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SEAT No. :

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P2152

[5804]-105
F.Y. B.B.A. (I.B.)
105 : BUSINESS MATHEMATICS
(2019 Pattern) (Semester - I)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Use of statistical tables and calculator is allowed.*
4) *Symbols have their usual meanings.*

Q1) A) Fill in the blanks : **[5 × 2 = 10]**

a) If $x : y = 6 : 8$ and $x = 42$, then $y =$ _____.

i) 40 ii) 48

iii) 56 iv) None

b) Fourth proportional to 4, 6, 8 is _____.

i) 10 ii) 12

iii) 14 iv) None

c) A man sold 12 pens for the cost price of 15 pens then profit is _____%.

i) 25 ii) 50

iii) 40 iv) None

d) 12% of 800 = _____.

i) 90 ii) 80

iii) 95 iv) None

e) ${}^{15}C_4$ = _____ .

i) 1360 ii) 1365

iii) 1400 iv) None

P.T.O.

B) State whether the following statements are true or false : [3 × 2 = 6]

a) $1 + 2 + 3 + \ldots\ldots\ldots + n = \frac{n(n-1)}{2}$. F

b) If number of rows of matrix A is not equal to number of columns of matrix B then we can find the product of two matrices A and B. F

c) Objective function may be either maximize or minimize. T

2+3 2+3

Q2) Attempt any four of the following : [4 × 4 = 16]

a) Find n if ${}^{n}P_{4} = 18[(n-1)P_{2}]$.

b) Evaluate the following determinant $\begin{vmatrix} 4 & -3 & 2 \\ 1 & 2 & 1 \\ 3 & 1 & -2 \end{vmatrix}$

c) Find the simple interest on Rs. 2,000 at 6% p.a. for 5 months.

d) The population of a city according to 1971 census was 84,500 and it rose to 1,10,000 in 1981. Find the percentage increase in the population.

e) A commission agent gets 12% commission upto a sale of Rs. 30,000/- and 15% on the sales exceeding Rs. 30,000/-. In a month, his sales are Rs. 67,000/- find his commission.

f) Find the values of x, y and z if $\begin{vmatrix} 2x-1 & 3 \\ 4 & 2 \\ 3z-1 & 5 \end{vmatrix} + \begin{vmatrix} 7 & 2 \\ 1 & y+3 \\ z & -4 \end{vmatrix} = \begin{vmatrix} 10 & 5 \\ 5 & 9 \\ 11 & 1 \end{vmatrix}$.

Q3) Attempt any four of the following : [4 × 4 = 16]

a) Define the following terms :

i) Decision variables ii) Optimum solution

b) The following data relates to the marks of a group of students :

Marks	Below 10	Below 20	Below 30	Below 40	Below 50
No. of Students	15	38	65	84	100

How many students got marks more than 30?

c) Ratio of two numbers is 3 : 5 and the sum of the numbers is 232, find the bigger number.

d) Find the compound interest on Rs. 5,000 at 4% p.a. for 5 years.

e) Find the adjoint of the matrix $A = \begin{bmatrix} 4 & 3 \\ 7 & 5 \end{bmatrix}$.

f) The price of a mobile hand set is Rs. 20,000. An agent charges commission at 4%. If he earns Rs. 40,000. Find the number of mobile sets sold by him.

Q4) Attempt any four of the following : **[4 × 4 = 16]**

a) If ${}^nC_8 = {}^nC_6$, find ${}^nC_3$.

b) If 8, y and 50 are in continued proportion, find y.

c) Define the following terms :

i) Diagonal matrix

ii) Upper Triangular matrix

d) Solve the following LPP by graphical method

Maximize $Z = 3x_1 + 2x_2$

Subject to $2x_1 + x_2 \leq 2$

$3x_1 + 4x_2 \geq 12$

$x_1 \geq 0, x_2 \geq 0$

e) Find the value of x if $\begin{vmatrix} 5 & 5 & x \\ x & 5 & 5 \\ 5 & 5 & 4 \end{vmatrix} = 0$.

f) What is the difference between simple interest and compound interest at 10% p.a. on Rs. 1,500 for 2 years.

Q5) Attempt any one of the following : **[1 × 6 = 6]**

a) If $A = \begin{bmatrix} 2 & 3 \\ -1 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 \\ -1 & 2 \end{bmatrix}$ verify that $|AB| = |A||B|$.

b) If x varies directly as y and inversely as z and $x = 12$ when $y = 9$ and $z = 16$, find y when $x = 9$ and $z = 24$.