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

School of Advanced Sciences
Department of Mathematics
MATLAB   FAT – FEBRUARY 2021

Answer All the Questions

If your Registration Number End with 0:

1. (a) Write the MATLAB code and find the Laplace transform of a function
$$f(t) = \begin{cases} \sin t & 0 \le t \le \pi \\ 0 & \pi \le t \le 2\pi \end{cases}$$
(b) Write the MATLAB code and compute the inverse Laplace transform of
$$F(s) = \frac{1}{s^2(s+1)(s^2+9)}$$

2. Write the MATLAB code and expand $f(x,y) = e^x \log(1+y)$ in

terms of x and y upto the terms of 3rd degree using Taylor series.

If your Registration Number End with 1:

1. Write the MATLAB code and expand $f(x,y) = e^{-x} \cos y$ in terms of

x and y upto the terms of 3rd degree using Taylor series.

2. Evaluate $\iint_R \frac{1+x^2}{1+y^2}$ where $R = \{(x,y)/0 \le x \le 1, 0 \le y \le 1\}$.

If your Registration Number End with 2:

1. (a) Write the MATLAB code and find the Laplace transform of a function
$$f(t) = e^{-t} t \cos 5t$$
   (b) Write the MATLAB code and compute the inverse Laplace transform of
$$F(s) = \frac{1}{s^3(s-1)^2(s^2+4)}$$

2. Draw the surface $x=cost$; $y=sint$; $z=sin3t$ by using plot3 comment.

If your Registration Number End with 3:

1. Using MATLAB find the tangent to the curves $y = \sqrt{x}$ at $x = 4$ and show graphically.

2. Visualize and find the volume of the sphere $x^2 + y^2 + z^2 = 1$ in the first octant.

If your Registration Number End with 4:

1. Using MATLAB, draw the four curves *sinx, cosx, exp(-x) and sin3x in one window.*

2. (i) Write the MATLAB code , and find the Laplace transform of

$$3e^{-2t}\sin5t + 4e^{-2t}\cos5t$$
   (ii) Find the inverse Laplace transform of
$$F(s) = \frac{100(s+3)}{(s+1)(s+2)(s^2+2s+5)}$$

If your Registration Number End with 5:

1. (a) Write the MATLAB code and find the Laplace transform of a function
$$f(t) = \begin{cases} 0 & 0 \le t \le \pi \\ \sin t & \pi \le t \le 2\pi \end{cases}$$
(b) Write the MATLAB code and compute the inverse Laplace transform of
$$F(s) = \frac{3}{s^3(s-1)(s^2+9)}$$

2. Write the MATLAB code and expand $f(x, y) = e^{-x}\log(1 + y)$ in terms of x and y upto the terms of 3rd degree using Taylor series.

If your Registration Number End with 6:

1. Write the MATLAB code and expand $f(x, y) = e^{-x}\sin y$ in terms of x and y upto the terms of 3rd degree using Taylor series.

2. Evaluate $\iint_R \frac{1+x^2}{1+y^2}$ where $R = \{(x, y)/0 \le x \le 1, 0 \le y \le 1\}$.

If your Registration Number End with 7:

1. (a) Write the MATLAB code and find the Laplace transform of a function
$$f(t) = t\,\sin 3t\,\cos 5t$$
(b) Write the MATLAB code and compute the inverse Laplace transform of
$$F(s) = \frac{2}{s(s-1)(s^2+4)}$$

2. Draw the surface *x=cost*; *y=sint*; *z=sin5t* by using plot3 comment.

If your Registration Number End with 8:

1. Plot the curves x=cos t, y=sin t, z=sin 7t by using plot3 comment.

2. Visualize and find the volume of the sphere $x^2 + y^2 + z^2 = 4$ in the first octant.

If your Registration Number End with 9:

1. Solve the following system of two linear equations using solve comment

$$3x - 2y = 1, \qquad 5x + y = 6$$

2. Using MATLAB code, evaluate $\iint_R \sin x \cos y \, dx \, dy$ where R= $[0,\frac{\pi}{2}] \times [0,\frac{\pi}{2}]$

Note: Upload the scanned copy of the answer sheet (max 5MB size) in VTOP immediately after the test. This is mandatory for all the students. FAT Answer Sheet upload option is provided in VTOP Student Login.