F.Y. B.B.A
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)   In the ratio $\frac{a}{b}$ "a" is called _____

        i)   Antecedent
        ii)   Consequent
        iii) Parameter
        iv) None of the above

     b)   If $x:y = 3:2$ and $x = 30$ then $y =$ _____.
        i)   42
        ii)   20
        iii) 40
        iv) 36

     c) $^{10}C_2 =$ _____.
        i)   20
        ii)   45
        iii) 5
        iv) 1

     d)   If cost price is more than selling price then_____in incurred.
        i)   Profit
        ii)   Loss
        iii) Commission
        iv) None of the above

     e) $(\frac{4}{5})$ th of an amount= _____ % of that amount.
        i) 75
        ii) 50
        iii) 80
        iv) 20

P.T.O.

B) State whether the following statement are True or False : [3 × 2 = 6]

    a)   For multiplication of any two matrices the size of the matrices must be same.

    b)   Every L.P problem in two unknowns has optimal solutions.

    c)   For the arrangements of objects Combination is required.

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

    a)   Two numbers are in the ratio 3:2 and their sum is 135. Find the numbers.

    b)   Find the number whose 12% is 86.

    c)   If $\begin{bmatrix} 4 & x \\ 4 & 3 \end{bmatrix}$ is a singular matrix, then find the value of x.

    d)   If $^nC_8 = {}^nC_6$, then find $^nC_2$

    e)   What will be the simple interest on Rs.1200 at 10% p.a. for 2 years?

    f)   The sum of present ages of 3 persons is 66 years. Five years ago their ages were in the ratio 4:6:7. Find their present ages.

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

    a)   Find n if $nP_3 = 3(nC_4)$.

    b)   If $A = \begin{bmatrix} 1 & 3 \\ 2 & 1 \end{bmatrix}$, find matrix X such that $3A - 2X = \begin{bmatrix} 2 & 1 \\ -5 & 6 \end{bmatrix}$

    c)   Find the difference between compound interest and simple interest on Rs.500 for 2 years at 10% p.a.

    d)   Find the EMI on a loan of Rs.500, 000 to be paid in 5 years at 10% p.a. on the outstanding amount at the beginning of each month.

    e)   A club has 20 gentlemen & 30 ladies. In how many ways can a committee of 1 gentlemen and 1 lady be formed?

    f)   If a:b= 5:3 b:c= 2:5, find a:c.

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

    a)   Show that the matrix $A = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$ satisfies the equation $A^2 - 4A + I = 0$.

    b)   In a primary school there are 12 teachers comprising 7 gentlemen and 5 ladies. A committee of 4 teachers is to be formed so as to include at least 1 gentlemen at least 1 lady. In how many ways can the committee be formed?

c) A dealer in furniture buys chairs at Rs.340 each. At what price should be mark them for sale, so that he may earn a profit of 30% after giving 15% discount?

d) Explain the term L.P.P with its key points.

e) Following table shows number of criminal cases registered under cyber security law.

Years and cities	A	B	C
2015	50	60	40
2016	60	65	60
2017	60	70	90

State whether each of the following is true or false:

i) Maximum cases in city C registered in the year 2017.

ii) Maximum increase in cases occurred in city C are from 2016 to 2017.

iii) Average increase in cases for the 2015-16 and 2016-17 together is lowest in city B.

iv) Minimum increase is found in city A from 2015-16.

f) Explain any four types of matrices with example.

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

a) Solve the following L.P.P by graphical method :

Minimize $Z = 10x + 15y$

Subject to:

$$12x + 5y \leq 2700$$
$$5x + 10y \leq 2000$$
$$x, y \geq 0$$

b) Find the inverse of the matrix : $A = \begin{bmatrix} 3 & -2 \\ 1 & 5 \end{bmatrix}$

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