Dec., 2018
BBA (Gen) Ist Semester
BUSINESS MATHEMATICS
(BBA/GEN/102)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

(i) *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*

(ii) *Answer any four questions from Part-B in detail. Different sub-parts of a question are to be attempted adjacent to each other.*

PART–A

1. (a) Define Sets. Also explain Finite and Infinite Sets with example. (1.5)

    (b) Briefly explain Universal Set. Support your answer by giving an example. (1.5)

    (c) Solve the given equation : $5^{x+2} + 2.5^{x+1} = 7$. (1.5)

    (d) Find the sum of the given series
    $(1 + x) + (1 + x + x^2) + (1 + x + x^2 + x^3) + ...$
    to n terms. (1.5)

(e) Find the value of $\log_{0.5} 256$. (1.5)

(f) Prove that $(2n)!.(n-1)! = 2(n)!.(2n-1)!$. (1.5)

(g) In how many ways can a first eleven be selected from 25 players so that a particular player is always included in the team. (1.5)

(h) Find the values of a, b, c, d if
$$\begin{bmatrix} 2a+b & a-2b \\ 5c-d & 4c+3d \end{bmatrix} = \begin{bmatrix} 4 & -3 \\ 11 & 24 \end{bmatrix}.$$ (1.5)

(i) Solve the given system of equations using determinants :
$$5x - 10y = 4$$
$$x - 2y = 8.$$ (1.5)

(j) Differentiate the given function w.r.t. x :
$$(x^2 - 4x + 5)(x^3 - 2).$$ (1.5)

PART-B

2. (a) State and prove De-Morgan's law for two sets. (7)

(b) A college awarded 38 medals in football, 15 in basketball and 20 in cricket. If these medals went to a total of 58 sportsmen and only three sportsmen got medals in all the three sports, how many sportsmen received medals in exactly two of the three sports? (8)

3. (a) The sum of n terms of two A.P.'s are in ratio $3n + 1 : n + 4$. Find the ratio of the 4th terms. (7)

(b) A lamp lighter has to light 100 gas lamps. He takes 90 seconds to go from one lamp post to the next. Each lamp post burns 10 c.c. of gas per hour. How much gas (in c.c.) has been burnt by 8.30 p.m. if the first lamp is lighted at 6.00 p.m.? (8)

4. (a) How many arrangements can be made of the letters of the word 'ARRANGEMENT'. In how many of these the vowels occur together. (7)

(b) Expand $(1 + x + x^2)^4$ and hence find the coefficient of x^4. (8)

5. (a) If $A = \begin{bmatrix} 3 & 2 & 0 \\ 1 & 4 & 0 \\ 0 & 0 & 5 \end{bmatrix}$, then find the value of

$A^2 - 7A + 10\,I$. (7)

(b) Evaluate $\int \dfrac{dx}{\sqrt{2x^2 + 3x + 4}}$. (8)

6. (a) If $A = \{1, 2, 3\}$, $B = \{2, 3, 4\}$, $C = \{1, 3, 4\}$ and $D = \{2, 4, 5\}$, then verify that

$(A \times B) \cap (C \times D) = (A \cap C) \times (B \cap D)$. (7)

(b) If S_1, S_2, S_3 are the sums of the first n natural numbers, their squares and their cubes respectively, then show that $9S_2^2 = S_3[1 + 8S_1]$. (8)

7 (a) Solve the given equation : $\dfrac{4x+5}{x} - \dfrac{3x}{4x+5} = 2$. (7)

(b) A text book publisher finds that the production cost of each book is Rs. 20 and the fixed cost is Rs. 10,000. If each book can be sold for Rs. 30, then find (i) the cost function (ii) the revenue function (iii) the break even point. (8)