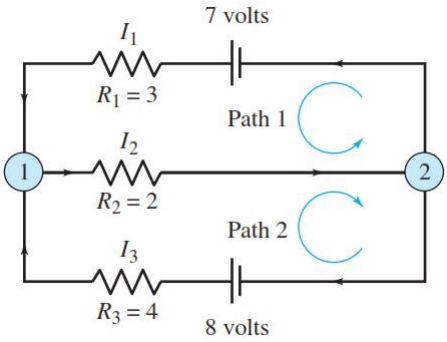
Department of Mathematical Sciences
Faculty of Applied Sciences
Wayamba University of Sri Lanka

B.Sc. (General/Joint Major/Special) Degree Examination - March 2020
Academic Year 2017/2018 - Level 3 (Semester II)
MMOD 3214/3224 – Numerical Methods (Practical)

No. of Questions: 04 **Answer All Questions** **Time: One (01) Hour**

1. The following system of linear equations represents the relations between currents I_1, I_2 and I_3 for the electrical network shown in Figure.

$$\begin{aligned} I_1 + I_2 + I_3 &= 0 \\ 3I_1 + 2I_2 &= 7 \\ 2I_2 + 4I_3 &= 8 \end{aligned}$$



   (a) Create necessary matrices to write the system in matrix form $A\mathbf{x} = \mathbf{b}$.

   (b) Use backslash to solve the system.

   (c) Use inverse of A to solve the system.

2. Write a MATLAB function for the following function

$$W(m, x) = e^{2m} \sin(x),$$

   where m are x are input to the function, and x is in radians.

   (a) Use the function to calculate $W(-1, 2)$

   (b) Use the function to make the plots of the function $W(m, x)$ for $x \in [1, 3]$ when $m = -1$ and $m = 1$ on the same figure.

   (c) Give title to your graph and label the axes.

3. Using "for" loop, write a script to convert the temperature range from -40 °C to 40 °C into the Fahrenheit scale, at 4 °C increments, using the conversion equation

$$T(^\circ\mathrm{F}) = 1.8T(^\circ\mathrm{C}) + 32.$$

Print the results using the following format:

4. Let $f(x) = e^x(x^2 + 2x)$.
   (a) Enter the formula for $f(x)$ as a symbolic expression.
   (b) Obtain and name a symbolic expression for $f'(x)$.
   (c) Evaluate $f(5)$ and $f'(5)$, using 'inline'.
   (d) Evaluate $f(5)$ and $f'(5)$, by creating anonymous functions.
   (e) Evaluate $f(5)$ by creating an M-file.

********** END **********
