

FACULTY OF CHEMICAL AND ENERGY ENGINEERING  
UNIVERSITI TEKNOLOGI MALAYSIA

SKPN 2273 PROGRAMMING FOR ENGINEERS  
Test 2

Semester II 2017-2018  
60 minutes

1. If the matrix A and B are given as

$$A = \begin{bmatrix} 0 & 2 & 5 & 10 \\ 5 & 3 & 4 & 6 \\ 7 & 7 & 0 & 1 \\ 9 & 6 & 8 & 4 \end{bmatrix} \quad \text{and} \quad B = \begin{bmatrix} 2 & 4 \\ 5 & 3 \end{bmatrix}$$

What are the outputs of the following Matlab commands

- a)  $A(:,2:3)$
  - b)  $A(:,1) \leq A(:,2)$
  - c)  $B(2,:) * A(3:4,1:3)$
  - d)  $\text{find}(A(:,3))$
  - e)  $B .* B$
2. Trace the following segment of the Matlab program and predict the output as it would appear in the command window

```
x = [-1:0.5:1]
y = x - x.^2
a = sum(y)
b = max(y)
```

3. The volume  $V$  and the surface area  $A$  of a cylinder with a radius  $r$  and height  $h$  is given by  $V = \pi hr^2$  and  $A = 2\pi r^2 + 2\pi rh$ 
  - a) Using the vectors  $r$  and  $h$  as the input arguments, write a Matlab function named cylinder that calculates and returns the values of the volume  $V$  and the surface area  $A$  of the cylinders
  - b) What shall be the name of the function file?
  - c) Write the Matlab main program that calls the function cylinder and displays the volume and surface area on the command window for  $r = [2 \ 3 \ 4 \ 5]$  and  $h = [3 \ 5 \ 7 \ 9]$ .
4. A get rich quick scheme company XYZ promises to pay a return of 5% per month while an investment in mutual fund ASW only pays 10% return per year. Due to the risky nature of the investments, RM1000 is invested in XYZ while RM5000 is invested in ASW. Write a Matlab program to calculate and display the total fund accumulated in each investment scheme at the end of each year. Stop your program and display the number of years when the fund in XYZ exceeds the fund in ASW. Plot both accumulated investments against time in a single plot (do not use bar graph) to show the point when XYZ exceeds ASW.