

B.Sc. Semester III (Honours) Examination, 2018-19**ELECTRONICS****Course ID : 31715****Course Code : SHEL3-305SEC-1(T)**

Course Title : Programming with MATLAB

Time: 2 Hours**Full Marks: 40***The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*

1. Answer *any five* of the following: 2×5=10
- (a) What will be output of the following MATLAB command?
 >> A = [2 3 5];
 >> B = [1 4 7];
 >> C = A * B.
- (b) Write MATLAB expressions for the following:
 (i) $\sin^2(\pi/6) + \cos^2(\pi/6)$
 (ii) $x(t) = e^{-0.2t} \cos(2t)$ 1+1=2
- (c) Give the general format of 'fprintf' command.
- (d) Write MATLAB script file for the polynomial $f(x) = x^5 - 2x^4 + 4x^3 - 7x^2 - 7x$ to calculate $f(2)$.
- (e) Write two ways to display the following matrix $A = \begin{bmatrix} 3 & 4 & 5 & 6 & 7 \\ 9 & 12 & 15 & 18 & 21 \end{bmatrix}$.
- (f) Compare script file with function file.
- (g) Using the line space function, create the following vectors:
 (i) 4 6 8
 (ii) -3 -6 -9 -12 -15 1+1=2
- (h) Assume $a = 20, b = -2, c = 0, d = 1$. What will be the output of the following:
 (i) $a > b \ \&\& \ c > d$
 (ii) $a \ \&\& \ b + d > c$.
2. Answer *any four* of the following: 5×4=20
- (a) Explain structure of function file. Write a MATLAB function to calculate the distance between two points (x_1, y_1) and (x_2, y_2) in Cartesian Coordinate System. 2+3=5
- (b) Write down the script file to solve the following system of linear equations using Matrix Inversion method.
 $2x + 3y - 4z = 5, y + 4z + x = 10, -2z + 3x + 4y = 0$.

(c) Write a MATLAB program to print the sum of ODD numbers from 1 to N (given by the user).

(d) Write a MATLAB program to print the division corresponding to the marks obtained by a student.

Marks ≥ 60 First
 45 \leq Marks < 60 Second
 30 \leq Marks < 45 Third
 Marks < 30 Fail

(e) Give the MATLAB Command to plot, on the same figure, the two functions

$$f = 3t^2 + 2t - 0.5 \text{ and } g = 2t \cos t$$

where the variable t varies from 0 to 10 with step 0.5. Draw the function f in blue with marker * and the function g in red with marker =. Give title to your graph and label the axes.

2+2+1=5

(f) Write a MATLAB program to calculate the sum of all integers from 1 to N.

3. Answer *any one* of the following:

10×1=10

(a) Explain 'if-end' structure in MATLAB. Write a MATLAB program to evaluate a function for any two user specified values x and y . The function is defined as follows:

$$\begin{aligned} f(x, y) &= x + y & , & \quad x \geq 0 \text{ and } y \geq 0 \\ &= x + y^2 & , & \quad x \geq 0 \text{ and } y < 0 \\ &= x^2 + y & , & \quad x < 0 \text{ and } y \geq 0 \\ &= x^2 + y^2 & , & \quad x < 0 \text{ and } y < 0. \end{aligned}$$

2+8=10

(b) Explain 'while-end' and 'for-end' loops used in MATLAB. Write MATLAB program to calculate the factorial of a number using both 'while-end' and 'for-end' loop.

2+4+4=10
