

Roll No.

57502

**BBA 1st Semester (New Scheme)
Examination – December, 2022**

BUSINESS MATHEMATICS

Paper : BBAN-102

Time : Three Hours]

[Maximum Marks : 80

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

Note : **Section – A** (Question No. 1) is *compulsory*. Attempt *four* questions from **Section – B** selecting *one* question from each Unit. All questions carry equal marks.

SECTION – A

1. Briefly explain and illustrate the following :
 - (a) Union of two sets
 - (b) Cartesian product of two sets
 - (c) Relationship between indices and logarithms
 - (d) Common ratio

- (e) ${}^n C_r$
- (f) Equations reducible to quadratic equations
- (g) Scalar matrix
- (h) Integration

SECTION - B

UNIT - I

2. Using suitable examples, explain and illustrate the differences between :
- (i) Equal and equivalent sets
 - (ii) Finite and infinite sets
 - (iii) Joint and disjoint sets
 - (iv) Intersection and difference of two sets
 - (v) Null and singleton sets
3. (a) Let A, B, C be any three sets. Prove that :
- $$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$$
- (b) If a universal set $u = \{x \mid x \text{ is a positive integer } < 25\}$,
 $A = \{2, 6, 8, 14, 22\}$, $B = \{4, 8, 10, 14\}$, $C = \{6, 10, 12, 14, 18, 20\}$. Prove that :
- (i) $(B' \cap C') \cup (B' \cap C) = C \cap (A' \cup B')$
 - (ii) $(A \cap B)' = A' \cup B'$

UNIT – II

4. (a) Show that : $\frac{(81)^n \cdot 3^5 - 3^{4n-1}(243)}{9^{2n} \cdot 3^3} - \frac{4 \cdot 3^n}{3^{n+1} - 3^n} = 4$
- (b) Show that : $\log \frac{384}{5} + \log \frac{81}{32} + 3 \log \frac{5}{3} - \log 9 = 2$
5. (a) Sum of p terms of an A.P. is q and sum of q terms is p . Find the sum of $p + q$ terms.
- (b) Sum of three numbers in G.P. is 28 and sum of their squares is 336. Find the numbers.

UNIT – III

6. (a) In how many ways can the letters of the word STRANGE be arranged so that the :
- (i) Vowels are never separated
 - (ii) Vowels never come together
 - (iii) Vowels occupy any the odd places
- (b) Prove that : ${}^{n+1}C_r = {}^nC_r + {}^nC_{r-1}$
7. (a) Find the absolute term in the expansion of $\left(x - \frac{2}{x^2}\right)^{16}$.
- (b) Solve : $\frac{x}{b} + \frac{b}{x} = \frac{a}{b} + \frac{b}{a}$

UNIT – IV

8. Solve the following set of linear equations :

$$x + 2y + 3z = 14$$

$$3x + y + 2z = 11$$

$$2x + 3y + z = 11$$

9. (a) A firm has the following total revenue and total cost functions

$$TR = 100x - x^2$$

$$TC = x^3 - \frac{57}{2}x^2 \text{ where } x \text{ is the level of output.}$$

Find the maximum profit.

(b) Evaluate :

(i) $\int (2x - 3)^2 dx$

(ii) $\int \left(\frac{ax^3 + bx^2 + cx + d}{x} \right) dx$
