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**BBA (Sem. - 2<sup>nd</sup>)**

**BUSINESS MATHEMATICS**

**SUBJECT CODE : BBA - 203 (2012 Batch)**

**Paper ID : [C0242]**

**Time : 03 Hours**

**Maximum Marks : 60**

**Instruction to Candidates:**

- 1) Section - A is compulsory.
- 2) Attempt one question from each unit in Section - B.

**Section - A**

**(10 × 2 = 20)**

**Q1)** a) Let R be the relation on set N of natural numbers defined by

$$R = \{(a, b) / a + 3b = 12, a \in N, b \in N\} \text{ Find } R,$$

b) Differentiate  $x^2 + \sin x + \frac{1}{x^2}$  wrt  $x$ .

c) Differentiate  $\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)^2$ .

d) Expand  $(x^2 + 20)^5$  by binomial Theorem.

e) Find the 10<sup>th</sup> term in the binomial expansion of  $\left(2x^2 + \frac{1}{x}\right)^{12}$ .

f) Find the number of terms in expansion of  $(2x - 3y)^9$ .

g) Show that 
$$\begin{vmatrix} x & 1 & m & 1 \\ \alpha & x & n & 1 \\ \alpha & \beta & x & 1 \\ \alpha & \beta & r & 1 \end{vmatrix} = (x - \alpha)(x - \beta)(x - r).$$

h) For what value of  $x$  the matrix  $A = \begin{bmatrix} 1 & -2 & 3 \\ 1 & 2 & 1 \\ x & 2 & -3 \end{bmatrix}$  is singular.

i) Find the value of

$$\log_3^4 \cdot \log_4^5 \cdot \log_5^6 \cdot \log_6^7 \cdot \log_7^8 \cdot \log_8^9.$$

j)  $y \log_5^a \cdot \log_a^x = 2$ , Find the value of  $x$ .

**Section - B**

**Unit - I**

(4 × 10 = 40)

**Q2)** Express the following matrix as sum of a symmetric & skewsymmetric matrix

$$A = \begin{bmatrix} -1 & 7 & 1 \\ 2 & 3 & 4 \\ 5 & 0 & 5 \end{bmatrix}.$$

OR

**Q3)** Find the maximum & minimum values of  $f(x) = 2x^3 - 24x + 107$  in the interval  $[1, 3]$ .

**Unit - II**

**Q4)** Find the middle terms in expansion of  $\left(3x - \frac{x^3}{6}\right)^7$ .

OR

**Q5)** In a survey of 700 students in a college, 180 were listed as drinking limca, 275 as drinking Mirenda and 95 were listed as both drinking limca as well as Mirenda. Find how many students were drinking neither Limca nor Mirenda.

**Unit - III**

**Q6)** Find the value of  $3\log\frac{81}{80} + 5\log\frac{25}{24} + 7\log\frac{16}{15}$ .

OR

**Q7)** If  $y = x^{x^{x^{\dots}}}$ , find  $\frac{dy}{dx}$ .

**Unit - IV**

**Q8)** Solve  $\begin{matrix} x + y + z = 6 \\ x + 2z = 7 \\ 3x + y + z = 12 \end{matrix}$  by matrix Inverse method.

OR

**Q9)** If the fourth term in the expansion of  $\left(ax + \frac{1}{x}\right)^n$  is  $\frac{5}{2}$  then find the values of a.

