

**BBA- 1st Semester (New Scheme)**  
**Examination, November-2023**  
**BUSINESS MATHEMATICS**  
**Paper - BBAN-102**

*Time allowed : 3 hours*

*[Maximum marks : 80*

*Note : Attempt five questions in all by selecting one question from each unit of Section-B. Question No. 1 (Section-A) is compulsory. All questions carry equal marks.*

**Section-A**

1. (a) Differentiate between joint and dis-joint sets.
- (b) Using Venn diagram, show  $(A \cup B) \cap C$ .
- (c) With the help of example explain Index.
- (d) By taking an example explain Arithmetic Progression.
- (e) Differentiate between permutation and combinations.

- (f) Define Binomial expression (with example).
- (g) Explain and Illustrate diagonal matrix.
- (h) Differentiate  $(3x^{1/2} + 5x^{3/2} + 2x - 9)$  w.r.t.  $x$ .

**Section-B**

**Unit-I**

2. (a) Prove that  $A \cup (B \cap C) = (A \cup B) \cap C$ .
- (b) If  $A = \{1, 3\}$ ,  $B = \{1, 2, 3, 4\}$ ,  $C = \{1, 2, 3, 4, 5, 6\}$ , then verify that  $A \cup (B \cap C) = (A \cup B) \cap (A \cup C) = B$
3. (a) In a class of 35 students, 15 study Maths, 22 study Biology and 14 study Physics. If 11 students study both Maths and Biology, 8 study both Biology and Physics, 5 study Maths and Physics and if 3 study all three subjects. Find how many students of the class are not taking any of these subjects.
- (b) If  $A = \{1, 2, 3\}$ ,  $B = \{2, 3, 4\}$ ,  $C = \{1, 3, 4\}$  and  $D = \{2, 4, 5\}$ , then verify that  $(A \times B) \cap (C \times D) = (A \cap C) \times (B \cap D)$

## Unit-II

4. (a) If  $m = a^{1/2} + a^{-1/2}$ , prove  $m^3 - 3m = a + \frac{1}{a}$ .
- (b) If  $\log_2 x + \log_4 x + \log_{16} x = \frac{21}{4}$ , find  $x$ .
5. (a) If  $a, b, c$  are in A.P., prove  $a^3 + 4b^3 + c^3 = 3b(a^2 + b^2)$ .
- (b) Sum the series  $1^3 + 3^3 + 5^3 + \dots$  to  $n$  terms and hence to 50 terms.

## Unit-III

6. (a) If  ${}^{18}C_r + {}^{18}C_{r+2}$  evaluate  ${}^1C_r$  and  ${}^1C_r$ .
- (b) Find the 8th term in  $\left[\frac{2x}{3} - y^2\right]^{11}$ .
7. (a) Find the coefficient of  $x^0$  in  $(1-2x)^{-2}$ ,  $|x| < \frac{1}{2}$ .
- (b) Solve  $3x^2 - 2x - \sqrt{3x^2 - 2x + 4} = 16$ .

## Unit-IV

8. (a) If  $f(x) = x^2 - 5x + 7$ , find  $f(A)$  where
- $$A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & -2 & 1 \\ 4 & 2 & 1 \end{bmatrix}$$
- (b) Prove that  $\begin{bmatrix} 1 & a & a \\ a & 1 & a \\ a & a & 1 \end{bmatrix} = (2a+1)(1-a)^2$ .
9. (a) Differentiate  $x^2 + (x^{1/2} + 1)(x^3 + 3x + 1)$  w.r.t.  $x$ .
- (b) Integrate  $\int \frac{x^2 + x + 1}{(x-3)^3} dx$