

Introduction to Matlab Programming (MEPC-213) Test-2

Roll Number:

Max marks: 15

Time allotted: 50 min

Note: All the Questions are compulsory

1. Examine the following loops and determine the value of `ires` at the end of each of the loops, and also the number of times each loop executes. [4]

```
(a) ires = 1;
while mod(ires,10) ~= 0
    ires = ires + 1;
end
```

```
(b)      ires = 0;
          for index = 10:-2:4
              if index == 6
                  continue;
              end
              ires = ires + index;
          end
```

```
(c)      end
        ires = 0;
        for index = 10:-2:4
            if index == 6
                break;
            end
            ires = ires + index;
        end
```

```
(d)      end
        ires = 0;
        for index1 = 10:-2:4
            for index2 = 2:2:index1
                if index2 == 6
                    break
                end
            end
            ires = ires + index2;
        end
```

2. Write the MATLAB statements required to calculate $y(t)$ from the equation for values of t between -9 and 9 in steps of 0.5 using vectorization. [3]

$$y(t) = \begin{cases} -3t^2 + 5 & t \geq 0 \\ 3t^2 + 5 & t < 0 \end{cases}$$

3. Let $A(1,1) = \{[1\ 2\ 3; 4\ 5\ 6; 7\ 8\ 9]\}$;
 $A(1,2) = \{2 + 3i\}$;
 $A(2,1) = \{\text{'A character String'}\}$;
 $A(2,2) = \{12 : -2 : 0\}$;

Find the output.

- i) $\gg A \{2,2\}$
- ii) $\gg A (2,2)$
- iii) $\gg A \{1,: \}$
- iv) $\gg A (1, :)$

4. The output power produced by a rotating motor is given by the equation

$$P = \tau_{IND} \omega_m$$

where τ_{IND} is the induced torque on the shaft in newton-meters, ω_m is the rotational speed of the shaft in radians per second, and P is in watts. Assume that the rotational speed of a particular motor shaft is given by the equation

$$\omega_m = 188.5(1 - e^{-0.2t})$$

and the induced torque on the shaft is given by

$$\tau_{IND} = 10e^{-0.2t}$$

Plot the torque, speed, and power supplied by this shaft versus time for $0 \leq t \leq 10$ s. Be sure to label your plot properly with the symbols and where appropriate. [4]

[4]