VIT

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF ADVANCED SCIENCE
DEPARTMENT OF MATHEMATICS

Continuous Assessment Test - I, August 2018

B.Tech, Fall Semester-2018-19

Course Code : MAT1011 **Duration** : 90 Minutes.

Course Name :CALCULUS FOR ENGINEERS **Max. Marks** : 50M

Slot : B1+TB1

ANSWER ALL THE QUESTIONS

1(a) Find the absolute maximum and minimum values of $f(x)=x^2-2x+1$ on $[0,2]$ [5M]

(b) Obtain the critical points of $f(x)=x^3-3x^2-9x-2$ and identify the intervals on which f is increasing and on which f is decreasing [5M]

2 (a) Find the area of the region enclosed by the curve $y=x^2$ and the line $y=x$ [5M]

(b) Obtain the volume of the solid generated by revolving the region $x^2+y^2=a^2$ about the $x-$axis. [5M]

3. Find the Laplace transform of the function (a) $f(t)=e^{-t}t\sin t$ (b) $g(t)=\dfrac{\sin t}{t}$ [10M]

4. Find the Laplace transform of periodic function defined by the triangular wave

$$f(t)=\begin{cases}\dfrac{t}{a}, & 0\le t\le a,\\ \dfrac{2a-t}{a}, & a\le t\le 2a.\end{cases}$$ and $f(t+2a)=f(t)$ [10M]

5 (a) Using convolution theorem to find the inverse Laplace transform of the function $F(s)=\dfrac{s}{(s-1)(s^2+1)}$. [5M]

(b) Find $L^{-1}\left\{\dfrac{s-2}{s^2+5s+6}\right\}$ Using partial fraction method. [5M]

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