ID—180-CU-102521

B.B.A. EXAMINATION, 2023

(First Semester)

BUSINESS MATHEMATICS

Code : BBAN-102

Time : 3 Hours *Maximum Marks : 80*

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Units I to IV. Unit V is compulsory.

Unit I

1. (a) Prove that : **8**

$$A \cup (B \cup C) = (A \cup B) \cup C.$$

(b) In a group of 65 people, 40 like cricket, 10 like both cricket and tennis : **8**

(i) How many like tennis ?

(ii) How many like tennis only and not cricket ?

2. (a) Prove that : **8**

$$(A - B) \cup (B - A) = (A \cup B) - (A \cap B).$$

(b) If $A = \{2, 3\}$, $B = \{6, 8\}$, $C = \{1, 2\}$ and $D = \{6, 9\}$, then verify that : **8**

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

Unit II

3. (a) If $\frac{9^n.3^2.(3^{-n})^{-1} - 27^n}{3^{3m}.2^3} = \frac{1}{27}$, prove that $m = 1 + n$. **8**

(b) Solve the equation : 8

$$11^{4x-5} \times 3^{2x} = 5^{3-x} \times 7^{x}.$$

4. (a) If pth term of an A.P. be 'q' and qth term be 'p', prove that the $(p + q)$th term is zero. 8

(b) Sum of three numbers in G. P. is 31 and sum of their squares is 651. Find the numbers. 8

Unit III

5. (a) If $^{22}P_{r+1} : {}^{20}P_{r+2} = 11 : 52$, find r. 8

(b) A polygon has 44 diagonals. Find the number of its sides. 8

6. (a) The first three terms in the bionomial expansion are 1, 10 and 40. Find the expansion. 8

(b) Solve : 8

$$x(x+1)^2(x+2) = 72.$$

Unit IV

7. (a) Find the inverse of the matrix : 8

$$A = \begin{bmatrix} 1 & 0 & 0 \\ 3 & 3 & 0 \\ 5 & 2 & -1 \end{bmatrix}.$$

(b) Solve the following system of equations : 8

$$x + y + z = 6$$

$$x - y + z = 2$$

$$2x + y - z = 1$$

8. (a) Differentiate $\frac{x^4+1}{x^2+1}$ w.r.t 'x'. 8

(b) Prove that : 8

$$\begin{vmatrix} b+c & a & a \\ b & c+a & b \\ c & c & a+b \end{vmatrix} = 4abc$$

Unit V

9. (a) Define disjoint sets with two examples.

(b) Solve :

$$\log_{27} x = \frac{4}{3}.$$

(c) Evaluate :

$${}^{61}C_{57} - {}^{60}C_{56}.$$

(d) Find the sum of first 'n' natural numbers.

(e) In how many ways can 5 men and 4 women be seated in a row so that the women occupy the even places ?

(f) Using binomial theorem write the expansion of $(x^2 - 2x + 1)^3$.

(g) Solve $x^2 + x + 1 = 0$.

(h) If $2y = 5x^2 + 3$, find $\frac{dy}{dx}$ at $x = -2$.

$2 \times 8 = 16$