



Daffodil International University
Department of Electrical and Electronic Engineering
Faculty of Engineering
Final Examination, Summer - 2026

Course Code: 0713-111

Section: A, B, C, D, E, F

Full Marks: 40

Course Title: Electrical Circuits I

Level-Term: L1-T1

Exam Date: August 27, 2026

Teacher's Initial: MRK, KAH

Time: 2 Hours

Answer all questions below. The second right most column indicates the course outcomes (COs) with respective Bloom's level and the right column indicates the allocated marks.

Q1.

- a) State Superposition theorem. Obtain i in the circuit of Fig. 1 using superposition theorem. CO2 [05]
C(3)

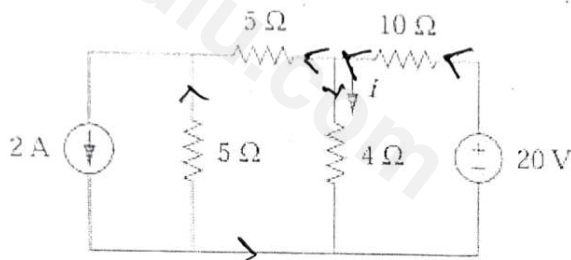


Fig. 1

- b) State Thevenin theorem. Determine V_o in the circuit of Fig. 2 applying Thevenin theorem. CO2 [05]
C(3)

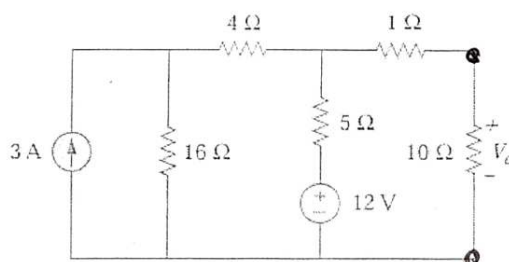


Fig. 2

Q2.

- c) State maximum power transfer theorem. Show that the maximum power transfer takes place when the load resistance equals the Thevenin resistance of the circuit. CO2 [05]
C(2)
- d) Determine the value of R_L that will draw the maximum power from the rest of the circuit shown in Fig. 3. Calculate the maximum power. CO2 [05]
C(3)

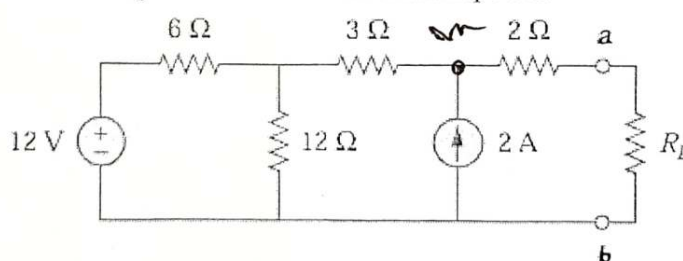


Fig. 3

$V = IR$
 $\Rightarrow$

Q3.

- a) Analyze the transient behavior of a 1st order RC series circuit during charging phase and sketch the transient voltage and current up to five-time constants of that network during this phase. CO3 [04]
C(4)
- b) For the circuit of Fig. 4: CO3 [06]
C(4)
- Determine the time constant of the circuit when the switch is thrown into position 1.
 - Find the mathematical expression for the voltage across the capacitor after the switch is thrown into position 1.
 - Determine the mathematical expression for the current following the closing of the switch at position 1.
 - Obtain the voltage v_c and the current i_c if the switch is thrown from position 1 into position 2 at $t = 100$ ms.
 - Determine the mathematical expressions for the voltage v_c and the current i_c if the switch is thrown into position 3 at $t = 200$ ms.
 - Plot the waveforms of v_c and i_c for a period of time extending from $t = 0$ to $t = 300$ ms.

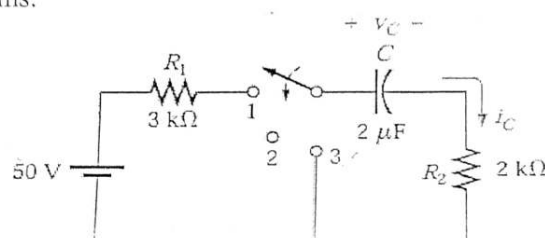
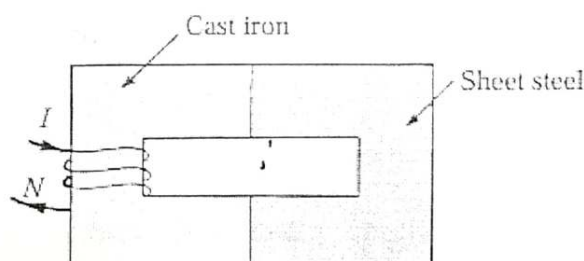


Fig. 4

- a) Describe Hysteresis behaviour of the magnetic material with sketching if any. CO1 [05]
C(2)
- b) Obtain the current I required to establish a flux 3×10^{-4} Wb in the magnetic circuit of Fig. 5. Also find μ and μ_r for Sheet steel and Cast iron both. CO2 [05]
C(3)



$l_{\text{iron core}} = l_{\text{steel core}} = 0.3$ m
Area (throughout) = 5×10^{-4} m²
 $N = 100$ turns

Fig. 5

xxx

$\mu = B/H$