Hall Ticket Number:

Code No.: 31408

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (Mech. Engg.) III Year I-Semester (Main) Examinations, Nov./Dec.-2016

Finishing School - III : 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. List the order of precedence for arithmetic operations.
2. The matrix B is given as $B = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 10 \end{pmatrix}$, Write the MATLAB code for finding
   a) Transpose of matrix and *b)* Rank of matrix.
3. Write the MATLAB code for multi plots to represent two variables (displacement and velocity) with respect to time variable.
4. What is the necessity of nested loops?
5. Write the MATLAB code for the following definite integral $\int_0^1 \log(x)\sqrt{x}\, dx$.

Part-B (5 × 5 = 25 Marks)

6. a) Write the syntax for the following expression $e^{\pi\sqrt{163}}(sin^2 x) - tan^{-1}(y)$. [2]
   b) Discuss the rules about variables and mention some predefined variables in MATLAB with examples. [3]

7. a) Discuss the indexing of the elements in a matrix with examples. [2]
   b) If $P = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ and $Q = \begin{bmatrix} 12 & 10 & 20 \\ 14 & 8 & 24 \\ 20 & 10 & 16 \end{bmatrix}$; Write the MATLAB codes for finding *i)* $P^T Q^{-1}$ [3]
   ii) PQ/P^T and *iii)* Determinant of the matrix Q.

8. a) If a function is defined by $y = e^{-t}\cos(t)$, $0 \le t \le 10$; Write the script file for plotting the function f(t) with respect to time 't'. [2]
   b) Differentiate script file and function file with example. [3]

9. a) Explain switch case command with an example. [2]
   b) Differentiate ezcontour and ezcontourf commands with an example. [3]

10. a) Explain the procedure to find the maximum of a function. [2]
    b) Write the procedure to solve the differential equation $xy' + 1 = y$. [3]

11. a) Discuss the assignment operators. [2]
    b) Discuss the appending of elements in a matrix with examples. [3]

12. Answer any ***two*** of the following:
    a) Colour codes and line styles used in 2D plots. [2½]
    b) 3D plot commands. [2½]
    c) Procedure to solve first order ordinary differential equation $\frac{dy}{dt} = 2y + t$ with the initial condition $y(0) = 1$ for a time span of 0 to 4 seconds using solver ODE45. [2½]