| Reg. No. | | | | | | | | | | | | | | | |
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| Question Paper Code | 13436 |
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**B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025**

Seventh Semester

**Computer Science and Business Systems**

**20CBPW702 - IT WORKSHOP SKY LAB/MAT LAB**

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

**PART - A (MCQ) (10 × 1 = 10 Marks)**

Answer ALL Questions

| | | Marks | K – Level | CO |
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| 1. | Which of the following practices generally improves the performance of MATLAB code when dealing with large arrays?<br>(a) Using explicit for loops for element-wise operations.<br>(b) Dynamically growing arrays within loops.<br>(c) Pre-allocating memory for arrays before populating them.<br>(d) Avoiding the use of built-in functions. | 1 | K1 | CO1 |
| 2. | What is the purpose of using a semicolon (;) at the end of a MATLAB statement when multiple statements are on the same line?<br>(a) To indicate the end of the entire line of code. (b) To separate different statements.<br>(c) To suppress the output of that specific statement. (d) To indicate a comment. | 1 | K1 | CO1 |
| 3. | Consider the MATLAB assignment v = 1:2:7;. What will be the value of v?<br>(a) [1 2 3 4 5 6 7] (b) [1 3 5 7] (c) [1 2 7] (d) [1; 3; 5; 7] | 1 | K1 | CO2 |
| 4. | Consider the system of equations: 2x + y = 5x - 3y = -1 Which MATLAB code snippet correctly solves for x and y?<br>(a) A = [2 1; 1 -3]; b = [5; -1]; solution = inv(A) * b;<br>(b) A = [2 1; 1 -3]; b = [5 -1]; solution = A \ b;<br>(c) A = [2 1; 1 -3]; b = [5; -1]; solution = A / b;<br>(d) A = [2 1; 1 -3]; b = [5 -1]; solution = inv(A) \ b; | 1 | K1 | CO2 |
| 5. | Which MATLAB command is used to add a text annotation at a specific location (x=2, y=3) on the plot with the text "Important Point"?<br>(a) annotate(2, 3, 'Important Point') (b) text('Important Point', 2, 3)<br>(c) text(2, 3, 'Important Point') (d) label(2, 3, 'Important Point') | 1 | K1 | CO3 |
| 6. | To turn on the grid lines on a MATLAB plot, you would use the command:<br>(a) grid() (b) showgrid (c) grid on (d) grid = on | 1 | K1 | CO3 |
| 7. | What is the primary purpose of defining a function in MATLAB?<br>(a) To execute a sequence of commands in the command window.<br>(b) To create variables that are accessible throughout the MATLAB session.<br>(c) To encapsulate a specific task that can be reused with different inputs.<br>(d) To save the current state of the workspace to a file. | 1 | K1 | CO4 |
| 8. | What is the result of the expression 2 + 3 * 4 == 20 / 2 in MATLAB?<br>(a) 0 (false) (b) 1 (true) (c) 10 (d) Error | 1 | K1 | CO4 |
| 9. | What is the primary purpose of debugging in MATLAB?<br>(a) To improve the performance of MATLAB code.<br>(b) To identify and remove errors from MATLAB code.<br>(c) To add comments and documentation to MATLAB code.<br>(d) To save the current workspace to a file. | 1 | K1 | CO5 |

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| 10. | While in debug mode, which of the following is a way to examine the current value of a variable?<br>(a) Typing show variable_name in the command window.<br>(b) Hovering the mouse cursor over the variable name in the editor (data tip).<br>(c) Using the inspect variable_name command.<br>(d) All of the above. | *1* | *K1* | *CO5* |

**PART - B (12 × 2 = 24 Marks)**

Answer ALL Questions

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| 11. | Name any two key historical milestones in the development of MATLAB. | *2* | *K1* | *CO1* |
| 12. | What does the MATLAB error message "Undefined function or variable 'x' " indicate? | *2* | *K1* | *CO1* |
| 13. | Outline the MATLAB command to create a variable named **data** and assign it a value of 25. | *2* | *K2* | *CO1* |
| 14. | What is the syntax of extracting sub matrix? | *2* | *K1* | *CO2* |
| 15. | Name two built-in MATLAB functions that can be used to generate special matrices. | *2* | *K1* | *CO2* |
| 16. | How can you create a column vector in MATLAB? | *2* | *K1* | *CO2* |
| 17. | What is the purpose of the hold on command in MATLAB plotting? | *2* | *K1* | *CO3* |
| 18. | How do you add a label to the x-axis of a MATLAB plot as "Time (s)"? | *2* | *K1* | *CO3* |
| 19. | List two ways to pass input to a MATLAB function. | *2* | *K1* | *CO4* |
| 20. | Illustrate the role of operator precedence in MATLAB. | *2* | *K2* | *CO4* |
| 21. | What is a breakpoint in the context of MATLAB debugging? | *2* | *K1* | *CO5* |
| 22. | Compare dbstep and dbstep out. | *2* | *K2* | *CO5* |

**PART - C (6 × 11 = 66 Marks)**

Answer ALL Questions

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| 23. | a) | Explain the genesis and evolution of MATLAB, highlighting its initial design objectives and its transformation into a versatile tool used across various disciplines. | *11* | *K2* | *CO1* |
| | | **OR** | | | |
| | b) | Summarize the importance of understanding operator precedence in MATLAB. Explain the order in which different types of operators are evaluated with suitable examples. | *11* | *K2* | *CO1* |
| 24. | a) | Explain the importance of matrices in MATLAB and provide examples of common operations involving matrices | *11* | *K2* | *CO2* |
| | | **OR** | | | |
| | b) | Describe the various ways to determine the dimensions and the number of elements in MATLAB arrays. Explain the functionality and provide examples of the following functions:<br>* size() (with and without specifying a dimension)<br>* length()<br>* ndims()<br>* numel()<br>Illustrate how these functions can be used to obtain crucial information about the structure of your data. | *11* | *K2* | *CO2* |
| 25. | a) | Explain in detailed about plotting system in MATLAB. Discuss the fundamental concepts involved in visualizing data, including the role of figure windows and axes objects. | *11* | *K2* | *CO3* |
| | | **OR** | | | |

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| | b) | Explain the purpose and usage of the following MATLAB commands for enhancing plot readability and information content:<br>* title()<br>* xlabel()<br>* ylabel()<br>* legend()<br>* text()<br>* gtext()<br>For each command, provide its syntax and a brief example demonstrating its application in a plotting scenario. | *11* | *K2* | *CO3* |
| 26. | a) | A library charges a fine for every book returned late.<br>For first 5 days the fine is 5 rupees, For 6-10 days fine is 10 rupees and above 10 days fine is 50 rupees. If you return the book after 30 days your membership will be cancelled.<br>Demonstrate a program to accept the Expected Date of Return and Actual Date of Return as yyyy,mm,ddfrom the user<br>Calculate the number of days the member is late to return. | *11* | *K3* | *CO4* |
| | | **OR** | | | |
| | b) | Identify the various methods for controlling the flow of execution in MATLAB programs. Explain the following control flow structures, including their syntax, functionality, and appropriate use cases:<br>*The if-elseif-else-end conditional statement, including nested if structures.<br>*The for...end loop for iterating a known number of times. Include examples of iterating through vectors and matrices. | *11* | *K3* | *CO4* |
| 27. | a) | Explain the concept of breakpoints in MATLAB debugging. Describe at least two different methods for setting breakpoints in M-files. | *11* | *K2* | *CO5* |
| | | **OR** | | | |
| | b) | Demonstrate the concept of "stepping into" and "stepping out of" functions during a MATLAB debugging session. Describe the debugger commands used for these actions (dbstep and dbstep out) and illustrate with a scenario where your main script calls a user-defined function. | *11* | *K2* | *CO5* |
| 28. | a) (i) | Illustrate the different ways to provide input to a MATLAB script file. Explain how to use the input() function to obtain user input and how scripts can also utilize variables already present in the workspace. | *6* | *K2* | *CO4* |
| | (ii) | Summarize five common practices or tips that can help you debug MATLAB code more effectively. | *5* | *K2* | *CO5* |
| | | **OR** | | | |
| | b) (i) | Discuss the different ways to produce output from MATLAB programs. Explain the usage of the disp() function for displaying simple text and variable values. Describe the fprintf() function for generating formatted output to the command window, including the use of format specifiers. | *6* | *K2* | *CO4* |
| | (ii) | Explain the difference in behavior between the dbstep command and the dbcont command when used during a MATLAB debugging session. | *5* | *K2* | *CO5* |