Hall Ticket Number:

Code No. : 32017 TS

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (Civil Engg.) III Year II-Semester Main Examinations, May-2017

Finishing School - IV : Technical Skills

Time: 1 ½ hours Max. Marks: 35

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (5 × 2 = 10 Marks)

1. **Explain** what happens when the following code is executed
   $x = 0: 0.1\pi: 2\pi$;
   $y = \sin(x)$;
   $plot(x, y, ':xb')$;
2. **Explain** what happens when the following code is executed
   $x = 0: 5$
   $y = [1.5,1.0,0.9,0.6,0.3,0]$;
   $polyfit(x, y, 1)$;
3. **Explain** what happens when the following code is executed
   *y = exp(3*x)*
   diff(y,2)
4. **Compute** the output of the following code
   *f = @(x) (x.^2+3*x+2)*
   quad(f,1,4)
5. **Explain** what happens when the following code is executed
   x = 0:0.1:1;
   y = x.^3;
   trapz(x,y)

Part-B (5 × 5 = 25 Marks)

6. a) What is the output of the following lines of code is executed [2]
   $x = 0: 0.01\pi: 2\pi$;
   $y = cos(3 * x)$;
   $plot(x, y, '--*g')$;

   b) Write a MATLAB program to make plots of $\cos(4 * x)$, $\sin(x)$ and $\sin(3x)$ *in the same figure* with the following specifications: [3]
   i) range of values of x is from 0 to 2π in steps of 0.01π
   ii) title for the figure and labels for x and y axes.
   iii) the plots of $\cos(4 * x)$, $\sin(x)$ and $\sin(3x)$ are shown in magenta, cyan and red colors respectively.

7. a) **Compute** the output of the following lines of code [2]
   $x = 0: 5$
   $y = [30,20,18,12,4,0]$;
   $new\_x = interp1(x, y, 3)$;
   $fprintf(1, 'newx = \%f\backslash n', new\_x)$;

Contd...2

b) Consider the x and y values shown in the table below. Write a MATLAB program to use to linear interpolation to approximate y_{new} values for x_{new} values evenly spaced between 1 and 10 at intervals of 0.1. [3]

x	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
y	4.6	9.0	12.0	16.4	22.2	28.0	35.4	39.6	40.0	44.0

8. a) Write a sample MATLAB program illustrating the use of *ode45* function. Explain your steps in detail. [2]

b) Write a MATLAB program to solve $\frac{dy}{dt} = 2t$ numerically using the initial condition $y(-1) = 1$ and to plot t *vs* y . [3]

9. a) **Explain** what is a parabolic partial differential equation, **citing** a suitable example. [2]

b) Write a MATLAB program to solve the partial differential equation using MATLAb function *pdepe*. [3]

$\pi^3 \frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial z^2}$ subject to $u(z,0) = \sin(\pi z)$; $u(0,t) = 0$ and $\pi e^{-t} + \frac{\partial u}{\partial z}(1,t) = 0$

10. a) Citing a suitable example, explain how numerical integration is carried out using the MATLAB function *quadl*. [2]

b) Write a MATLAB program to compute $\int_2^5 (3x^2 + 5x + 4)dx$ by Simpson's rule . [3]

11. a) Write a MATLAB program to make plots of $\sin(2 * x)$ and $\cos(2 * x)$ *in the same figure* with the following specifications: [2]

i) range of values of x is from 0 to 2π in steps of 0.01π

ii) provide title for the figure and labels for x and y axes.

iii) plot of $\sin(2 * x)$ to be in red color using a solid line

iv) plot of $\cos(2 * x)$ to be in blue color using a dashed line

b) Write a MATLAB program to fit a second order curve for the following data [3]

x	0	1	2	3	4	5
y	1.5	1.0	0.9	0.6	0.2	0

12. Answer any **two** of the following questions: [5]

a) Write a MATLAB program to solve the third order ODE $\frac{\partial y}{\partial x} + 3y = e^{-2t}$ subject to the condition $y(0) = 1$

b) Explain the steps in solving a partial differential equation using MATLAB pde toolbox.

c) Write a MATLAB program to compute $\int_0^2 (x^3 + 4x - 3)dx$ by Trapezoindal rule.

******