

NATIONAL INSTITUTE OF TECHNOLOGY, KURUKSHETRA
THEORY EXAMINATION

B.Tech : 2nd

Paper Code : MEPC-213

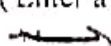
Title : Introduction to MATLAB

Semester: 4th

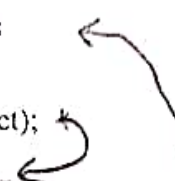
Branch: Mechanical

Session : May 2025


Q1 (a) Find five errors (Factorial of a Number) (2.5)

```
n = input('Enter a number: ');  
fact = 0;  fact = 1
```

```
for i = 1:n  
    fact = i * fact;  
    disp('Factorial of', n, 'is', fact);  
end
```



```
if n < 0  
    disp('Factorial is not defined');  
else if n == 0  
    disp('Factorial is 1');  
end
```



(b) What will be output (1)

```
a = 5;
```

```
b = 3;
```

```
result = (a ~= b)
```

(c) Write a command to convert angle from degree to radian (1)

(d) A = [10, 20, 30;

40, 50, 60;

70, 80, 90];

Suppose linear index m=5. Write a command to find its corresponding row and column indices (1.5)

(e) Give single command to replace all negative elements in the matrix A with zero? (1)

(f) What will be the output of the following code? (1)

```
x = 5;
```

```
if x > 3 && x < 10
```

```

disp('In range')
else
    disp('Out of range')
end

```

(g) How do you preallocate a row vector of 10 zeros for better performance in a loop? (1)

(h) How can you check whether a variable x exists in the workspace? (1)

Q2 (a) Write a MATLAB script that iterates over the numbers from 1 to 20. The script should display only the odd numbers and skip the even numbers using the `continue` statement. (3)

(b) Write a MATLAB script that checks whether a given number or string is a palindrome. A palindrome is a number or string that reads the same forward and backward. (7)

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Q3. Write a script `triangle_checker.m` that:

(5)

- Takes input of three sides of a triangle.
- Uses a subfunction `triangle(a, b, c)` to:
 - Check if the sides form a valid triangle.
 - If valid, compute the area
 - Also classify the triangle as:
 - Equilateral
 - Isosceles
 - Scalene
- Display appropriate messages.

(b) Write a MATLAB script that uses the built-in function `fzero` to find a root of the function:

$$f(x) = x^3 - 5x + 1$$

- Define the function using a function handle. Use `fzero` with an initial guess of 1. Display the root found.

Q(a) Create a bar graph showing the number of students in five engineering departments: ME, CSE, ECE, CE, and EE. with Axis Labels and Title (2)

(b) Display a mesh plot for $z = \sin(x) \cdot \cos(y)$ (3)

(c) Use subplot to display three plots in a single figure: (5)

- $y = x^2$
- $y = \sqrt{x}$
- $y = \log(x)$, for $x = 1$ to 10

Q5(a) Write a MATLAB script to store data of 3 books in a structure array books, with fields: Title, Author, Price, and Year. Display the title of the book with the highest price. (5)

(b) Create a cell array c containing the following data: (5)

- A string 'NIT Kurukshetra'
- A numeric array [10 20 30]
- A 2x2 matrix [1 2; 3 4]
- A logical value true

extract:

- The second element as a numeric array
- The string value as a character vector