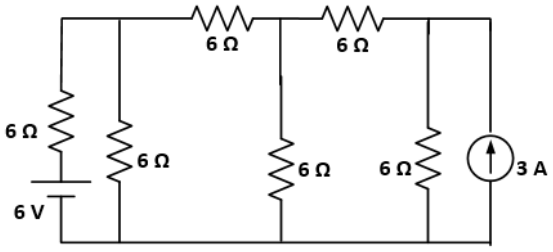
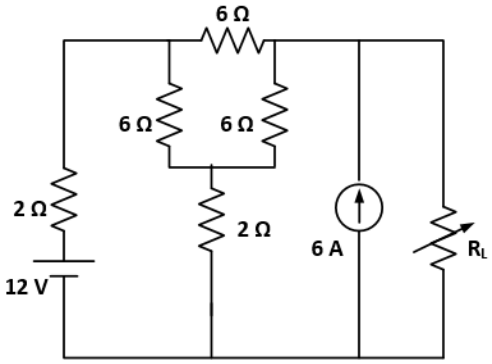
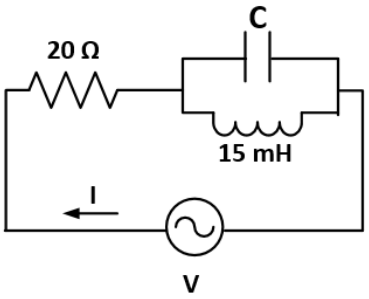
MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

Mid Semester Test (MISAC)			
Course:	**Fundamentals of Electrical Engineering**	**Exam :**	**Mid Term, Marks: 30, Duration: 90 Min**
Course Code:	**ELE 1072**	**Date & Time:**	**7 March 2025, 04:30 – 06:00 PM**
Semester:	**Second (Sections – PA to PH)**	**Branch:**	**Physics Cycle**

Part A – Objective Questions

Q. No.	Question	Marks	BTL	CO
1	During capacitor charging, the voltage rises to _____ percent of its _____ value after one time constant. A. 63.2, initial B. 37, initial C. 63.2, final D. 37, final	**1**	**2**	**1**
2	In an ac circuit, the supply voltage and resulting current are expressed by $v(t) = 100 \sin(100\pi t + 24°)$ V and $i(t) = 5 \cos(100\pi t + 5°)$ A. The impedance of the load is A. $(6.5 + j18.9)\ \Omega$ B. $(6.5 – j18.9)\ \Omega$ C. $(18.9 + j6.5)\ \Omega$ D. $(18.9 – j6.5)\ \Omega$	**1**	**3**	**2**
3	A series RLC circuit has a sinusoidal input voltage of 1 V. If L = 100 mH, R = 10 Ω, and C = 0.1 µF, the magnitude of voltage across capacitor at resonance is 1. 100 V 2. 30 V 3. 15.91 V 4. 1 V	**1**	**3**	**2**
4	If all the elements of a delta connected resistive network are scaled by a factor k, where k > 0, then the elements of equivalent star connection will be scaled by a factor of ____ 1. k^2 2. k 3. 1/k 4. $\sqrt{k}$	**1**	**3**	**1**
5	A three-phase star connected balanced RYB supply has $V_{RY} = 400\angle 30°$ V. The angular difference between V_{BN} and V_{RY} is 1. 30° 2. 60° 3. 90° 4. 120°	**1**	**4**	**2**

Part B – Descriptive Questions

Q. No.	Question	Marks	BTL	CO
6	For the circuit shown, use mesh current analysis to determine the power delivered by the 6 V source. 	5	3	1
7	For the circuit shown below, calculate the maximum power transferred to the load resistor RL. 	5	3	1
8	A 20 Ω resistor is connected in series with a parallel combination of capacitance "C" and a pure inductance of 15 mH as shown in figure below. This circuit is connected to a voltage source of angular frequency ω = 1000 rad/s. Find the value of capacitance "C" such that the supply voltage is leading the current (I) by 45°. 	5	4	2
9	A 5 kW load at 0.8 lagging power factor is being supplied by a 220 V, 50 Hz, single-phase ac supply. Calculate the reactive power drawn from the source. If a capacitor is now connected in parallel to the load to improve the power factor to 0.9 lagginig, find the value of the capacitor required.	5	3	2
10	Three similar coils when connected in star across a 400 V, 50 Hz, three-phase supply takes a line current of 10 A at an angle of 66.86° lagging with respect to its line voltage. Determine (a) per phase circuit constants, (b) power factor, (c) active, reactive, and apparent powers.	5	3	2