Enroll No.................   Roll No....................

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Examination: Odd Semester Examination 2017

Paper Name: Mathematics-I | **Paper Code: BFTC-102**
Time: 3 Hours | **Maximum Marks: 70**

Note: Mobile Phones or programmable calculator or any equipment with memory are not allowed inside the examination hall. Follow proper numbering for answering the questions.

Attempt all questions from section A (5*6=30), Any four questions from section B (4*10=40) .

Section-A (Each question carries 06 Marks)

Question 1(a). Define Equivalence relation.

(b). Define Logarithmic and Exponential Function.

Question 2. Solve the following System of Equation for Consistency and hence

Obtain (x, y, z) using Creamer's Rule, $5x - 7y + z = 11,\quad 6x - 8y - z = 15$ *and* $3x + 2y - 6z = 7$.

Question 3. State the term Continuity. Evaluate $\lim_{x \to 2} \frac{x^{10} - 1024}{x^5 - 32}$

Question 4. What do you mean by $\frac{dy}{dx}$? If $y = x^3 + 4^3 + \log x + e^x$ .find $\frac{dy}{dx}$.

Question 5. What do you mean by Integration. Integrate the following: $\int x^5\, dx$ & $\int e^x\, dx$.

Section- B (Each question carries 10 Marks)

Question 1(a). If $A=\begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$, then show that $A^{-1} = \frac{1}{19}A$.

(b). Find x, y, z *and* w such that $\begin{bmatrix} x-y & 2z+w \\ 2x-y & 2x+w \end{bmatrix} = \begin{bmatrix} 5 & 3 \\ 12 & 15 \end{bmatrix}$.

17 11 −19

Question 2(a). Define Upper and Lower triangular matrices.

(b). Find the rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ -3 & -6 & -9 \end{bmatrix}$.

Question 3(a). Define Linear dependence of Vectors.

(b). Are the Vectors $X_1 = (1,3,4,2),\ X_2 = (3,-5,2,2), X_3 = (2,-1,3,2)$

Linearly dependent? If So, Express one of these as a Linear Combinations of others.

Question 4. Find the limit of the followings:

(a). $\lim_{x\to 1}[(x^2+4)(3x-2)]$. 5

(b). $\lim\limits_{x\to 5} \sqrt{x^2+2}$.

(c). **Find** $\lim\limits_{h\to 0} \frac{\sqrt{x+h}-\sqrt{x}}{h}$, **for** $h > 0$.

Question 5(a). $\lim\limits_{m\to\infty} P\left(1+\frac{i}{m}\right)^{mn}$.

(b). If $y = (2x^3 - 5x^2 + 7x + 1)^{25}$ find $\frac{dy}{dx}$.

Question 6. Define point of inflection. Find all the points of local maxima and local minima as well as the corresponding local maximum and minimum values of the function $f(x) = x^4 - 8x^3 + 22x^2 - 24x + 1$.

It is defined as $x = x^0$ when there is no local minima or local maxima at $x = x^0$.

$x = x^0$

$f(x^0) \geq f(x) \to$ max

$f(x^0) \leq f(x) \to$ Mi