B.C.A./ 2nd Sem

Fundamentals of Mathematics

Subject Code :BMATO-204

Paper ID : May 2018

Max Marks: 60

Time allowed: 3 Hrs

Important Instructions:

- Section A is compulsory.
- Attempt any fivequestions from section B and section C selecting at least two questions from each section.
- Assume any missing data
- Additional instructions, if any

PART A (2marks ×10)

Q. 1. Short-Answer Questions:

(a) Define upper triangular matrix with an example

(b) Find $(AB)^T$ When $A = \begin{bmatrix} 2 & 1 & -3 \\ 1 & 2 & 1 \\ 1 & -1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 0 & 0 \\ 1 & 1 & 1 \end{bmatrix}$

(c) Solve $2x + 5y = 1$, $x - 3y = 5$

(d) Obtain the Median :

X:	1	2	3	4	5	6	7	8	9
F:	8	10	11	16	20	25	15	9	6

(e) What are the Demerits of median?

(f) Find $\frac{dy}{dx}$ when $y = \frac{\log(2x+3)}{x^2}$

(g) Find $\frac{dy}{dx}$ when $y = x^{-3} + x^{-5}$

(h) Evaluate $\int_0^{\frac{\pi}{2}} \frac{tanx}{tanx+cotx} dx$

(i) Evaluate $\int \frac{(x+2)^3}{\sqrt{x}} dx$

(j) Write the formula for Trapezoidal method.

PART B (8marks ×5)

Q. 2. Find the maximum and minimum value of $Y = (x + 1)(x - 2)^2$

OR

Compute $\int_0^1 \frac{dx}{1+x^2}$ using simpson's rule by dividing [0,1] into 4 equal parts.

Q. 3. Solve by matrix method

$$2x + 5y - z = 9$$
$$3x - 3y + 2z = 7$$
$$2x - 4y + 3z = 1$$

OR

Reduce the matrix to the normal form and hence, find its rank.

$$\begin{bmatrix} 2 & -1 & 3 & 4 \\ 0 & 3 & 4 & 1 \\ 2 & 3 & 7 & 5 \\ 2 & 5 & 11 & 6 \end{bmatrix}$$

Q. 4. Calculate mode and standard deviation .

X :	1-10	11-20	21-30	31-40	41-50	51-60
F :	3	16	26	31	16	8

OR

The scores of 21 students in an intelligence test are shown in the frequency table below:

score	91	92	96	97	101	103	108
frequency	3	2	3	2	5	3	3

Calculate σ^2

Q. 5. Evaluate I= $\int \frac{e^x(1+x)}{\sin^2 x\ e^x} dx$

OR

Evaluate $\int_0^{\frac{\pi}{4}} \log(1 + \tan x)\, dx$

Q. 6. If siny = x sin(a+y) , then prove that $\frac{dy}{dx} = \frac{\sin^2(a+y)}{\sin a}$

OR

Find $\frac{dy}{dx}$ if $x = a(1 - \cos\theta)$, $y = a(1 + \sin\theta)$