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Subject Introduction to Comp Programming

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Final Term Paper.

Q1

①

a) what are the basic Plots and graphs of MATLAB?

Ans The basic plots and graphs of MATLAB are as follow:-

Box — Axis border

Errorbar — Plots error bars along curve

hold — Retains current graph while adding new graphs

line — Creates line object.

LineStyle — Syntax of line specification string.

loglog — log to log scale plot

Plot — 2-D line plot

Plot3 — 3-D line plot

Plotyy — 2-D line plots with y-axis on both left and right side.

Polar — Polar coordinate plot

Semilogx — semilogarithmic plot

semilogy — semilogarithmic plot

subplot — creates axis in tilted positions

xlim — Sets or queries x-axis limits.

(2)

$y_{lim}$  — sets or queries  $y$ -axis limits

$z_{lim}$  — sets or queries  $z$ -axis limits.

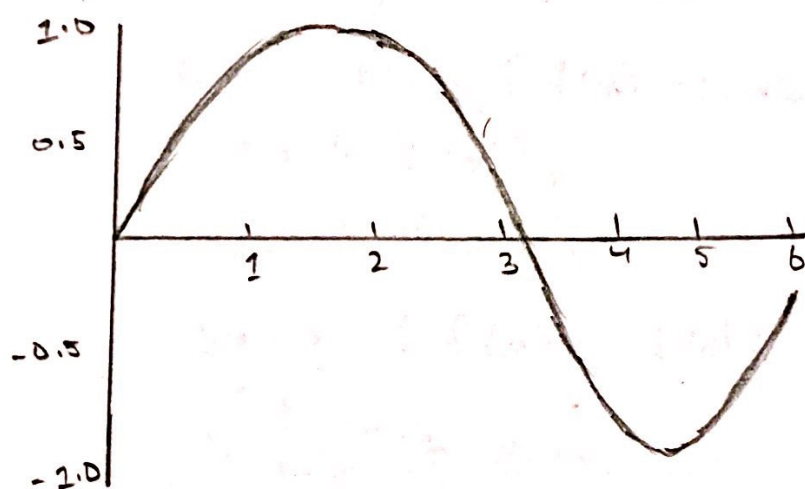
Q1 (b) Plot the function;

$$y(x) = \sin(x) \quad \text{For } 0 \leq x \leq 6$$

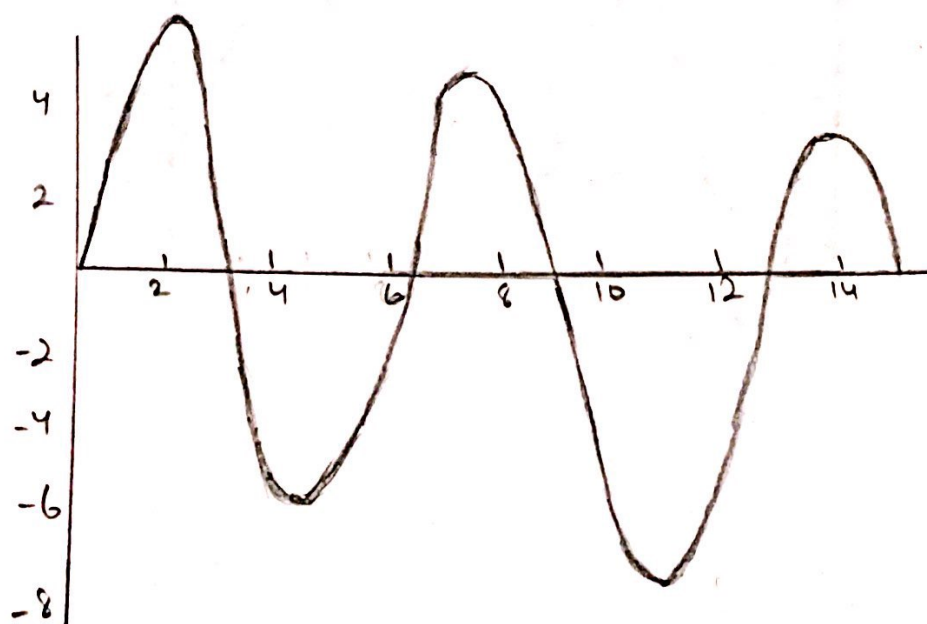
$$y(x) = 2\sin(x)e^{-0.2x} \quad \text{For } 0 \leq x \leq 15$$

Plot

$$y(x) = \sin(x) \quad \text{For } 0 \leq x \leq 6$$



$$y(x) = 2\sin(x)e^{-0.2x} \quad \text{For } 0 \leq x \leq 15$$



Q2 Plot the function

$f(x) = \sin 2x$  and its derivative  $d/dx \sin 2x$  on same graph.

Ans

$$x = 0:\pi/100:2*\pi;$$

$$y1 = \sin(2*x);$$

$$y2 = 2*\cos(2*x);$$

$$\text{plot}(x, y1, 'k-', x, y2, 'b--');$$

$$\text{title}('Plot of f(x) = \sin(2x) \text{ and its derivative}');$$

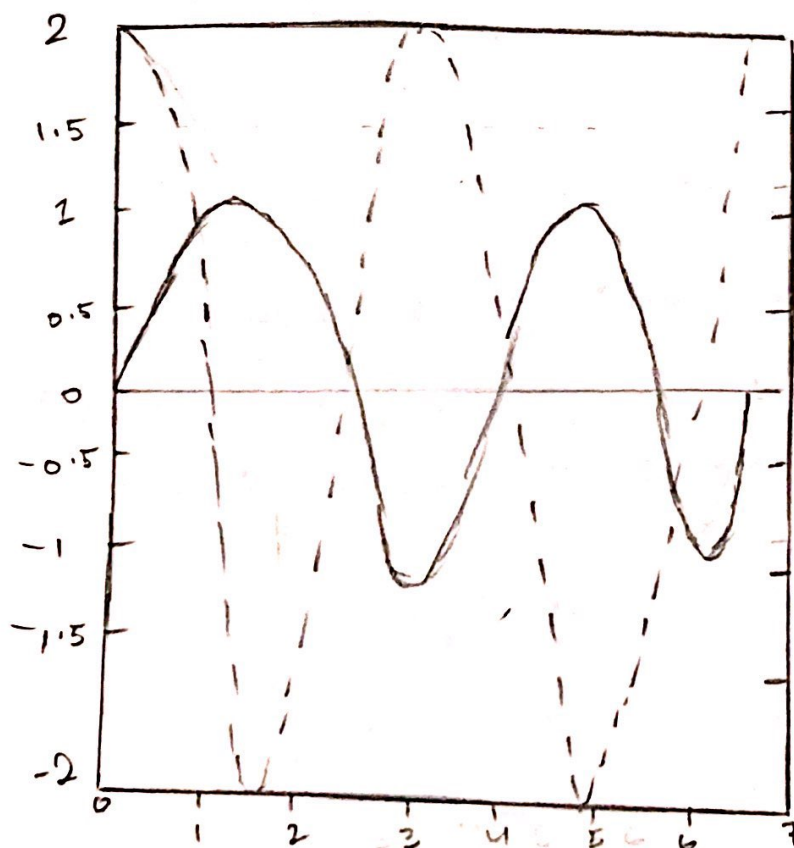
$$\text{xlabel}('x');$$

$$\text{ylabel}('y');$$

$$\text{legend}('f(x)', 'd/dx f(x)', 'tl')$$

grid on;

Plot of  $f(x) = \sin 2x$



—  $f(x)$   
 - - -  $d/dx f(x)$



(4)

Q 3 (a) What are the memory management functions in MATLAB?

Ans Memory Management functions:-

clear — Removes variable from memory.

Pack — Saves the existing variables to disk and then reloads them contiguously.

save — Selectively persists variables to disk

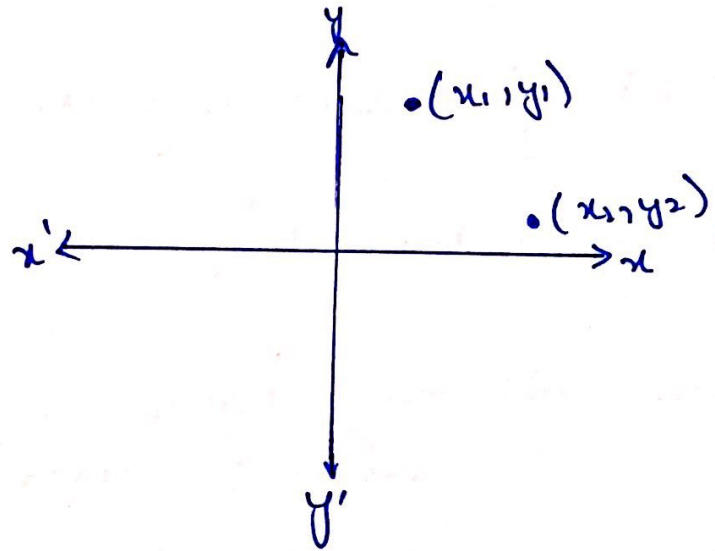
load — Reloads a data file saved with the save function.

quit — Exits MATLAB and returns all allocated memory to the system.

Q 3  
b)

Ans The distance between ~~between~~ two points  $(x_1, y_1)$  and  $(x_2, y_2)$  on a Cartesian coordinate plane is given by the equation

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$



Distance between two points on a Cartesian coordinate plane.

Q4

a) what do you mean by M-File in MATLAB?

Ans 1) They are files containing Matlab Programs.

⇒ Can be called from the command line or from other M-Files

2) Contain ".m" file extension.

3) Two main types of M-Files

⇒ Scripts

⇒ Functions

4) Comment character is %

⇒ % will comment out rest of line.

Q4b) Write a MATLAB program that reads an input temperature in degree Fahrenheit convert it into an absolute temperature in Kelvin.

Ans The relation between temperature in degrees Fahrenheit ( $^{\circ}\text{F}$ ) and temperature in Kelvin ( $\text{K}$ ) is

$$T_K = \left[ \frac{5}{9}(T_F - 32.0) \right] + 273.15$$

The sample values on both temperatures scales which we can use to check the operation of our program are:-

The boiling point of water       $212^{\circ}\text{F}$        $373.15\text{K}$

The Sublimation point of Dry ice       $-110^{\circ}\text{F}$        $194.26\text{K}$

Our program must perform the following steps

- $\Rightarrow$  Prompt the user to enter an input temperature in  $^{\circ}\text{F}$
- $\Rightarrow$  Read the input temperature
- $\Rightarrow$  Calculate the temperature in Kelvin from the above equation.
- $\Rightarrow$  Write out the result and Stop.

Program:-

Define variables

temp\_f      -- Temperature in degrees Fahrenheit

temp\_k      -- Temperature in Kelvin

For input temperature

temp\_f = input('Enter the temperature in degrees Fahrenheit:');

temp\_k =  $(5/9) * (temp_f - 32) + 273.15$ ;

Result

fprintf('%6.2f degrees Fahrenheit = %6.2f Kelvin.\n', ...  
temp\_f, temp\_k);



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Q5) Write A MATLAB program to evaluate the equation  $y(x) = x^2 - 3x + 2$  for all values of  $x$  between -1 and 3 in steps of 0.1 using for loop.

Ans MATLAB Program:-

```
clc
n = 1;
for ii = -1:0.1:3
    x(n) = ii;
    y(n) = ii^2 - 3*ii + 2;
    n = n + 1;
end
plot(x, y, 'r--', 'LineWidth', 3);
```

