VIT®
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

VIT, VELLORE
SCHOOL OF ADVANCED SCIENCES
DEPARTMENT OF MATHEMATICS
FALL SEMESTER - 2019-20

DA - MAT 1011
G_1 SLOT

1.) For $f(t) = t(6-t)^{\frac{2}{3}}$, find critical points, inflection points, intervals of increasing and decreasing and intervals of concave up and concave down

2.) Find the area bounded by $y = \sqrt{x}$ and $y = x - 2$ above x-axis

3.) Find the volume of the solid generated by revolving the region bounded by $y = \sqrt{x}$ and the line $x = 4$ about the line $x = 1$

4.) Evaluate

i) $L\left(\int_0^t \frac{e^{-t}\sin t}{t}\right)$

ii) $L\left(\int_0^t e^{-t}\cosh t\right)$

iii) Use step function to evaluate $L(f)$ where

$$f = \begin{cases} \sin t, & 0 \leq t < \pi \\ \sin 2t, & \leq t < 2\pi \\ \sin 3t, & t > 3\pi \end{cases}$$

5.) Use convolution to evaluate

i) $L^{-1}\left[\frac{s^{-2}}{(s^2+1)(s^2+4)}\right]$

ii) $L^{-1}\left[\frac{s}{(s+1)(s-3)(s+5)}\right]$