VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (Mech. Engg.) III Year I-Semester Main & Backlog Examinations, December-2017

Finishing School-III: 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. Write the MATLAB code to compute $9\frac{\sqrt{5}-1}{(\sqrt{5}+1)^2} -1$.

2. How to delete a row in a matrix show with an example.

3. Explain the usage of legend command with an example.

4. Discuss for loop with an example.

5. Write the MATLAB code to determine the derivative of the function $\cos(x^2)$.

Part-B (5 × 5 = 25 Marks)

6. a) Discuss different display formats with an example. [2]

    b) List the arithmetic and logical operators and mention the order of preference. [3]

7. a) What is the meaning of the following codes used for variable indexing [3]
        (i) v(1) (ii) p(4:6:10) (iii) q(4,:) (iv) r(:,3) (v) s(:,1:3:end) (vi) e(1:2,2:4)

    b) If $A=\begin{bmatrix} 2 & 4 & -1 \\ -2 & 1 & 9 \\ -1 & -1 & 0 \end{bmatrix}$ and $B=\begin{bmatrix} 0 & -1 & -1 \\ 1 & 0 & 2 \\ -1 & -2 & 0 \end{bmatrix}$ and $C=\begin{Bmatrix} 3 \\ 1 \\ -1 \end{Bmatrix}$; [2]
    Write the MATLAB codes used for determining
    (i) $(AB^T)C$ (ii) $C(A^{-1}B)$ (iii) $|A|I(B^{-1})$ (iv) $|B|IA^T$

8. a) Discuss anatomy of a function file. Write a function file for finding the conversion of Celsius to Fahrenheit using $F=\frac{9}{5}C+32$. [3]

    b) Discuss the plotting with different line styles [2]

9. a) Discuss the structure of for loop and write the script file for display of all the multiples of 5 below 100. [3]

    b) Differentiate mesh and meshc commands [2]

10. a) Write the MATLAB code for evaluating (i) $\int x^3 e^x dx$ (ii) $\int_0^\Pi sin2\theta cos^2\theta \, d\theta$ [2]

    b) Solve the equation of motion of a nonlinear pendulum using MATLAB [3]
    $\ddot{\theta} + \omega^2 \sin\theta = 0$ with the initial conditions $\theta(0) = 1$, $\dot{\theta}(0) = 0$.

11. a) Discuss the MATLAB windows that appears on desktop of the MATLAB [2]

    b) Write the MATLAB code for (i) combining two 3x3 matrices row wise and (ii) adding an element at 4th row 5th coloumn in an 3x3 Identity matrix. [3]

12. Answer any *two* of the following:

    a) If $f(x) = 3x^4 + 2x^3 + 7x^2 + 2x + 9$ and $g(x) = 5x^3 + 9x + 2$; Write a script file to create a plot showing graph of two polynomials F(x) and g(x). [2½]

    b) Write the MATLAB code for creation of surface plot for $z = \frac{xy(x^2-y^2)}{(x^2+y^2)}$, $-3 \leq x \leq 3$, $-3 \leq y \leq 3$. [2½]

    c) Discuss the procedure for solving ODEs using ODE23 solver. [2½]

ಲ೦ಲ೦ಲ೦ಟಿಲ೦ಟಿಲ೦