day to maximise his profit ?

(i) Write the objective function.

(ii) Write the constrains.

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3. A firm produced 2 different products A and B. Each product has to undergo three operations before takes the shape. The profit per unit and time required per unit of each product in each operation is tabulated below.

Department	Time taken by each unit of product A & B in hours		Maximum Time available
	A	B	
Cutting	1	4	24 hours
Mixing	3	1	21 hours
Packing	1	1	9 hours
Net profit per unit of product	₹5	₹8	

To formulate a linear programming problems write

(i) the non-negativity constraints

(ii) Cutting constraints .

(iii) Mixing constraints

(iv) Packing constraints

(v) Objective function

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4. A tyre manufactureing company produces tyres of cars and buses. Three machines A, B, C are to be used for the production of these typres. Machines A and C are available for operation atmost 11 hours, whereas B must be operated for atleast 6 hours a day. the time required for construction of one typre the three machines given in the following table.

Tyre	Hours		
	A	B	C
Car	3	2	1
Bus	4	3	2

Comapy sells all the tyres and gets a profit of Rs. 100 Rs 150 on a tyre of a car and bus respectively. The company wants to know how many numbers of each item to be produced to maximise the profit.

To formulate a linear programmining problem,

(i) Write the objective function.

(ii) Write all constraints.

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5. Consider the linear inequalities

$2x + 3y \leq 6, 2x + y \leq 4, x \geq 0, y \geq 0$

(i) Mark the feasible region.

(ii) Maximise the function $Z = 4x + 5y$ subject to the given constraints.

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6. (i) Draw the graph of

$5x + 4y = 40, x = 4, y = 5$

(ii) Solve the following LPP graphically maximise

$Z = 3x + 5y$

Subject to the conditions

$5x + 4y \leq 40, x \leq 4, y \leq 5, x, y \geq 0$

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7. Consider the linear programming problem

Maximize $Z = 4x + y$

Subject to the constraints.

$x + y \leq 50$

$3x + y \leq 90$

$x > 0, y > 0$

(i) Draw its feasible region.

(ii) Find the corner points of the feasbile region.

(iii) Find the corner at whcih Z attains its maximum.

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8. Solve the following linear programming problem graphically.

Minimize $Z = 200x + 500y$

subject to the constraints:

$x + 2y \geq 10$

$3x + 4y \leq 24$

$x \geq 0, y, \geq 0$

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9. Minimise and maximise $Z = 3x + 9y$ subject to the constraints.

$x + 3y \leq 60$

$x + y \geq 10$

$x \leq y$

$x \geq 0, y \geq 0$

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10. Consider the linear programming problem.

Maximize $Z = x + y$

Subject to $2x + y - 3 \geq 0$

$x - 2y + 1 \leq 0$

$y \leq 3$

$x \leq 0, y \leq 0$

(i) Draw its fesible region.

(ii) Find the corner points of the feasible region.

(iii) Find the corner at which Z attains its maximum.

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11. Solve the following linear programming problem graphically :

Minimize $Z = x + 2y$

subject to $2x + y \geq 3, x + 2y \geq 6, x, y \geq 0.$

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12. Minimise $Z = 3x + 2y$

Subject to the constraints

$x + y \geq 8$

$3x + 5y \leq 15$

$x \geq 0, y \geq 0$

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13. Manu has Rs. 36,000 for purchaes of rice and wheat. A bag of rice and a bag of wheat cost Rs 180 and Rs 120 respectively. He has a storage capacity for 250 bages only. He ears a profit of Rs 11 and Rs. 9 per bag of rice and wheat respectively.

(i) formulate an LPP to maximise the profit

(ii) Solve the LPP.

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14. A furniture dealer sells only tables and chairs. He has Rs. 12,000 to invest and a space to store 90 pieces. A tables costs him Rs. 400 and a chair Rs 100. He can sell a table at a profit of Rs. 75 and a chair at a profit of Rs. 25. Assume that he can sell the items. The dealer wants to get maximum profit.

(i) By defining suitabale variables, write the objective function.

(ii) Write the constraints.

(iii) Maximise the objective function graphically.

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15. A company produes two types of cricket ball A and B. the production time of one ball of type B is double the type A (Time in units) . The company has a time to produce a maximum 2000 balls per day. The supply of raw material is sufficient for the production of 1500 balls (both A and B) per day. the company wants to make maximum profit by making profit fo Rs 3 from a ball of tye A and Rs. 5 from a ball of type b. Then

(i) By defining suitable variables, write the objective function.

(ii) Write the constraints.

(iii) How many balls should be produced in each type per day in order to get maximum profit ?

16. A manufacturing company makes tow models A and B of product. Each piece of model A reqwuires 9 labour hours for fabricating and 1 hour labour for finishing . Each piece of model Brequires 12 labour hours for fabricating and 3 labour hours for fininshing. for fabricating and finishing, the maximum labour hours available are 180 and 30 respectively. The company makes

a profit of Rs. 8,000 on each piece of modle A and Rs 12,000 on each piece of model B. How many pieces of model A and B should be manufactured per week to realise a maximum profit ? What is the maximum profit per week ?

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17. A bakery owner makes two types of cakes A and B. three machines are needed for this pupose. The time in (minutes) required for each type of cake in each machine is given below.

	Types of cakes	
Machine	A	B
i	12	6
ii	18	0
iii	6	9

Each machines is available for atmost 6 hours per day. Assume that all cakes will be sold out every day. The bakery owner wants to make maximum pforit per day by making Rs. 7.5 from type A and Rs. 5 from type B.

a Write the objective function by defining suitable variables.

b Write the constraints.

c Find the maximum profit graphically.

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18. There are two factories located at place P and the other the place Q. From these locations, a certain commodity is to be delivered to eachof the three depots situated A, B and C. the weekly requirement of the de-pots are respectively 5,5 and 4 units of the commodity while the production capacity of the factories at P and Q are respectively 8 and 6 units. The cost of

transportation per unit is gien below.

From / To	Cost in ₹		
	A	B	C
P	160	100	150
Q	100	120	100

How many units should be transported from each factory to each depot in order that the transportation cost in minimum ? What whill be the minimum transportation cost ?

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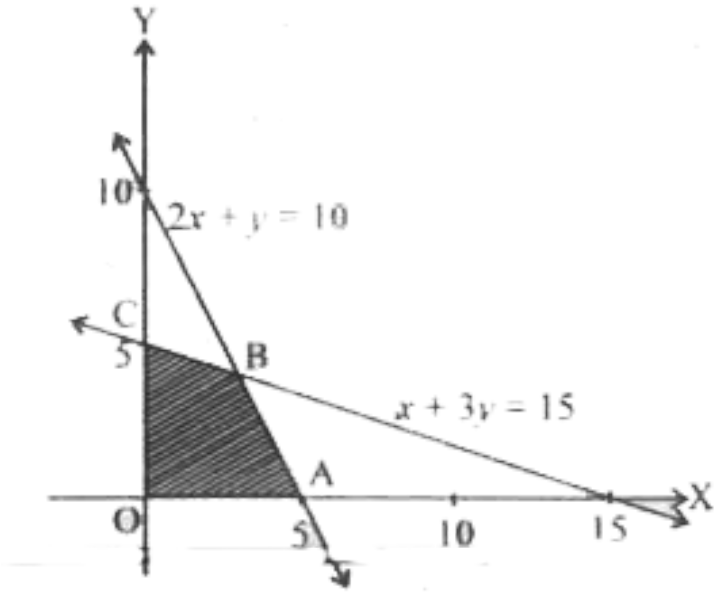
19. The graph of a linear programming problem is given below. The shaded region is the feasible

region. The objective function is Max

$Z = px + qy$



(i) What are the coordinates of the corners of the feasible region.

(ii) Write the constraints.

(iii) If the Z occurs at A and B, what is the relation between p and q.

(iv) If q=1 write the objective, function.

(v) Find the Max Z.

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Necert Text Book Exercise 12 1

1. Maximise $Z = 3x + 4y$ subject to the constraints $x + y \leq , 4, x \geq 0, y \geq 0$

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2. Minimise $Z = -3x + 4y$ subject to

$x + 2y \leq 8, 3x + 2y \leq 12, x \geq 0, y \geq 0$

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3. Maximise $Z = 5x + 3y$ subject to

$3x + 5y \leq 15, 5x + 2y \leq 10, x \geq 0, y \geq 0$

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4. Minimize $Z = 3x + 5y$ such that $x + 3y \geq 3, x + y \geq 2, x, y \geq 0.$

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5. Maximise $Z = 3x + 2y,$ subject to $x + 2y \leq 10, 3x + y \leq 15, xy \geq 0$

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6. Minimise $Z = x + 2y$ subject to

$2x + y \geq 3, x + 2y \geq 6, x, y \geq 0$

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7. Minimise and maximise $Z = 5x + 10y$ subject to

$x + 2y \leq 120, x + y \geq 60, x - 2y \geq 0, x, y \geq 0$

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8. Minimise and maximise $Z = x + 2y$ subject to

$x + 2y \geq 100, 2x - y \leq 0, 2x + y \leq 200, x, y \geq 0$

.

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9. Maximise $Z = -x + 2y$, subject to the constrains.

$x \geq 3, x + y \geq 5, x + 2y \geq 6, y \geq 0.$

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10. Maximise $Z = x + y$ subject to $x - y < 1, \ -x + y, \ \leq 0, x, y \geq 0$

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Necert Text Book Exercise 12 2

1. Reshma wishes to mix two types of food P and Q in such a way that the vitamin contents of the mixture contain atleast 8 units of vitamin A and 11 units of vitamin B. Food P costs Rs. 60// kg and food Q cost Rs. 80/kg. food P contains 3

units/ kg of vitamin A and 5 units/ kg of vitamin B while food Q contains 4 units/kg vitamin A and 2 units/kg of vitamin B. Determine the minimum cost of the mixture .

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2. One kind of cake requires 200 g of flour and 25 g of fat and another kind of cake requires 100 g flour and 50g of fat. Find the maximum number of cakes which can be made from 5 kg of flour and 1 kg of fat assuming that there is

not shortage of the other ingredients used in making the cakes.

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3. A factory makes tennis rackets and cricket bats. A tennis racket takes 1.5 hours of machine time and 3 hours of craftman's time in its making while a cricket bat takes 3 hours of machine time and 1 hour of craftman's time. In a day , the factory has the availability of not more than 42 hours of machine time and 24 hours of craftsman's time.

(i) What number of rackets and bats must be made if the factory is to work at full capacity ?

(ii) If the profit on a racket and on a bat is Rs 20 and Rs. 10 respectively, find the maximum profit of the factor when it works at full capacity.

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4. A manufacturer produces nuts and bolts. It takes 1 hour of work on machine A and 3 hours on machine B to produce a package of nuts. It takes 3 hours on maching A and 1 hour on machine B to produce a package of botls. He

earns a profit of Rs. 17.50 per pack age and nuts and Rs. 7.00 per pakage on bolts. How many package of each should be produced each day as to maximise his profit, if he operates his machine for at the most 12 hours a day ?

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5. A factory manufactures two types of screws, A and B. Each type of screw requires the use of two machines, an automatic and a hand operated. It takes 4 minutes on the automatic and 6 minutes on hand operated machines to

manufacture a package of screws A while its takes 6 minutes on automatic and 3 minutes on the hand operated machines to manufacture a package of screws B. Each machine is available for at the most 4 hours on any day. The manufacturer can sell a package of screws A at a profit of Rs. 7 and screws B at a profit of Rs. 10 Assuming that he can sell all the screws he manufactures, how many packages of each type should the factory owner produce in a day in order to maximise his profit ? Determine the maximum profit.

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6. A cottage industry manufactures pedestal lamps and wooden shades, each requiring the use of a grinding/ cutting machine and a spayar. It takes 2 hours on grinding/cutting machine and 3 hours on the sprayer to mafnufacture a pedstal lamp. It takes 1 hour on the grinding/cutting machine and 2 hours on the sprayer to manufacture a shade. on any day, the sprayer is available for at the most 20 hours and the grinding/cutting machine for at the most 12 hours. The profit from the sale of a lamp is Rs 5

and that form a shade is Rs. 3 Assuming that the manufacture can sell all the lamps and shades his daily production in order to maximise his profit ?

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7. A company manufactures two tpyes of novely souvenirs made of plywood. Souvenirs of type A require 5 minuts each for cuting and 10 minuts each for assembling. Souvenirs of type B require 8 minutes each for cutting and 8 minutes each for assembling. There are 3 hours for

assembling. The profit is Rs. 5 each for type A and Rs 6 each for type should the company mafnufacture in order to maximise the profit ?

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8. A merchant plans to sell two types of personal computers -a desktop model and a portable model that wil cost Rs. 25,000 and Rs. 40000 respectively. He estimates that the total monthly demand of computers will not exceed 250 units Determine which the merchant should stock to get maximum profit merchant should

stock to get maximum profit if he does not want to invest more than Rs. 70 laksh and if his profit on the dekstop model is Rs 4500 and on portable model is Rs. 5000

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9. A diet is to contain atlest 80 units of vitamin A and 100 units of minerals. Two foods F_1 and F_2 are available. Costs Rs. 6 per unit. One unit of food F_1 contains 3 units of vitamin A and 4 units of minerla one unit of food F_2 contains 6 units of vitamin A and 3 units of

minerals. Formulate this as a linear programming problem. Find the minimum cost for diet that consists of mixture of these two foods and also meets the minimal nutritional requirements.

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10. The corner points of the feasible region determined by the following sytem of linear inequalities:

$2x + y \leq 10, x + 3y \leq 15, x, y \geq 0$ are (0,0), (5,0),(3,4) and (0,5). Let $Z = px + qy$ where

$p, q \geq 0$. Condition on p and q so that the maximum of Z occurs at both (3,4) and (0,5) is

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Additional Questions For Practice 12 2

1. A company produces two types of belts A and B. Profits on these types are 2 and 1.5 on each belt respectively. The belt of type A requires twice as much time as a belt of type B. The company can produce utmost 1000 units of belt per day. but the supply of leather is sufficient

for 800 belts per day is available, Utmost 400 buckles for belts of type A and 700 for those of type B are available per day.

How many of each type of belts should be produced so as to maximise the profit assuming that the company can sell all the items produced. What is the maximum profit?

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2. A manufacturer has 3 machines I, II and III installed in his factory. Machines I and II are capable of being operated for utmost 12 hours

whereas machine III must be operated atleast for 5 hours a day. He produces only two items A and B each requiring the use of three machines. The number of hours required for producing 1 unit of each of the items A and B on the three machines are given below.

Item	Number of hours on machines		
	I	II	III
A	1	2	1
B	2	1	1.25

He makes a profit of Rs 7600 on item A and Rs 400 on item B. Assume that he can sell all that he produces.

(i) Formulate this as a linear programming

problem.

(ii) Solve the L.P.P by corner point method.

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3. A retired person wants to invest an amount upto Rs 20,000. His broker recommends investing in two types of bonds A and B, bond A yielding 10% return on the amount invested and bond B yielding 15% return on the amount invested. After some consideration he decides to invest atleast Rs 5,000 in bond A and not more than Rs 8,000 in bond B. He also wants to

invest atleast as much in bond A as in bond B. How should he invest to maximise his return on investment?

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4. A dietician wishes to mix two types of foods in such a way that vitamin contents of the mixture contain atleast 8 units of vitamin A and 10 units of vitamin C. Food I' contains 2 units/kg of vitamin A and I unit/kg of vitamin C. Food 'Il' contains 1 unit/kg of vitamin A and 2 units/kg of vitamin C. It costs Rs 50 per kg to purchase food

T and Rs 70 per kg to purchase food I'. Formulate this problem as a linear programming problem to minimise the cost of such a mixture.

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5. Every gram of wheat provides 0.1g of proteins and 0.25g of carbohydrates. The corresponding values of rice are 0.05g and 0.5g respectively. Wheat costs Rs 2 per kg and rice Rs 8. The minimum daily requirements of protein and carbohydrates for an average child are 50g and

200g respectively. In what quantities, should wheat and rice be mixed in the daily diet to provide the minimum daily re-quirement of protein and carbohydrates at minimum cost.

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6. There is a factory located at each of the two places P and Q. From these locations a certain commodity is delivered to each of the three depots situated at A, B and C. The weekly requirements of the depots are respectively 5, 5 and 4 units of the commodity while the

production capacity of the factories at P and Q are respectively 8 and 6 units. The cost of transportation per unit is given below.

From \ To	Cost Rs/unit		
	A	B	C
P	16	10	15
Q	10	12	10

Formulate the above LPP mathematically in order thaet transportation const in minimum. Solve the I.P.P.

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Ncert Miscellaneous Exercise

1. A dietician has to develop a special diet us ing two foods P and Q. Each packet (containing 30g) of food P contains 12 units of calcium, 4 units of iron, 6 units of cholesterol and 6 units of vitamin A. Each packet of the same quantity of food Q contains 3 units of calcium, 20 units of iron, 4 units of cholesterol and 3 units of vitamin A. The diet requires atleast 240 units of calcium, atleast 460 units of iron and almost 300 units of cholesterol. How many packets of each food should be used to maximise the

amount of vitamin A in the diet? What is the maximum amount of vitamin A in the diet?

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2. A farmer mixes two brands P and Q of cattle feed. Brand P, costing Rs 250 per bag, contains 3 units of nutritional element A, 2.5 units of element B and 2 units of element C. Brand Q costing Rs 200 per bag, contains 1.5 units of nutritional element A, 1.25 units of element B, and 3 units of element C. The minimum requirements of nutrients A, B and Care 18 units,

45 units and 24 units respectively. Determine the number of bags of each brand which should be mixed in order to produce a mixture having a minimum cost per bag? What is the minimum cost of the mixture per bag?

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3. A dietician wishes to mix together two kinds of food X and Y in such a way that the mix tue contains atleast 10 unitws of vitamin A 12 units of vitamin B and 8 units of vitamin c. The vitamin contents of one kg food is given below.

Food	Vitamin A	Vitamin B	Vitamin C
X	1	2	3
Y	2	2	1

One kg of food X costs Rs. 16 and one kg of food Y costs Rs. 20. find the least cost of the mixture which will produce the required diet.

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4. A manufacturer makes two types of toys A and B. Three machines are needed for this purpose and the time in minutes, required for each toy on the machines is given below:

Types of Toys	Machines		
	I	II	III
A	12	18	6
B	6	0	9

Each machine is available for a maximum of 6 hours per day. If the profit on each toy of type A is Rs 7.50 and that on each toy of type B is Rs 5, show that 15 toys of type A and 30 of type B should be manufactured in a day to get maximum profit.

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5. An aeroplane can carry a maximum of 200 passengers. A profit of Rs 1000 is made on each executive class ticket and a profit of 600 is made on each economy class ticket. The airline reserves atleast 20 seats for executive class. However, atleast 4 times as many passengers prefer to travel by economy class than by the executive class. Determine how many tickets of each type must be sold in order to maximise the profit for the airline. What is the maximum profit?

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6. Two godwons A and B have grain capacity of 100 quintals and 50 quintals resepectively. They supply to 3 ration shopts,D, E and F whose requirements are 60,50 and 40 quintals respectively. The cost of transportion per quintal from the godwons to the shops are given in the following table :

Transportation cost per quintal (in ₹)		
From/To	A	B
D	6	4
E	3	2
F	2.50	3

How should the supplies be transported in

order that transportation cost is minimum ? What is the minimum cost ?

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7. An oil company has two depots A and B with capacities of 7000 L and 4000 L respectively. The company is to supply oil to three petrol pumps, D, E and F whose requirements are 4500L, 3000L and 3500 L respectively, the distances(in km) between the depots and the petrol pumps is given in the following table:

Distance in km.		
From/To	A	B
D	7	3
E	6	4
F	3	2

Assuming that the transportation cost of 10 litres of oil is 1 per km, how should the delivery be scheduled in order that the transportation cost is minimum? What is the minimum cost?

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8. A fruit grower can use two types of fertilizer in his garden, brand P and brand Q. The

amounts (in kg) of nitrogen, phosphoric acid, potash, and chlorine in a bag of each brand are given in the table. Tests indicate that the garden needs atleast 240 kg of phosphoric acid, atleast 270 kg of potash and atmost 310 kg of chlorine.

If the grower wants to minimise the amount of nitrogen added to the garden, how many bags of each brand should be used? What is the minimum amount of nitrogen added in the

garden?

kg per bag		
	Brand P	Brand Q
Nitrogen	3	3.5
Phosphoric acid	1	2
Potash	3	1.5
Chlorine	1.5	2

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9. A fruit grower can use two types of fertil izer in his garden, brand P and brand Q. The amounts (in kg) of nitrogen, phosphoric acid, potash, and chlorine in a bag of each brand are given in the table. Tests indicate that the

garden needs atleast 240 kg of phosphoric acid, atleast 270 kg of potash and atmost 310 kg of chlorine. If the grower wants to maximise the amount of nitrogen added to the garden, how many bags of each brand should be added? What is the maximum amount of nitrogen added?

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10. A toy company manufactures two types of dolls, A and B. Market tests and available resources have indicated that the combined

production level should not exceed 1200 dolls per week and the demand for detts of type B is utmost half of that for dolls of type A. Further, the production level of dolls of type A can exceed three times the production of dolls of other type by utmost 600 units . If the company makes profit Rs 12 Rs. 16 per doll respectively on dolls a and B, how many of each should be produced weekly in order to maximise the profit ?

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Unit Test

1. A company combines two items A and B from gift packs during a festival season. Each pack must weight atleast 5 kg and should contain atelast 2 kg of A and not more than 4 kg of B. The net contribution of the company is Rs. 10 per kg of A and Rs 12 per kg of B. the company wants to determine the optimum mix. By defining suitable variables, write

i. the objective function

ii. The constraints

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2. A furniture dealer sells only two items namely tables and chairs. He has Rs. 10,000 to invest and a space to store atmost 60 piecs. A table costs him Rs. 500 and a chair rs. 200 He can sell a table at a profit of Rs. 50 and a chair at a profit Rs 15. Assume that he can sell all the items that he buys. By defining suitable variables.

i. write the objective function

ii. write the cost constraint

iii. write the space constraint

iv write the non negative constraint

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3. A housewife wishes of mix two kinds of food X and Y in such a way that the mixture contains atelst 10 units of vitamin A, 12 units of vitamin B and 8 vitamin C. the vitamin content of one kg of food is given below.

	Vitamin A	Vitamin B	Vitamin C
Food X	1	2	3
Food Y	2	2	1

One kg of food X costs Rs. 6 and one kg of food Y costs Rs. 10. Formulate the above problem as a

linear prgramming problem to find the least cost of mixture which will produce the dict.

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4. A medicien company has factories at two places A and B. From these places, supply is made to each of its three agencies situated at P,Q and R. The monthly requirements of the agencies are respectively 40,40 50 packets of its medicines, while the production of the factories at A and B are 60 and 70 packets respectively. The transportation cost (in Rs) per packet from

the factories to the agencies are given below.

To \ From →	A	B
P	5	4
Q	4	2
R	3	5

Formulate the linear programming problem so that the cost of transportation is minimum .

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5. (i) Draw the graph of lines

$x + y = 8, 3x + 5y = 15$

(ii) Solve the following linear programming

problem graphically

Minimise $Z = 3x + 2y$

Subject to constraints

$x + y \geq 8$

$3x + 5y \leq 15$

$x, y \geq 0$

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6. Sumi wants to invest atmost Rs. 20,000 in VIII sereis National Savings Bonds and Kisan vikash Oathras. According to rules, she has to invest atleast Rs. 5000 in saving bonds and atmost Rs.

8000 in Kisan Pathra. If the rate of inerest on savings bond is 10% p.a and the rate of Kisan vikash Pathara is 15% p.a, how much money should she invest in each to ear maximum yearly income ? also find the maximum yearly income.

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Objective Type Questions

1. The solution set of the inequation $2x + y > 5$ is

A. half plane that contains the origin

B. open half plane not containing the origin

C. whole xy- plane except the points lying on the line $2x + y = 5$

D. None of these

Answer: B

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2. Objective function of a L.P.P. is

A. a constraint

B. a function to be optimized

C. a relation between the variables

D. None of these

Answer: B

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3. Which of the terms is not used in a linear programming problem ?

A. slack variable

B. Objective fucntion

C. Concave region

D. Feasible region

Answer: C

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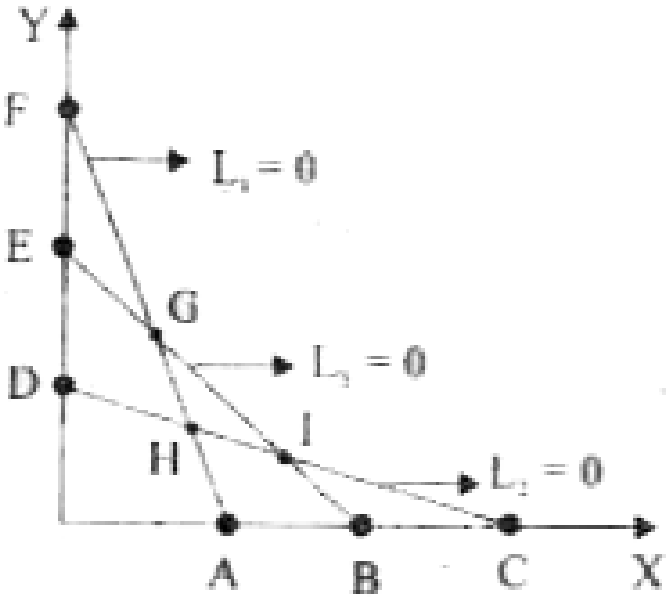
4. The feasible region for the following constrains

$L_1 \leq 0, L_2 \geq 0, L_3 = 0, x \geq 0, y \geq 0$ in the

diagraam show is



A. area DHF

B. area AHC

C. line segment EG

D. line segment GI

Answer: C

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5. The region respresented by $x \geq 0, y \geq 0$ is

A. first quadrant

B. second quadrant

C. third quadrant

D. fourth quadrant

Answer: A

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6. The objective function of a L.P.P is

A. constant

B. linear function to be optimised

C. relation between the variables

D. None of these

Answer: B

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7. The optimal value of the objective function is attained at the points

A. on x-axis

B. on y-axis

C. which are the corner points of the fesible region

D. none of these

Answer: C

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8. Which of the following statements is correct

A. Every :.P.P has atleast one optimal solution

B. Every L.P.P has a uniqe optimal solution

C. If an L.P.P. admits two optimal solution then it has an infinitely many solutions

D. None of these

Answer: C

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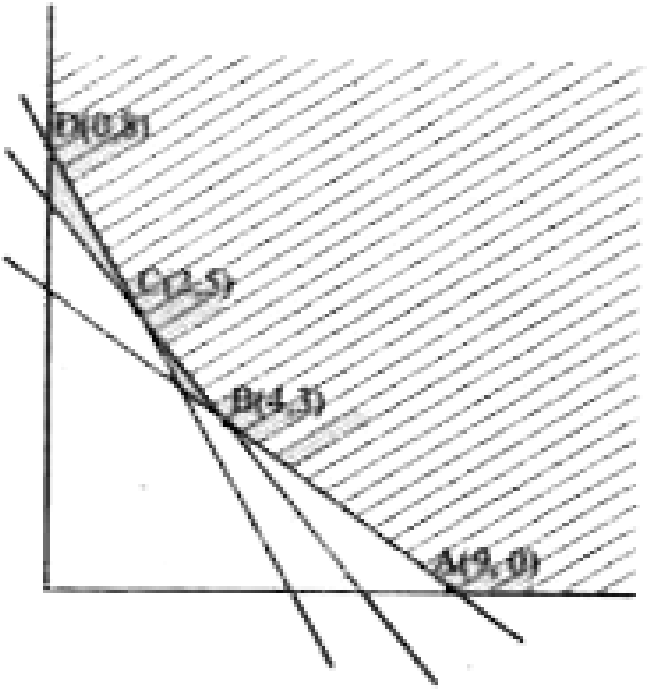
9. Feasible region of an L.P.P is shown shaded in the following figure. Minimum of $Z = 4x + 3y$ occurs at the point.



A. (0,8)

B. (2,5)

C. (4,3)

D. (9,0)

Answer: B

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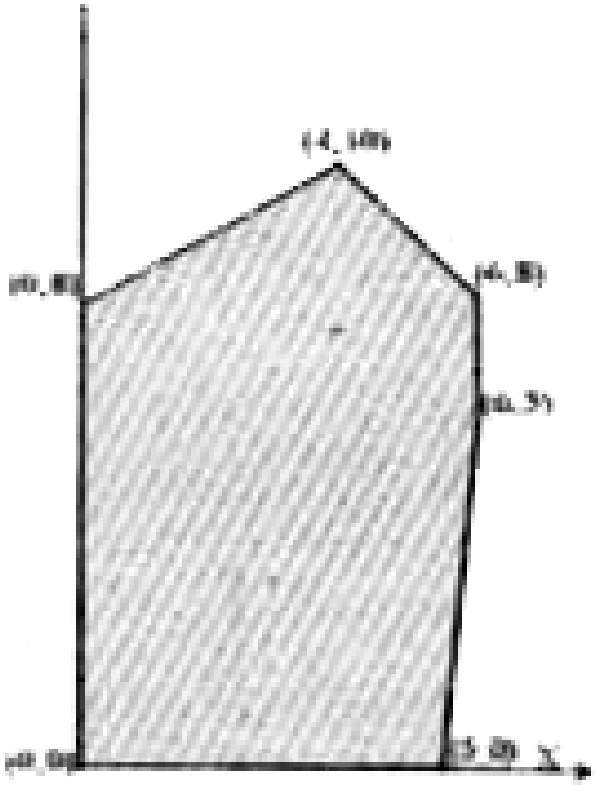
10. The feasible region of an L.P.P is shown shaded in the figure. Let $Z = 3x - 4$ y be the

objective function. The minimum of Z occurs at



A. (0,0)

B. (0,8)

C. (5,0)

D. (4,10)

Answer: B

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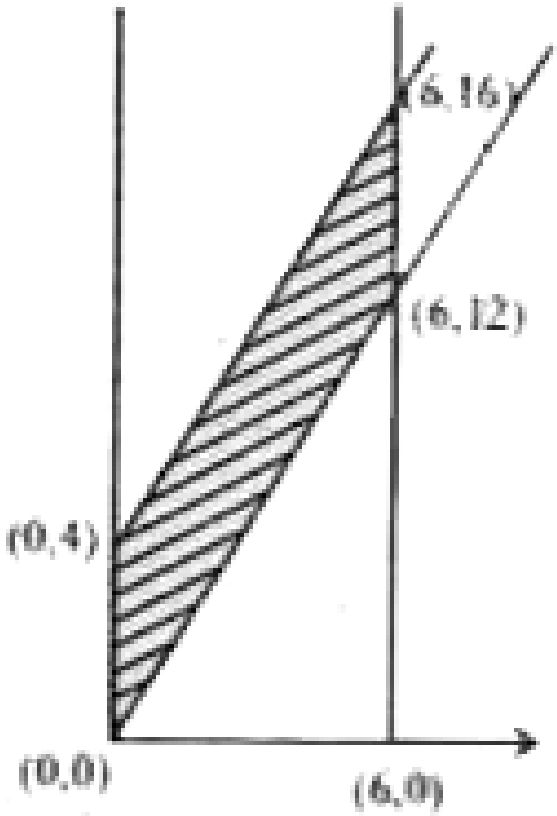
11. The feasbile regin of the LPP is shown shaded in the figure Let $Z = 3x - 4y$ be the objective

function. Therefore maximum value of z is



A. 0

B. 8

C. 12

D. 16

Answer: A

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12. Solution set of the inequality $x \geq 0$ is

A. half plane on the left of y axis

B. half plane on the right of y axis excluding the points on y axis

C. half plane on the right of y axis including the points on y axis

D. none of these

Answer: C

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