

Roll No. 

--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 03

Total No. of Questions : 18

BBA (2014 to 2017) / BRDM / B.SIM (2014 &amp; onwards) (Sem. 2)

**BUSINESS MATHEMATICS**

Subject Code : BBA-203

M.Code : 10546

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** consists of **FOUR** Sub-sections : Units-I, II, III & IV.
3. Each Sub-section contains **TWO** questions each, carrying **TEN** marks each.
4. Students have to attempt any **ONE** question from each Sub-section.

**SECTION-A**

1. Two finite sets have  $m$  and  $n$  elements. The total number of subsets of the first set is 56 more than the total number of subsets of the second set. Find the values of  $m$  and  $n$ .
2. State De-Morgan's Law.
3. In a class of 25 students, 12 have taken economics, 8 have taken economics but not politics. Find the number of students who have taken economics & politics and those who have taken politics but not economics.
4. Show by means of an example that the product of two non-zero matrices can be a zero matrix.
5. Let  $A = \begin{pmatrix} 1 & 0 & 2 \\ 0 & 2 & 3 \\ 0 & 0 & 5 \end{pmatrix}$  then show that  $|3A| = 27|A|$ .
6. Without expanding prove  $\begin{vmatrix} 9 & 9 & 12 \\ 1 & -3 & -4 \\ 1 & 9 & 12 \end{vmatrix} = 0$ .
7. Use logarithms to solve the following equation :  $3^x = 2$ .

8. Given  $y = (4x + 3)^{-5}$ , find  $\frac{dy}{dx}$ .
9. Differentiate  $\sin^2 x^3$  w.r.t.  $x$ .
10. Find the 3<sup>rd</sup> term of  $\left(3x - \frac{y^3}{6}\right)^4$

**SECTION-B****UNIT-I**

11. a) State and prove inclusion-exclusion principle.  
b) If A, B, C be any three sets, then prove that  
$$(A \cup B) \times C = (A \times C) \cup (B \times C).$$
12. In a town of 10,000 families, it was found that 40% families buy newspaper A, 20% families buy newspaper B and 10% newspaper C, 5% buy A and B, 3% buy B and C and 4% buy A and C. If 2% families buy all the three newspapers, find the number of families which buy
- a) A only      b) B only      c) only C      d) none of A, B and C.

**UNIT-II**

13. If  $A = \begin{pmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{pmatrix}$  and  $B = \begin{pmatrix} 3 & 1 & -1 \\ 1 & 3 & 1 \\ -1 & 1 & 3 \end{pmatrix}$ , find the product AB and use this result to solve the following system of linear equations :
- $$2x - y + z = -1 ; -x + 2y - z = 4 : x - y + 2z = -3.$$
14. Using properties of determinants, prove that :

$$\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix} = (a + b + c)(ab + bc + ca - a^2 - b^2 - c^2).$$

**UNIT-III**

15. Show that of all rectangles with a given perimeter, the square has the largest area.
16. Differentiate the following function w.r.t.  $x$  :
- a)  $\tan^{-1} x^4$
- b)  $\log \log \log x^3$ .

**UNIT-IV**

17. The coefficients of  $(r-1)^{\text{th}}$ ,  $r^{\text{th}}$  and  $(r+1)^{\text{th}}$  terms in the expansion of  $(x+1)^n$  are in the ratio  $1 : 3 : 5$ . Find both  $n$  and  $r$ .
18. a) State and prove Logarithmic Base changing formula.
- b) The value of machine when new is Rs. 20,000. It depreciates in its value at the rate of 3% per annum in the first 4 years and then at the rate of 5% per annum in the next six years. What will be its value after 10 years?

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**