Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14CE3034** | **Duration :** | **3hrs** |
| **Sub. Name :** | **Fundamentals of MATLAB programming** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| Q. No. | Sub Div. | Questions | Course  Outcome | Marks |
| 1. | a. | 1. Suppose x is a new variable, with the following Matlab statement, x = [-10: -1: -15; -2: 3]; How many elements are generated in x?   1. 0; because there is an error in the assignment (B) 10 (C) 12 (D) 5 (E) 6   2. Create a vector of the even whole numbers between 31 and 75.  3. Given vectors x=[-1, 2, 3, -2], y=[0.2, 3.1, 0, -3] and z=[3, 0, 1, 0.1], provide answers to the following operations. (A) x < y > z (B) x + ~y > z (C) x == y ~=z | CO 1 | 6 |
| b. | Given the array A = [2 7 9 7 ; 3 1 5 6 ; 8 1 2 5], explain the results of the following commands: a. A'; b. A(:,[1 4]); c. A([2 3],[3 1]; d. reshape(A,2,6); e. A(:) ; f. [A A(end,:)]; g. A(1:3,:); h. [A ; A(1:2,:)]; i. sum(A); j. sum(A'); k. sum(A,2) | CO 1 | 7 |
| c. | Write in detail about relational, logical and mathematical operators with examples | CO 1 | 7 |
| (OR) | | | | |
| 2. | a. | Write the MATLAB commands to generate a table of conversions from inches to centimeters. The range of inches should be from 0 to 36 in increments of 3. | CO 3 | 4 |
| b. | List down six matrix operations using MATLAB command. Give an example for each | CO 1 | 4 |
| c. | 1. Given the following matrices, show the results generated by these MATLAB command A.\*I. (a) I = eye(2) (b) A = [1 2; 2 3]  2. Show the results generated by the following MATLAB command. y = [2.1 3.8; 8.5 5.1; 4.7 9.2]; (a) maxy = max(y)  3. True/False (circle your choice):  a. T F The final step of the Engineering Problem-SolvingMethodology is  algorithm development.  b. T F The semicolon (;) suppresses output when used with MATLAB commands  c. T F The transpose operator (T) interchanges the rows and columns of a matrix.  d. T F The disp command pauses a MATLAB program and prompts for input  4. The following MATLAB statements contain an error, state what the cause of the error is and correct the statement:  i. a = [1 2 3]; b = [4 5]; c = a + b;  ii. i = 1:10; i(2:4) = [4 3];  iii. a = [1 2 3]; b = [4 5 6]; a\*b; | CO 1 | 4 |
| d. | Evaluate the following MATLAB expressions manually to check the answers  a. 2/ 2 \* 3; b. 6 - 2 / 5 + 7 ^ 2 – 1; c. 10 /2\5 - 3 + 2 \* 4;  d. 3 ^ 2 /4; e. 3 ^ 2 ^ 2; f. 2 + round(6 /9 + 3 \* 2) / 2 – 3; g. 2 + floor(6/9 + 3 \* 2) / 2 – 3; h. 2 + ceil(6 / 9 + 3 \* 2) /2 – 3 | CO 1 | 4 |
| e. | Given that x = [1 5 2 8 9 0 1] and y = [5 2 2 6 0 0 2], execute and explain the results of the following commands: a. x > y; b. y < x; c. x == y; d. x <= y; e. y >= x  f. x | y; g. x & y; h. x & (~y); i. (x > y) | (y < x) j. (x > y) & (y < x) | CO 1 | 4 |
| 3. | a. | In each of the following questions, evaluate the given MATLAB code fragments for each of the cases indicated   1. if 0 < x < 10 a. x = -1 y = ?   y = 4\*x b. x = 5 y = ?  elseif 10 < x < 40 c. x = 30 y = ?  y = 10\*x d. x = 100 y = ?  else  y = 500  end   1. if n > 1 a. n = 7 m = ?   m = n+1 b. n = 0 m = ?  else c. n = -10 m = ?  m = n - 1  end | CO 2 | 4 |
|  | b. | Explain in detail about how loops and nested loops are useful in MATLAB programming. List down the rules for execution | CO 2 | 5 |
|  | c. | Given the following Matlab code,  k= 0; while k ^0.5 < k; k = k + 1; end; k  what is the value of k after executing the code ? (A) 0; (B) 1; (C) 2; (D) 3; (E) 4 | CO 2 | 2 |
|  | d. | What is the output of executing the following Matlab code?  for i=1:5; for j=i:5 ; M(i, j) = i+j; M(j, i)= M(i,j); end; end; M(4, 3) | CO 2 | 5 |
|  | e. | How many times will the display command in the following script be executed?  x = 3;  while (x < 8)  disp('Am I done yet?')  x = x + 2.5; end | CO 2 | 4 |
| (OR) | | | | |
| 4. | a. | In order to print formatted integers with the following format,  00005  00006  00007  00008  00009  00010  which fprintf statement should be used in the following code?  for i=5:10  fprintf( )  end  (A) fprintf('%5.5f\n', i); (B) fprintf('%5.2d\n', i); (C) fprintf('%05d', i); (D) fprintf('%5.5d\n', i); (E) fprintf('%d\n', i) | CO 2 | 2 |
|  | b. | Using nested for-loops to generate a matrix that has elements shown below (without typing the numbers explicitly):  A=[ 12 8 4 0 −4; 14 10 6 2 −2; 16 12 8 4 0 ] | CO 2 | 5 |
|  | c. | Write in detail about how switch statement can be used in programming in MATLAB (with example). | CO 1 | 5 |
|  | d. | Using one if-statement to rewrite the following nested if-statement  if w < x  if w > y  w = x\*y  end if  end if | CO 1 | 3 |
|  | e. | Create a simple multiple input dialog in MATLAB that requests two strings to be input and outputs the concatenation of the two strings | CO 3 | 5 |
| 5. | a. | Write the program code for importing excel data into MATLAB. | CO 3 | 3 |
|  | b. | Write short notes on following commands   1. Menu command 2. Keyboard 3. Return 4. Input | CO 2 | 6 |
|  | c. | Differentiate between script file and function file | CO 2 | 3 |
|  | d. | Suppose that column one in the following file, RAIN.TXT, contains the daily rainfall for one week, and the second column contains the average rainfall for the week.  0.100000 0.694286  1.000000 0.694286  0.000000 0.694286  0.200000 0.694286  3.560000 0.694286  0.000000 0.694286  0.000000 0.694286  Write a MATLAB prorgram that will 1. Read the contents of RAIN.TXT into MATLA 2. Plot a histogram of the daily rainfall measurements and a horizontal line for the average weekly rainfall | CO 2 | 5 |
|  | e. | Write a function file for finding out factorial of a number. | CO 3 | 3 |
| (OR) | | | | |
| 6. | a. | Explain in detail about formatted input and output statements with example. | CO 2 | 10 |
|  | b. | Write down the rules for writing the function file. Explain with an example. | CO 2 | 6 |
|  | c. | Given the following matrix, show the results generated by the MATLAB command.  R = [1.22 3.78 2.41]; fprintf('R = %3.1f \n', R). | CO 1 | 2 |
|  | d. | Differentiate between user function and inbuilt function. Give an example | CO 1 | 2 |
| 7. | a. | What is GUI in MATLAB? | CO 3 | 2 |
|  | b. | List down any five uicontrol objects and explain how they are created in MATLAB. | CO 3 | 8 |
|  | c. | How the formatted plot can be created? | CO 3 | 5 |
|  | d. | Which MATLAB command generates a two-dimensional representation of a three-dimensional surface?   1. mesh(z) b. pie(x) c. contour(z) d. figure(n) | CO 3 | 1 |
|  | e. | List down any four 3D plot commands with an example | CO 2 | 4 |
| (OR) | | | | |
| 8. | a. | Write a MATLAB script file that will plot and label the function z = f(x, y) = [e−x2−y2 · sin(y) · sin(y)] over the domain −2 ≤ x ≤ 2 and −2 ≤ y ≤ 2. | CO 2 | 4 |
|  | b. | Write down any six 2D plot commands with example. | CO 2 | 8 |
|  | c. | List down different line specifiers with example. | CO 2 | 4 |
|  | d. | Write a MATLAB program to prompt the user for a time constant τ and a max time T, then generate a plot of *v* = e-t/τ. | CO 3 | 4 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Write short notes on   1. Algorithm 2. Pseudo code 3. Flowchart 4. Data types in MATLAB | CO 1 | 10 |
|  | b. | List down the rules for variables and string constants | CO 1 | 5 |
|  | c. | Explain how the water balance study can be done using MATLAB programming. | CO 3 | 5 |

ALL THE BEST