SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR

ROLL No: | | | | | | | | | | | | | | **Total number of pages:[2]**

B.C.A || 2nd Sem
Fundamentals of Mathematics
Subject Code: BMATO-204
Paper ID:

Time allowed: 3 Hrs **Max Marks: 100**

Important Instructions:

- **All questions are compulsory**

PART A (10x 2marks)

Q. 1. Short-Answer Questions:

(a) Find the rank of the matrix $\begin{bmatrix} 0 & -1 & 2 \\ 4 & 3 & 1 \\ 4 & 2 & 3 \end{bmatrix}$

(b) If AM and GM of two numbers are 8 and 6 respectively. Find the numbers?

(c) If $A = \begin{bmatrix} 1 & 3 \\ -2 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} -2 & 5 \\ 3 & 4 \end{bmatrix}$ find $(AB)'$.

(d) If the mode of the data is 18 and the mean is 24 find the median of the data?

(e) Evaluate $\int \frac{Cos \log x}{x} dx$

(f) Evaluate $\int \frac{5\, sec^2 x}{1+tanx} dx$

(g) Differentiate y = tan [cos (sin2x)].

(h) Find $\frac{dy}{dx}$ for $y = (x^2 + 2)(x - 5)^2$

(i) Solve $\int_0^1 x^4 e^{x^5} dx$

(j) If $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then find the value of k such that $A^2 = 8A + kI$

PART B (5×16marks)

Q. 2. Use Crammer's rule to solve the following system of equations CO1

$$X + 3Y + 5Z = 22$$
$$5X - 3Y + 2Z = 5$$
$$9X + 8Y - 3Z = 16$$

OR

Using matrix method to solve the equations CO1

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

Q. 3. (a) Differentiate $Y = (\sin x)^{\tan x} + (\tan x)^{\sin x}$. CO2

(b) Find the maximum and minimum value of $(1-x)^2 e^x$?

OR

(a) Differentiate $\sin[\log(x^2+1)] + \frac{\sin x}{(1+\tan x)}$ w.r.t x CO2

(b) Find $\frac{dy}{dx}$ if $y = e^{2x}\cos(3x+4)$

Q. 4. (a) Evaluate $I = \int \frac{1-\sin x}{1+\sin x}\,dx$ CO3

(b) Evaluate $I = \int x\cos^2 x\,dx$

OR

(a) Evaluate $I = \int_0^{\frac{\pi}{2}} \frac{\cos x-\sin x}{1+\sin x\cos x}\,dx$ CO3

(b) Evaluate $I = \int \frac{x-1}{(x-3)(x-2)}\,dx$

Q. 5. Use Trapezoidal rule to find $\int_0^4 \frac{1}{1+x}\,dx$ CO4

OR

Use simpson's 1/3 rule to find $\int_4^8 \frac{1}{x}\,dx$ CO4

Q. 6. (a) A and B are two non- mutually exclusive events of the experiment. If $P(A) = \frac{1}{4}$, $P(B) = \frac{2}{5}$, $P(A \cup B) = \frac{1}{2}$ find the values of $P(A \cap B)$ and $P(A \cap B^c)$ CO5

(b) Calculate the mean from the following data by Step- deviation method:

Weekly wages:	11-13	13-15	15-17	17-19	19-21	21-23	23-25
Frequency :	3	4	5	6	5	4	3

OR

Find the mean deviation from mean and its coefficient from the following data: CO5

Marks :	25	15	55	45	35	75	65
Frequency:	3	8	15	18	3	2	1