



Daffodil International University

Department of Textile Engineering (TE)
Faculty of Engineering
Mid Examination, Spring-2026

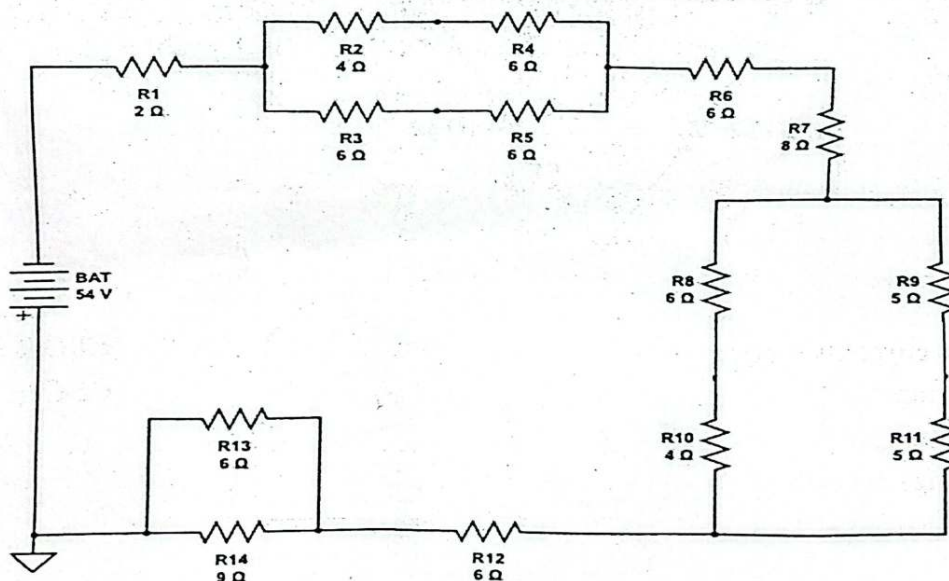
Course Code: 0713-221
Level & Term: L2T2

Course Title: Basic Electrical and Electronic Engineering
Full Marks: 25, Time: 1.5 hours
(Ans any 5 set of Questions)

1. a. Explain passive sign convention with appropriate diagram.
 b. Calculate the equivalent resistance of the circuit:

[CLO-2,
C2,C3]

[2+3]

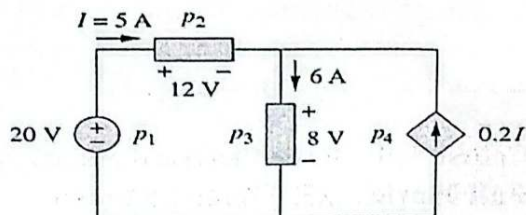


2. a. Determine the **total charge** entering a terminal in between $t=1s$ to $t=5s$;
 if current, $i = (10t^4 - 3t^2) A$
 b. Determine the **total current** entering a terminal at $t 0.2s$; if total charge,
 $q = 15t^2 \sin 4\pi t$ mC
 c. Explain why it is said that 'Electric current is always through an
 element and electric voltage is always across the element'

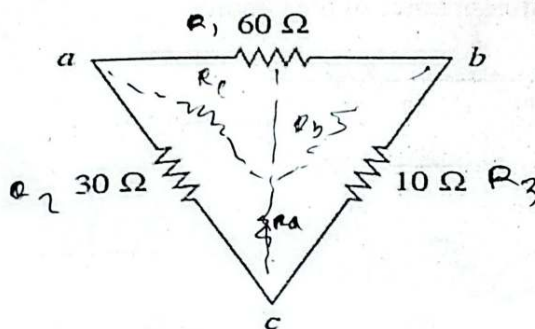
[CLO-2,
C5,C5,
C2]

[2+2+1]

3. a. State the law of conversion of energy. [CLO-2, [1+4]
b. From the following circuit prove that it obeys the law of conversion of C2, C3]
energy.



4. a. Discuss different types of dependent sources with proper symbols. [CLO-1, [2+3]
b. Convert the delta network to an equivalent Y network CLO-2, C1, C2]



5. At a node, five currents meet: [CLO-2, [2+3]
 $i_1 = 2x$ (entering)
 $i_2 = x + 5$ (leaving)
 $i_3 = 6$ (entering)
 $i_4 = x + 7$ (leaving)
 $i_5 = 6$ (direction unknown)
a. Determine the direction of i_5 (entering or leaving) with reasoning.
b. "KCL was useless in this problem because it could not find x ." Write a precise counter-argument — what specific and valuable information did KCL actually provide in this problem?

6. A closed loop contains only these elements: [CLO-2, [2+3]
 $V = 60$ V (single voltage source, rising)
 $R_1 = 3x + 2$ (voltage drop)
 $R_2 = 2x - 1$ (voltage drop)
 $R_3 = x + 5$ (voltage drop)
 $R_4 = 4x - 3$ (voltage drop)
Loop current $i = 3$ A
a. Calculate the voltage drop across each resistor.
b. Suppose the polarity of R_4 is reversed in the loop. Will the loop current still be 3A? Explain using KVL. C3, C2]