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SUBJECT :- QUANTIATIVE MANAGEMENT AND MODELING.

What given is:.

Total Nylon in hand = 5000 Sqft

Each collegiate requires = 3 feets.

whereas mini collegiate requirement = 2feets

Sold per week :-

collegiate = 1000

mini = 1200

collegiate :-

45 mins = 45/60 hrs per unit.

profit = $32

mini :-

40 mins = 40/60 hrs per unit.

profit = $24

(2)

Labours in total = 35

Total Time = 40 per week.

Answer:-

Lets assume x as the number of generated units for collegiate.

Lets take y as the number of generated units for mini.

a) Decision variables:-

units generated by collegiate = x

units generated by mini = y

Decision variables are x and y.

b) objective function :-

our objective function is to maximize Profit for values x

③

and y.

consider Z as profit:-

So,

$Z = 32x + 24y$

c) constraints:-

①

available nylon = 5000 Sq.ft

Collegiate required = 3 Sq.ft

For mini required = 2 Sq.ft

$5000 >= 3x + 2y$ → material constraint

② Total labours on total time =

$35 \times 40 = 1400$ and can

Produce x number of collegiate in

3/4 hours and y (number of

mini) in 2/3 hrs.

(4)

$1400 >= 3/4x + 2/3y$ → Time Constraint.

(3) Sold per week:

Collegiate = 1000

mini = 1200

(4) Non-Negative constraints.

$x >= 0$; $y >= 0$

d) Mathematical formulation:-

Obj function =

max profit $Z = 32x + 24y$

constraints are:

Material con. = $5000 >= 3x + 2y$

Time con. = $1400 >= 3/4x + 2/3y$

Quantity con = $x <= 1000$

$y <= 1200$

⑤

Non-Negativity cons.

$$x >= 0$$

$$y >= 0$$

Question 2:-

Given is:

Large unit profit = $420

medium unit profit = $360

small unit profit = $300

Productions:-

plant 1 = 750 units

plant 2 = 900 units

plant 3 = 450 units

capacity of plants :-

plant 1 = 13000 sq.ft

plant 2 = 12000 sq.ft

plant 3 = 5000 sq.ft

⑥

Required Area :-

Large size = 20 Sq ft

medium size = 15 Sq ft

Small size = 12 Sq ft

NOTE :- plants must use only the same percentage of their capacity.

Answer :-

Lets assume

x = Large

y = medium

z = small

and

1 = plant 1

2 = plant 2

3 = plant 3

a:) Decision variables:-

Six decision variables in total.

$x1, y1, z1, x2, y2, z2, x3,$

$y3, z3$.

b) Linear programming:-

Objective function:- Maximize profit for weigelt corporation

z = profit

Net profit:-

Large = $420

Medium = $360

small = $300

Sizes denoted:

x = Large

y = medium

(5)

Z = small

$Z = 420(x_1 + x_2 + x_3) +$
$360(y_1 + y_2 + y_3) +$
$300(z_1 + z_2 + z_3)$

Constraints :-

Capacity constraint

$x_1 + y_1 + z_1 <= 750$

$x_2 + y_2 + z_2 <= 900$

$x_3 + y_3 + z_3 <= 450$

Space constraint

$20x_1 + 15y_1 + 12z_1 <= 13000$

$20x_2 + 15y_2 + 12z_2 <= 12000$

$20x_3 + 15y_3 + 12z_3 <= 5000$

Plants should use same percentage of their Capacity :-

$900(x_1 + y_1 + z_1) = 750(x_2 + y_2 + z_2)$

$450(x_1 + y_1 + z_1) = 750(x_3 + y_3 + z_3)$

⑨ Non-Negative constraints :-

$x_{11} = 0$,

$y_{11} = 0$,

$z_{11} = 0$,

$x_{21} = 0$,

$z_{21} = 0$,

$x_{31} = 0$

$y_{31} = 0$,

$z_{31} = 0$