



Date: 27-04-2016

Dept. No.

Max. : 100 Marks

Time: 01:00-04:00

Answer ALL Questions.

1. (a) Explain the MATLAB desktop. (5)
- (OR)**
- (b) Write down the uses of the following MATLAB commands: (5)
- (i) clc (ii) clear (iii) : (iv) ; (v) ...
- (c) (i) Explain the script M-file with an example.
- (ii) Write MATLAB commands to evaluate the following mathematical expressions:
- (1) $e^{(-2.1)^3} + 3.47 \log 14 + \sqrt[4]{899}$ (2) $6\pi \tan^{-1}(12.5) + 4$
- (3) $5 \ln 7 + 5 \log 7$ (4) $5 \tan\left(\sin^{-1}\frac{13}{5}\right)$ (10+5)
- (OR)**
- (d) Explain the following MATLAB commands.
- (1) conv(a,b) (2) [q r]=deconv(num,den) (3) poly(r) (4) polyval(a, x) (5) roots(a)
- (6) eye(n) (7) ones(m,n) (8) eig(A) where A is a square matrix. (15)
2. (a) Describe if...else statement in MATLAB. (5)
- (OR)**
- (b) Suppose that $x = [10, -2, 6, 5, -3]$ & $y = [9, -3, 2, 5, -1]$. Find the results of the following operations by MATLAB. (a) $x < 6$ (b) $x \leq y$ (c) $x > y$ (d) $x = y$ (e) $x \sim y$. (5)
- (c) Write M-files to find the following: (i) area and perimeter of a triangle whose sides are a, b, c (ii) transforming Cartesian coordinate into polar coordinate (iii) sum of the first 15 terms in the series $5k^2 - 2k$. (15)
- (OR)**
- (d) Explain the switch case statement in MATLAB and using the same, write a function M-file to compute the total elapsed days in a year, given the number (1-12) of the month, the day, and an indication of whether the year is a leap year. (15)
3. (a) Write down the uses of the following MATLAB commands:
- (i) grid (ii) title (iii) fplot (iv) hold (v) legend (5)
- (OR)**
- (b) Explain subplot with an example. (5)
- (c) (i) Construct a chess board using MATLAB commands.
- (ii) Explain the following MATLAB commands.
- (1) stairs (2) stem (3) polar (4) waterfall (7+8)
- (OR)**
- (d) (i) Describe the plot for complex numbers.
- (ii) Explain the method to change the plot colour, line styles and data markers. (5 +10)

4. (a) Let $X = \{7, 9, 11, 13, 19, 20, 25\}$. Write the MATLAB commands to compute mean, mode, median, variance and standard deviation of X. (5)

(OR)

- (b) Explain underdetermined system with an example. (5)

- (c) (i) Use the rref, pinv, left division and matrix inverse methods to solve the following set of equations: $x_1 + 5x_2 + 6x_3 + 2x_4 = 6$, $8x_1 - x_2 + 2x_3 - 6x_4 = 1$, $5x_1 - 6x_2 + 4x_3 - x_4 = -5$.

- (ii) Describe the MATLAB commands interp1 and interp2. (10+5)

(OR)

- (d) Given a system $Ax = b$ where $A = \begin{bmatrix} 8 & 2 \\ 4 & 3 \end{bmatrix}$ $x = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$ $b = \begin{bmatrix} 5 \\ 7 \end{bmatrix}$.

Write the MATLAB commands to compute the following: (i) rank of A (ii) rank of [A , b] (iii) determinant of A (iv) inverse of A (v) using pseudo inverse method solve the system (vi) row reduced echelon form of [A , b]. (15)

5. (a) Find complementary function, particular integral and general solution of the equation

$$\frac{d^2y}{dx^2} + \frac{dy}{dx} + y = \sin x. \quad (5)$$

(OR)

- (b) Write the MATLAB commands to compute left limit, right limit and limit of a function

$$h(x) = 4x^2 + 3x + 2 \text{ at } x = 5. \quad (5)$$

- (c) Compute the following by MATLAB commands. (i) $\frac{d^2}{dx^2}(\tan x)$ (ii) $\int \sin 3x \, dx$ (iii) $\sum_{i=1}^n i^2$

(iv) Taylor's series of $\sin(x)$ up to degree 8 (v) $\int_0^{-5} \int_0^3 (4yx^2 + 5xy^2) \, dx \, dy.$ (15)

(OR)

- (d) Describe the following MATLAB commands.

polyder(p), polyder(p1,p2), [num , den] = polyder(p1,p2), diff, symsum, subs. (15)

=====