AHMEDABAD UNIVERSITY
School of Engineering and Applied Science
2025-2026 Winter

EEE301 Electrical circuits and networks
Mid-Term Examination
Sunday 22 February 2026, 11:00 – 13:00

Name:	Roll no.	A	U	2							Marks /30
Section Number:											

Instructions:

1. *Answer all the questions.*
2. *No electronic objects are allowed except calculators.*
3. *Closed book exam. Access to internet is not allowed.*
4. *All acronyms carry their usual meaning.*

Answer the questions.

Question 1: [1 Marks]

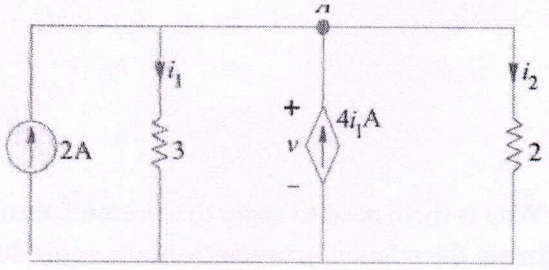
A coil consists of 2000 turns of copper wire having a cross-sectional area of 0.8 mm^2. The mean length per turn is 80 cm and the resistivity of copper is 0.02 $\mu\Omega$-m. Find the resistance of the coil and power absorbed by the coil when connected across a 110 V DC supply.

Question 2: [2 Marks]

Explain the difference between the ideal and practical current source along with its symbolic representation and V-I characteristics.

Question 3: [1 Marks]

Using Kirchhoff's current law, find the values of the currents i_1 and i_2 in the circuit shown below which contains a current-dependent current source. All resistances are in ohms.

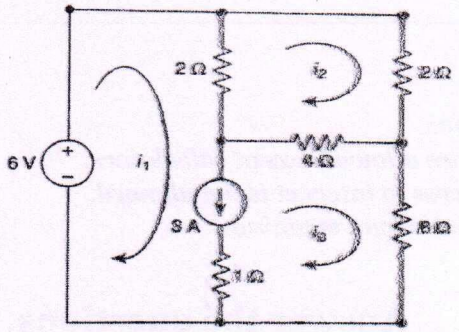


Question 4: [2 Marks]

Explain the super mesh analysis and why there is a need to apply super mesh analysis instead of normal mesh analysis.

Question 5: [1 Marks]

Find i1, i2 and i3 using Mesh analysis.

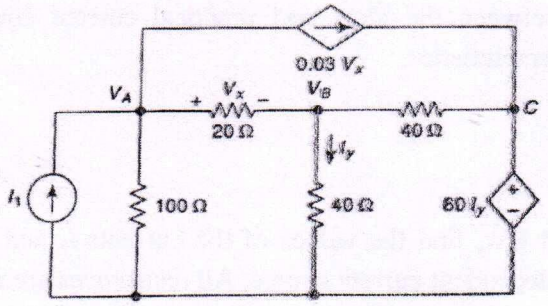


Question 6: [2 Marks]

What is Thevenin theorem? Why is there need to apply the Thevenin theorem if other circuit analysis techniques are available?

Question 7: [2 Marks]

Find VA, VB and Vx. (use nodal analysis)

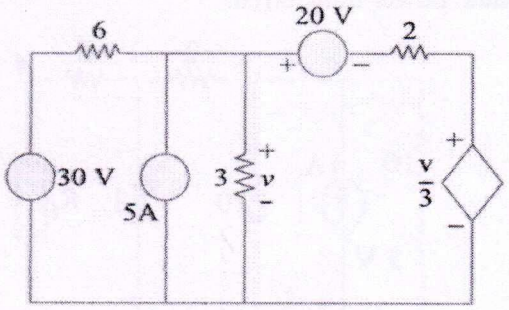


Question 8: [3 Marks]

What is Norton's theorem? Why is there need to apply the Norton's theorem if other circuit analysis techniques are available? Explain the relation between Norton's equivalent parameters with Thevenin's equivalent parameters.

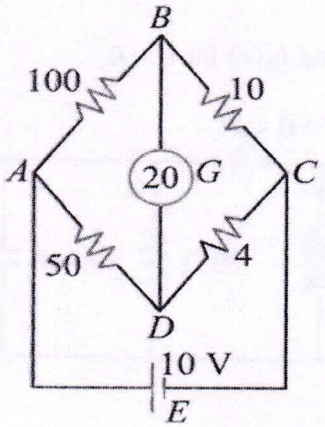
Question 9: [1 Marks]

Use superposition theorem to determine the voltage v in the network of Fig. shown below.



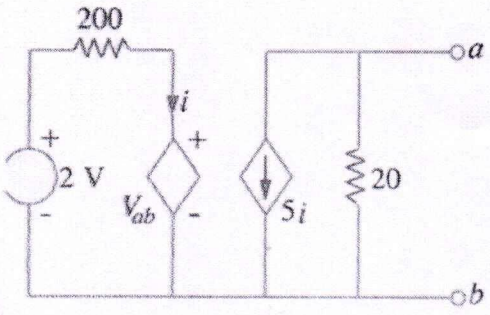
Question 10: [2 Marks]

The four arms of a Wheatstone bridge have the following resistances: AB = 100, BC = 10, CD = 4, DA = 50 Ω. A galvanometer of 20 Ω resistance is connected across BD. Use Thevenin's theorem to compute the current through the galvanometer when a potential difference of 10 V is maintained across AC.



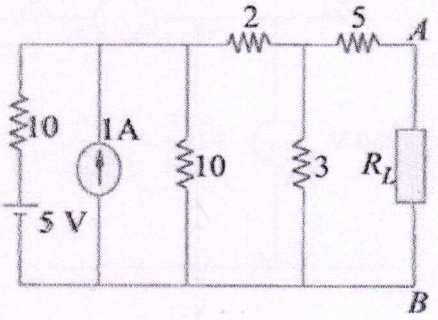
Question 11: [2 Marks]

Find the Norton equivalent for the transistor amplifier circuit shown in Fig. below. All resistances are in ohms.



Question 12: [2 Marks]

In the circuit shown in Fig. below, obtain the condition for maximum power transfer to the load R_L. Hence determine the maximum power transferred.

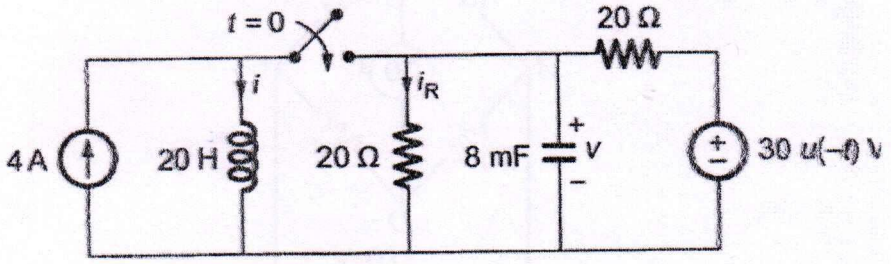


Question 13: [3 Marks]

Derive the response *i(t)* for source free RL circuit in time domain.

Question 14: [3 Marks]

In the circuit of figure, find $i(t)$ and $i_R(t)$ for $t > 0$.



Question 15: [3 Marks]

Derive the response *Vc(t)* for the sourced RC circuit in time domain.