**Roll No……..** **Total No. of Printed Pages: [02]**
**Total No. of Questions: [09]**

**BBA (Semester – 2nd)**
**MATHEMATICS**
**Subject Code: BMAT0-211**
**Paper ID: [150109]**

**Time: 03 Hours** **Maximum Marks: 60**

**Instruction for candidates:**

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

**Section – A** **(2 marks each)**

Q1. Attempt the following:

a. Find the values of $x$, $y$ and $z$ if $\begin{bmatrix} x-y & 4 \\ z & 2x-y \end{bmatrix} = \begin{bmatrix} -1 & 4 \\ 1 & 0 \end{bmatrix}$.

b. What are the symmetric and skew-symmetric matrices? Give their examples.

c. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 3 \\ 5 & 8 \end{bmatrix}$, then verify that $(AB)^T = B^T A^T$.

d. Use binomial theorem to evaluate $(102)^4$.

e. If $\log_2\{\log_2[\log_2(\log_2 a)]\} = 1$, then find the value of $a$.

f. Find the middle term in the expansion of $(a+ab)^{20}$.

g. Use first principle to find the derivative of $\sin 2x$.

h. If $y = A\cos nx + B\sin nx$, then prove that $\frac{d^2y}{dx^2} + n^2 y = 0$.

i. Evaluate $\int \frac{x^3+3x^2+2x+1}{x-1}dx$.

j. Compute the integral $\int \sin^3 x \cos^2 x dx$.

**Section – B** **(5 marks each)**

Q2. Use Cramer's rule to solve the following system of equations:
$2x-y-z=7$, $3x+y-z=7$, $x+y-z=3$.

Q3. Find the coefficient of $x^{15}$ in the expansion of $(x-x^2)^{10}$.

Q4. Find the value of $x$, if $\log(x-5)+\log(x+5) = 2\log 3 + 4\log 2$.

Q5. Differentiate the function $(\sin x)^{\cos x} + (\cos x)^{\sin x}$ with respect to $x$.

Q6. Evaluate the integral $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\cos x}}{\sqrt{\cos x}+\sqrt{\sin x}}\,dx$.

**Section – C** **(10 marks each)**

Q7. If $A=\begin{bmatrix}1 & 3 & 3\\ 1 & 4 & 3\\ 1 & 3 & 4\end{bmatrix}$, then verify that $A.adjA=|A|.I$. Also find $A^{-1}$.

Q8. Find the points at which the function $f(x)=(x-2)^4(x+1)^3$ has local maxima, local minima and point of inflexion.

Q9. Evaluate the following integrals:

a) $\int \frac{dx}{5+4\sin x}$ b) $\int_0^2 |x-1|dx$ (5,5)