

CT-05

01/20/2022  
Section A  
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Here given;

$$\text{Maximize, } Z = 4m + 5n$$

Subject to,

$$3m + 5n \leq 20$$

$$m + n \leq 6$$

$$\text{and } m, n \geq 0.$$

Turning the inequalities  
to equalities;

$$Z - 4m - 5n = 0 \quad (0)$$

$$3m + 5n + P = 20 \quad (1)$$

$$m + n + Q = 6 \quad (2)$$

Here, we find 4 different  
variables and 2 equation.

So the degree of freedom  
(4-2) or 2.

Let,  $(m, n) = 0$ ,  $m = 0$ ,  $n = 0$  [Let these  
are non Basic]

$$\begin{array}{r}
 1 \quad -4 \quad -5 \quad 0 \quad 0 \quad 0 \\
 (+) \quad 0 \quad 3 \quad 5 \quad 1 \quad 0 \quad 20 \\
 \hline
 1 \quad -1 \quad 0 \quad 1 \quad 0 \quad 20
 \end{array}$$

$$\begin{array}{r}
 0 \quad 1 \quad 1 \quad 0 \quad 1 \quad 6 \\
 (+) \quad 0 \quad -3/5 \quad -1 \quad -1/5 \quad 0 \quad -4 \\
 \hline
 0 \quad 4/5 \quad 0 \quad -1/5 \quad 1 \quad 2
 \end{array}$$

$$\begin{array}{r}
 0 \quad 3/5 \quad 1 \quad 1/5 \quad 0 \quad 4 \\
 (+) \quad 0 \quad -3/5 \quad 0 \quad 3/10 \quad -3/2 \quad -3 \\
 \hline
 0 \quad 0 \quad 1 \quad 1/2 \quad -3/2 \quad 1
 \end{array}$$

$$\begin{array}{r}
 1 \quad -1 \quad 0 \quad 1 \quad 0 \quad 20 \\
 (+) \quad 0 \quad 1 \quad 0 \quad -1/2 \quad 5/2 \quad 5 \\
 \hline
 1 \quad 0 \quad 0 \quad 1/2 \quad 5/2 \quad 25
 \end{array}$$



Basic variables	Eq.	Coefficient of;					Right side	ratio
		z	m	n	p	q		
z	(0)	1	-4	<u>-5</u>	0	0	0	$\frac{20}{5} = 4$
p	(1)	0	<u>3</u>	<u>5</u>	1	0	20	
q	(2)	0	1	<u>1</u>	0	1	6	$\frac{6}{1} = 6$
z	(0)	1	<u>-1</u>	0	1	0	20	
n	(1)	0	<u>3/5</u>	1	4/5	0	4	$4 \rightarrow \frac{4}{3/5} \rightarrow 6.67$
q	(2)	0	<u>2/5</u>	0	-1/5	1	2	$2 \rightarrow \frac{2}{2/5} \rightarrow 5$
z	(0)	1	0	0	1/2	5/2	<u>25</u>	$\rightarrow z$
n	(1)	0	0	1	4/2	-3/2	<u>1</u>	$\rightarrow n$
m	(2)	0	1	0	-4/2	5/2	<u>5</u>	$\rightarrow m$

So, maximize,  $z = 25$ ,

And,  $(m, n) = (5, 1)$  (Result)