[5802]-105
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.*

[5 × 2 = 10]

Q1) A) Fill in the blanks :

a) In the ratio $\frac{a}{b}$, "b" is called _____.

　i) Antecedent

　ii) Consequent

　iii) Parameter

　iv) None of the above

b) If $x:y = 4:9$ and $x = 28$ then $y = $ _____.

　i) 54

　ii) 63

　iii) 72

　iv) 81

c) Percentage means per _____ .

    i) 100

    ii) 200

    iii) 300

    iv) 500

d) If selling price is more than cost price then _____ in incurred.

    i) Profit

    ii) Loss

    iii) Commission

    iv) None of the above

e) $^5C_3 =$ _____ .

    i) 3

    ii) 5

    iii) 10

    iv) 20

$$\frac{n!}{r!\,(n-r)!} \qquad \frac{5!}{3!\,2!}$$
$$= \frac{120}{6 \times 2}$$
$$= \frac{\cancel{120}^{10}}{\cancel{12}_1} = 10$$

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

a) In an identify matrix all the diagonal elements are 1. T

b) A feasible solution of L.P.P need not satisfy all the constraints. F

c) For the arrangements of objects permutation is required. T

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

a) If the ratio of two numbers is 3:5 and their sum is 232. Find the numbers.

b) Find the number whose 14% is 84.

$$84 \times \frac{14}{100} = 11.76$$

$$3x + 5x = 232$$
$$8x = 232$$
$$x = 29$$
$$3x = 3 \times 29 = 87$$
$$5x = 5 \times 29 = 145$$

c) If $\begin{bmatrix} x & 6 \\ 4 & 8 \end{bmatrix}$ is a singular matrix, then find the value of x.

$\begin{vmatrix} x & 6 \\ 4 & 8 \end{vmatrix} = 8x - 24 = 0$

$= 8x = 24$

$x = 3$

d) If $^nC_6 = {}^nC_4$, then find $^nC_2$.

$^nC_6 = {}^nC_4 \quad 6 = n - 4$

$6 + 4 = n \quad n = 10$

e) A sum of money double itself in 5 years. Find the rate of Simple interest.

f) The average of three numbers is 77. The first number is twice the second number and second number is twice the third number, then find the first number.

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

a) Find n, if $^nP_3 = 3 \, (^nC_4)$

b) If $A = \begin{bmatrix} 4 & 5 \\ 3 & 7 \end{bmatrix}$, find a matrix X such that $A - 2X = \begin{bmatrix} 2 & 3 \\ 7 & 5 \end{bmatrix}$

c) What sum will amount to Rs. 4,000 in 3 years at the rate of interest 6% p.a. Compound interest?

d) An agent receives Rs. 1,275 as commission at the rate 7.5% on sales. Find the amount of his sales.

e) If 12 July 2018 is Sunday. What will be day on 12 July 2022?

f) Write a note on fundamental principle of counting.

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

a) If $A = \begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix}$, show that $A^2 = 4A - I$.

b) A committee of 3 persons is to be formed amongst 4 men and 3 women, so as to include atleast one man and at least one woman. In how many ways can this be done?

c) Ashok purchased 150 toys at Rs. 20 each and sold all toys at Rs. 25 each. Find total profit and percentage profit.

d) Explain feasible solution and optimal solution of the L.P.P

e) The following line graph show the percentage profit earned by two companies A and B in 6 different years.
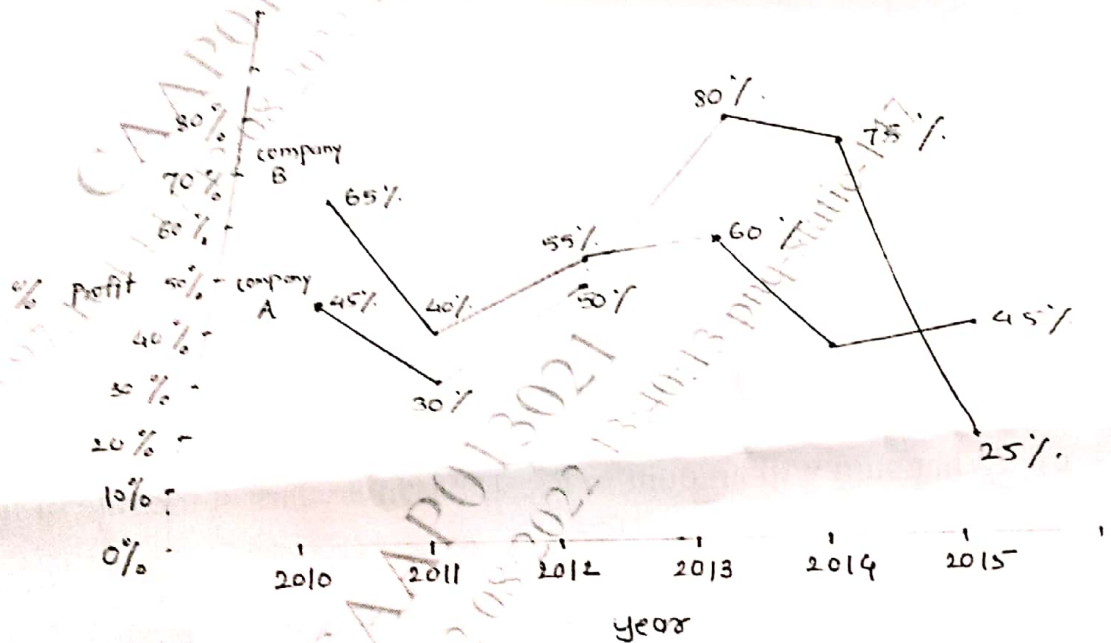
Answer the following questions :

i) If the incomes of company A and B are same in 2014, then find the ratio of their expenditures.

ii) If expenditures of company A in 2010 is Rs. 60,000/- and that of company B in 2013 is Rs. 1,50,000/- then find sum of their incomes.

f) Explain singular and non-singular matrix.

Q5) Attempt any one of the following :

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

Minimize $Z = 4x + 3y$

Subject to

$$4x + 12y \geq 18$$

$$16x + 4y \geq 24$$

$$8x + 6y \geq 24$$

$$x, y \geq 0$$

b) Find the inverse of the matrix :

$$A = \begin{bmatrix} 2 & 5 \\ 3 & 7 \end{bmatrix}$$

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