

# CBCS SCHEME

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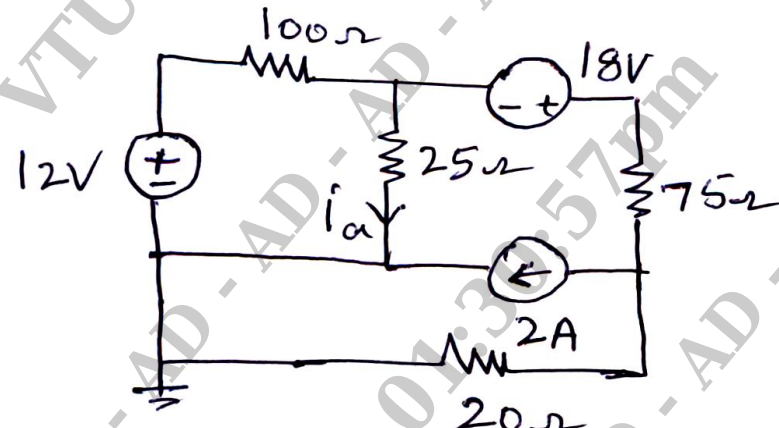
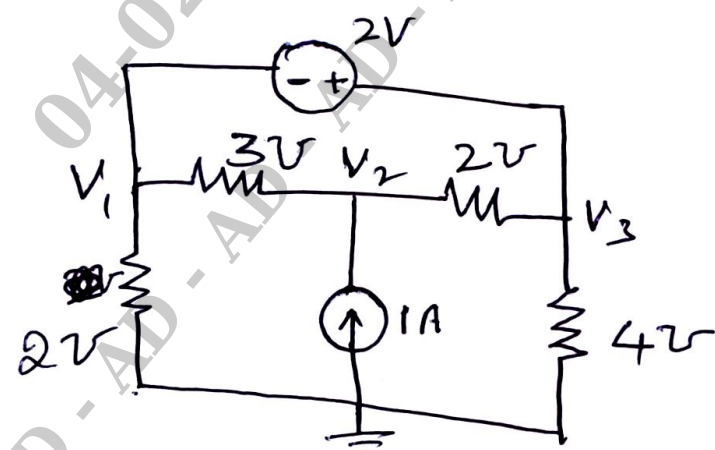
BEE302

## Third Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Electric Circuit Analysis

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.  
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1		M	L	C
<b>Q.1</b>	<p><b>a.</b> Distinguish between :</p> <p>i) Active and Passive elements ii) Ideal and Practical sources.</p>	<b>6</b>	<b>L1</b>	<b>CO1</b>
	<p><b>b.</b> Using Mesh current method, determine the current <math>i_a</math> in the network as shown in the Fig.Q1(b).</p> <div style="text-align: center;">  <p>Fig.Q1(b)</p> </div>	<b>7</b>	<b>L3</b>	<b>CO1</b>
	<p><b>c.</b> Find the voltages at nodes <math>V_1</math>, <math>V_2</math> and <math>V_3</math> for the network shown in Fig.Q1(c) using nodal analysis.</p> <div style="text-align: center;">  <p>Fig.Q1(c)</p> </div>	<b>7</b>	<b>L3</b>	<b>CO1</b>

OR

Q.2	a.	Explain the concept of super node analysis with a suitable circuit diagram.	6	L3	CO1
	b.	Determine the equivalent resistance between X, Y in the network shown in Fig.Q2(b) using Star – delta conversion.	7	L1	CO1

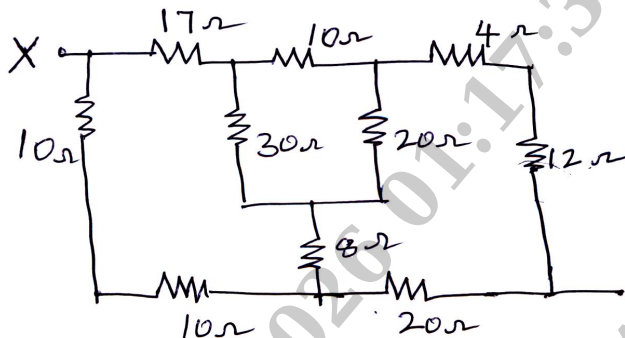


Fig.Q2(b)

	c.	Find the voltage at node $V_1$ for the network shown in Fig.Q2(c) and current $I_1$ .	7	L3	CO1
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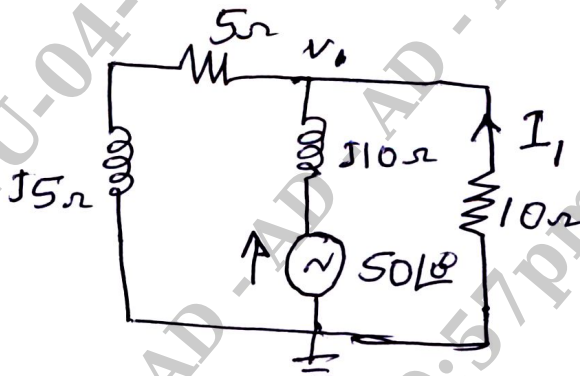


Fig.Q2(c)

## Module – 2

Q.3	a.	State and explain Super Position Theorem.	6	L1	CO2
	b.	Using the superposition theorem find the current $I$ in the network shown in Fig.Q3(b).	7	L3	CO2
	c.	Find the current $I$ in the circuit shown in the Fig.Q3(c) by using Norton's theorem.	7	3	CO2

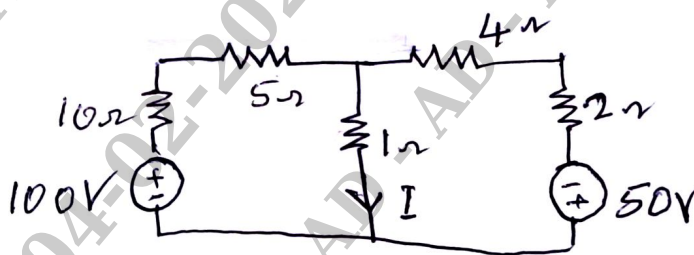


Fig.Q3(b)

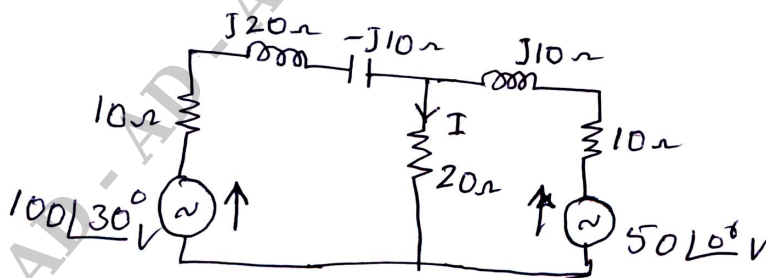
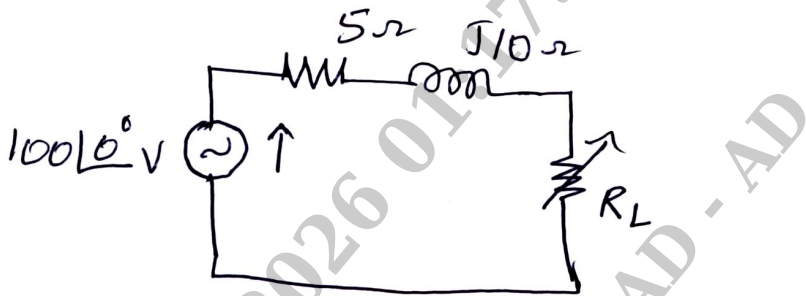
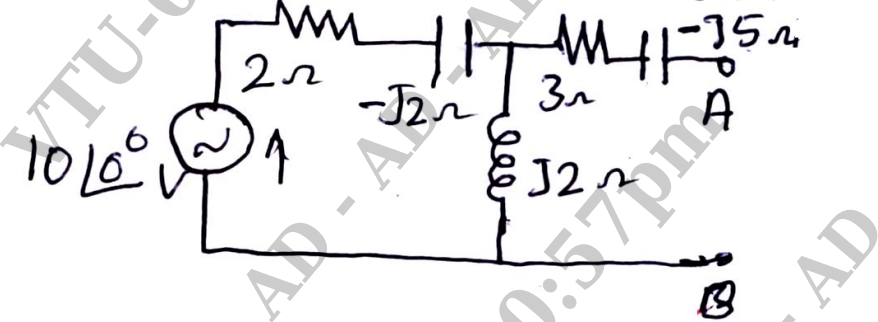
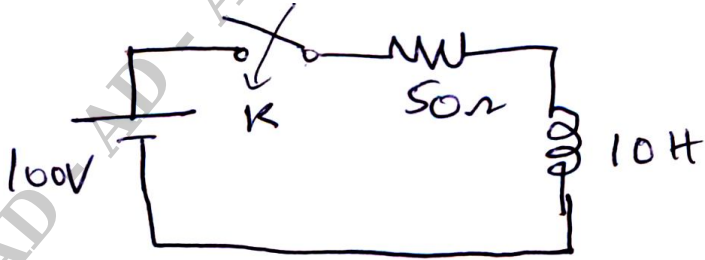


Fig.Q3(c)

OR

Q.4	a. State and explain the Norton's theorem.	6	L1	CO2
	b. What will be the value of $R_L$ to get maximum power delivered to it? What is the value of this power refer the network shown in the Fig.Q4(b).	7	L3	CO2
 <p style="text-align: center;">Fig.Q4(b)</p>				
	c. Using Thevenin's theorem. Determine the current in a 1 Ω resistor connected to terminals A, B of the network shown in Fig.Q4(c).	7	L3	CO2
 <p style="text-align: center;">Fig.Q4(c)</p>				

## Module - 3

Q.5	a. Derive an expression for resonant frequency in the geometric mean of the two half power frequencies.	6	L3	CO3
	b. A series connected RLC circuit has $R = 15\Omega$ , $L = 40\text{ mH}$ and $C = 40\text{ }\mu\text{F}$ . Determine the resonant frequency and under resonant condition. Calculate the current, power the voltage drops across various elements, if the applied voltage is 75 volts.	7	L3	CO3
	c. Find the equation of the current. If the switch is closed at $t = 0$ , find also the voltages across L and R the current at $t = 0.1\text{ sec}$ and the time at which the voltages across L and R are equal as in Fig.Q5(c).	7	L3	CO3
 <p style="text-align: center;">Fig.Q5(c)</p>				

OR

Q.6	a.	Derive expressions for resonant frequency in parallel circuit.	6	L3	CO3
	b.	A series circuit consisting of a capacitor and a coil takes a maximum current of 0.314 A at 200 V, 50 Hz. If the voltage across the capacitor is 300V at resonance, determine the Capacitance, Inductance, Resistance and the 'Q' of the coil.	8	L	CO3
	c.	Find the expression for the current $i(t)$ if the switch is closed at $t = 0$ , there is an initial charge of 500 $\mu\text{C}$ on the capacitor with polarity as shown in Fig.Q6(c).	6	L3	CO3

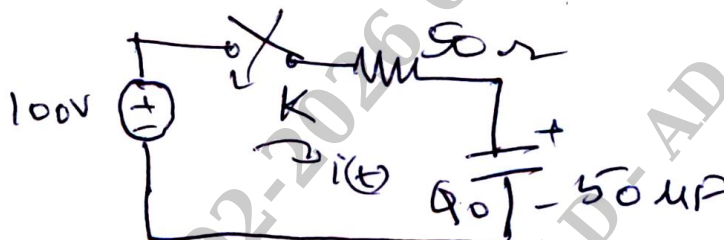


Fig.Q6(c)

Module – 4

Q.7	a.	State and explain the initial value theorem and final value theorem.	10	L3	CO4
	b.	Find the Laplace transform of the signals : i) Step ii) ramp iii) Impulse.	10	L2	CO4

OR

Q.8	a.	Find the Laplace transform of the following : i) $e^{at}$ ii) $\cos \omega t$ iii) $\sin \omega t$ .	10	L4	CO4
	b.	Find the inverse Laplace transform of the following functions : i) $\frac{1}{s(s+1)}$ ii) $\frac{1}{(s-a)^2}$ .	10	L4	CO4

Module – 5

Q.9	a.	Determine the Z-parameters in terms of Y-parameters.	10	L3	CO5
	b.	Three impedances of $(7 + j4)\Omega$ , $(3 + j2)\Omega$ and $(9 + j2)\Omega$ are connected between the neutral and RYB phase respectively of a 3-phase, 4-wire system. The line voltage is 440 V. calculate : i. The current in each line ii. The current in the neutral wire.	10	L3	CO5

OR

Q.10	a.	Determine the Y – parameters in terms of T – parameters.	10	L3	CO5
	b.	Find the Y and T parameters for the network shown in the Fig.Q10(b).	10	L3	CO5

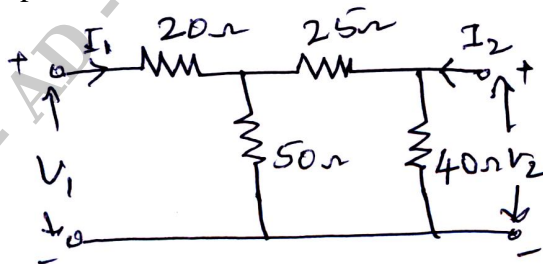


Fig.Q10(b)