Roll No. | | | | | | | | | | | | **Total No. of Pages: 02**

Total No. of Questions: 09

BBA (2012 & Onwards Batches) / BRDM (2014 & Onwards) / Bachelor In Service Industry Management (SIM) (2014 & Onwards) (Sem. – 2)

BUSINESS MATHEMATICS

M Code: 10546

Subject Code: BBA-203

Paper ID: [C0242]

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

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

SECTION A

1. Answer briefly:

   a) State base changing formula in logarithms.

   b) Let A & B be two sets, then prove that $A - B = A \cap B^c$.

   c) In a class of 60 boys, there are 45 boys who play cards and 30 boys play carom. How many play cards only and how many carom only?

   d) Give an example of two matrices A and B such that AB and BA are defined but $AB \neq BA$.

   e) If A is symmetric matrix, prove that $B'AB$ is also symmetric.

   f) Without expanding prove $\begin{vmatrix} 1 & 2 & 5 \\ 7 & 3 & 4 \\ 5 & -1 & -6 \end{vmatrix} = 0$.

   g) Given $y = (2x^3 - 1)^4$, find $\frac{dy}{dx}$.

   h) Differentiate $\sin x^2$ w.r.t x^2.

   i) Find the 10^{th} term of $\left(2x^2 + \frac{1}{x}\right)^{12}$

   j) Using Binomial theorem, prove that $x^n - y^n$ is always divisible by $x - y$, where x and y are distinct integers.

SECTION B

UNIT I

2. State and prove De-Morgan's law

3. 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

   i) A only (ii) B only (iii) only C (iv) none of A, B and C.

UNIT II

4. Show that any matrix can be uniquely expressed as the sum of a symmetric matrix and a skew-symmetric matrix.

5. Using Cramer's Rule, solve the following system of linear equations:

   $3x - 4y + 5z = -6$

   $x + y - 2z = -1$

   $2x + 3y + z=5$

UNIT III

6. Show that the height of the cylinder of maximum volume that can be inscribed in a sphere of radius R is $\frac{2R}{\sqrt{3}}$.

7. Differentiate the following function w.r.t x:

   a) $\cos^{-1}(4x^3 - 3x)$

   b) $\log(\cos e^x)$

UNIT IV

8. If the coefficients of x^{r-1}, x^r and x^{r+1} in the Binomial expansion of $(1 + x)^n$ are in A.P., prove that $n^2 - n(4r+ 1) + 4r^2 - 2 = 0$.

9. Use logarithms to solve the following equations:

   (a)$10^x = 5$ (b) $e^x = 8$ (c) $\pi^x = 10$ (d) $e^x = \pi$.