

Hall Ticket Number:

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Code No.: 32011TS AS

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (Civil Engg.) III Year II-Semester Advanced Supplementary Examinations, June/July-2017

Finishing School-IV : Technical Skills

Time: 1½ 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
 $x = 0:0.1\pi:2\pi$;
 $y = \cos(x)$;
 $plot(x, y, '-xg')$;
2. Explain what happens when the following code is executed
 $x = 0:5$
 $y = [15,10,9,6,2,0]$;
 $polyfit(x, y, 2)$;
3. Explain what happens when the following code is executed
 $y = \sin(3*x)$
 $diff(y,3)$
4. Compute the output of the following code
 $f = @(x) \exp(3*x)$
 $quad(f,0,1)$
5. Explain what happens when the following code is executed
 $x = 0:0.2:2$;
 $y = x.^2$;
 $trapz(x,y)$

Part-B (5 × 5 = 25 Marks)

6. a) What is the output of the following lines of code is executed [2]
 $x = 0:0.01\pi:2\pi$;
 $y = \sin(2 * x)$;
 $plot(x, y, '-*r')$;
- b) Write a MATLAB program to make plots of $\sin 4x$, $\cos x$ and $\cos 3x$ 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 $\cos 4x$, $\sin x$ and $\cos 3x$ are shown in blue, green and red colors respectively.
7. a) Compute the output of the following lines of code [2]
 $x = 0:5$
 $y = [15,10,9,6,2,0]$;
 $newx = interp1(x, y, 1.5)$;
 $fprintf(1, 'newx = %f\n', newx)$;
- 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 0.2. [3]

| | | | | | | | | | | |
|---|-----|-----|-----|-----|------|------|------|------|------|------|
| x | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 |
| y | 2.3 | 4.5 | 6.0 | 8.2 | 11.1 | 14.0 | 16.7 | 19.8 | 20.0 | 22.0 |

8. a) Citing an example, explain the utility of the *ode45* function in MATLAB. [2]
 b) Write a MATLAB program to solve $\frac{dy}{dt} = 3t^2$ numerically using the initial condition $y(-1) = -1$ and to plot *t vs y*. [3]
9. a) Explain what is an elliptic partial differential equation, citing a suitable example. [2]
 b) Write a MATLAB program to solve the partial differential equation $\pi^2 \frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$ subject the following conditions: [3]
 $u(x, 0) = \sin(\pi x)$; $u(0, t) = 0$ and $\pi e^{-t} + \frac{\partial u}{\partial x}(1, t) = 0$
10. a) Citing a suitable example, explain how numerical integration is carried out using MATLAB functions [2]
 b) Write a MATLAB program to compute $\int_1^3 (2x^2 + 4x + 5)dx$ by trapezoidal rule. [3]
11. a) Write a MATLAB program to make plots of $\sin(x)$ and $\cos(x)$ in the same figure with the following specifications: [2]
 i) range of values of x is from 0 to 2π in steps of 0.1π
 ii) provide title for the figure and labels for x and y axes.
 iii) plot of $\sin(x)$ to be in blue color using a solid line
 iv) plot of $\cos(x)$ to be in red 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 | 15 | 10 | 9 | 6 | 2 | 0 |

12. Answer any two of the questions: [5]
 a) Write a MATLAB program to solve the third order ODE $\frac{\partial y}{\partial x} + 4y = e^{-t}$ subject to the condition $y(0) = 1$
 b) Explain how a partial differential equation is solved using a suitable MATLAB function.
 c) Write a MATLAB program to compute $\int_0^2 (x^3 + 4x - 3)dx$ by Simpson's rule.
