POSSESSION OF MOBILES IN EXAM IS UFM PRACTICE.

Name of student: .... Enrollment No. ....

BENNETT UNIVERSITY, GREATER NOIDA
B.TECH. 1st YEAR
TEST-Make-Up
FALL SEMESTER 2017-18

COURSE CODE : EMAT101L	MAX. TIME: 1 Hour
COURSE NAME: ENGINEERING CALCULUS	
COURSE CREDIT: 3-1-0	MAX. MARKS: 25

Instructions:

- This paper contains 5 questions.

- All questions are mandatory.

1. True/False. Justify your answer. $[2 \times 5 = 10]$

    (a) $|\cos x| - |\cos y| > |x - y|$ for every value $x, y \in \mathbb{R}$.

    (b) $f(x) = x^2 - x \sin x - \cos x$ has exactly one root in $(0, 2\pi)$.

    (c) $\int_1^\infty \frac{dx}{x^2 + \sqrt{x}}$ converges.

    (d) $f(x) = \begin{cases} x[x] & 0 \le x \le 5 \\ 0 & x = 0, \end{cases}$ is Riemann Integrable.

    (e) Let $f(x) = 1 + x + x^2$. Then there exists some $c \in \mathbb{R}$ such that $f(c) = 2$.

2. Show that $\int_0^1 \frac{x^t - 1}{\log x} dx = \log(1 + t)$. $[3]$

3. Find all the values of x for which the series $\sum_{n=0}^{\infty} a_n (x - 1)^{2n}$ converges,

where [3]

$$a_n = \begin{cases} \frac{1}{2^n} & \text{if } n \text{ is odd} \\ \frac{1}{3^n} & \text{if } n \text{ is even.} \end{cases}$$

4. Using the Taylor series, find first two non-zero terms of the function $f(x) = \sqrt{1 + x^2}$ about the point $x = 0$. [3]

5. Let $f : \mathbb{R}^2 \to R$ be defined as

$$f(x, y) = \begin{cases} xy \sin\left(\frac{1}{x}\right) + xy \sin\left(\frac{1}{y}\right) & \text{if } xy \neq 0 \\ 1 & \text{if } xy = 0 \end{cases}$$

(a) Find the repeated limit and simultaneous limit of f. Is f continuous at $(0, 0)$. [4]

(b) Find the partial derivatives of f at $(0, 0)$. [2]