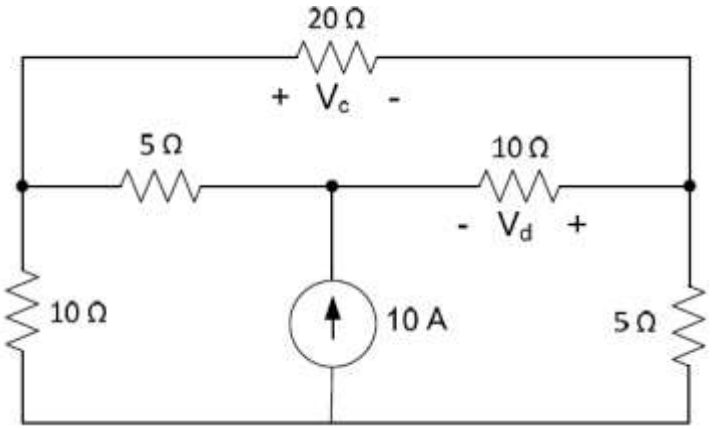
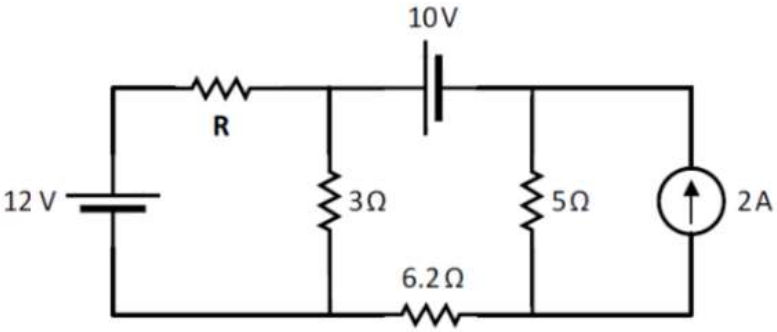
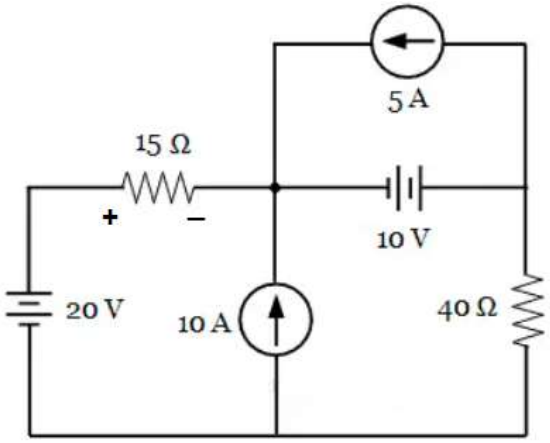
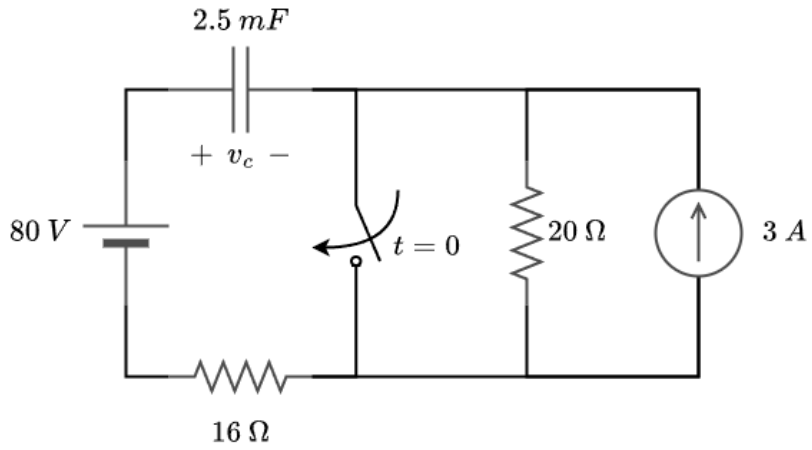
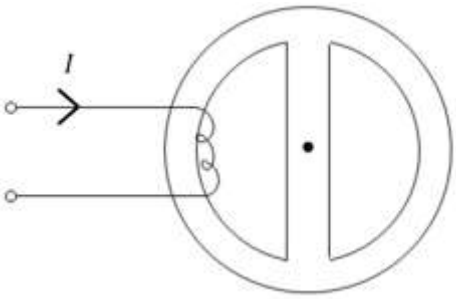
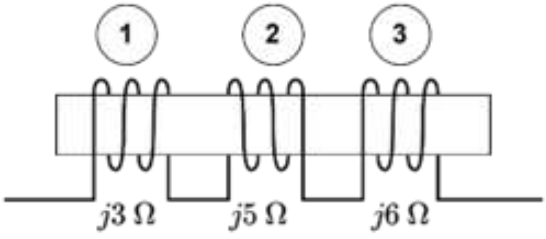
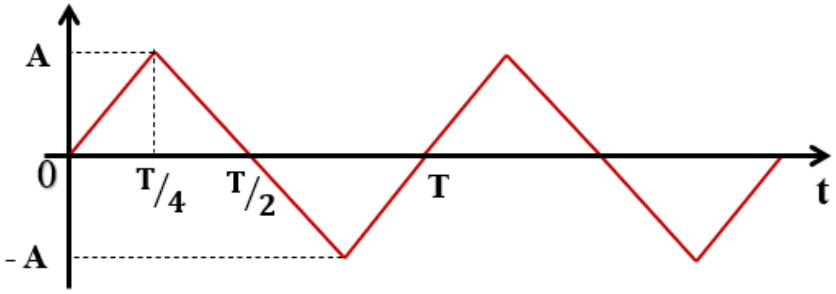
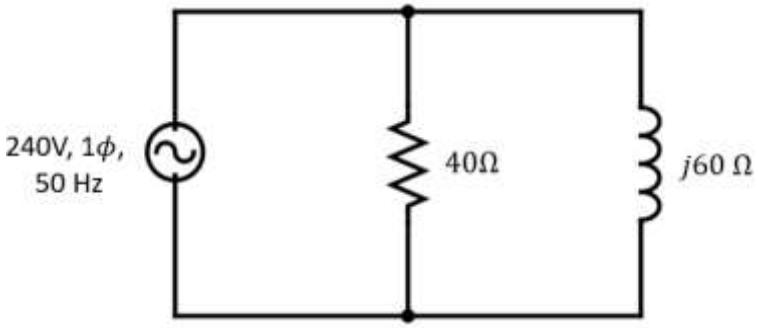
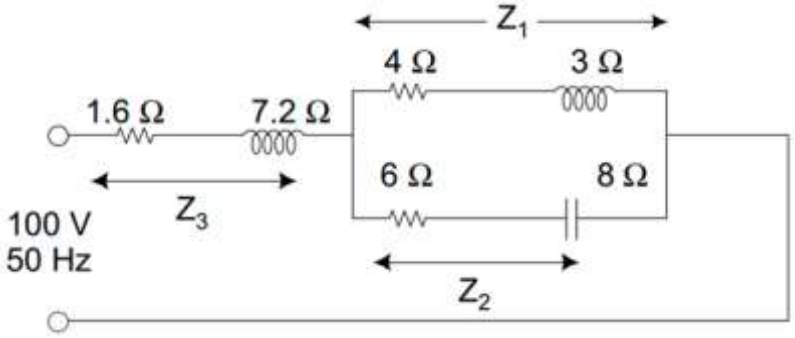
Q No	Description	Marks	CO	Level
1 A	Determine the voltages $\mathbf{V_c}$ and $\mathbf{V_d}$ in the given network. 	3	1	3
1 B	Determine the value of **R** that results in maximum power transfer to the **6.2 Ω** resistor in the given network. Also, obtain the maximum power dissipated under that condition. 	3	1	4
1 C	Find the voltage across **15 Ω** resistor using **superposition** principle. 	4	1	3

Q No	Description	Marks	CO	Level
2 A	The switch was in open position for a long time. It is operated as shown. Compute the capacitor voltage for **t > 0.** Also find the time at which the capacitor voltage is **50 V**. 	**3**	**1**	**3**
2 B	For the cast steel magnetic structure with a relative permeability of **700** shown, determine the current the **500** turns magnetizing coil on the left limb should carry so that a flux of **2 mWb** is produced in the right limb. The mean diameter of the ring is **15 cm**, and the area of the cross-section is **9 cm²**. Assume no magnetic leakage and fringing. $(\text{Absolute permeability of air } = 4\,\pi \times 10^{-7}\ \text{H/m})$ 	**4**	**2**	**3**
2 C	The following circuit is supplied from a **50 Hz** source with current entering from **RHS**. Draw the dotted equivalent circuit and determine the equivalent inductance if the coefficient of coupling between coils 1 & 2 and coils 2 & 3 is **0.7** each and that between coils 1 & 3 is **0.4**. 	**3**	**2**	**4**

Q No	Description	Marks	CO	Level
3 A	Find the **RMS** value of the given periodic waveform. 	3	3	3
3 B	For the given circuit, calculate the value of capacitor to be connected in parallel so that the power factor of the circuit reaches **unity**. Draw the associated phasors. 	3	3	3
3 C	For the circuit shown, determine a) Admittance of each parallel branch b) Total circuit impedance & admittance c) Supply current and power factor d) Active and reactive powers 	4	3	3

Q No	Description	Marks	CO	Level
4 A	A factory has the following loads connected to the mains supply of **1-Φ, 415 V, 50 Hz.** a) **40 kVA** at **0.75** power factor lagging b) **5 kVA** at **unity** power factor c) **10 kVA** at **0.9** power factor leading Find the capacitance needed to correct the power factor to **0.9** lagging**.**	**4**	**3**	**3**
4 B	Three identical coils, each of resistance **5 Ω** and inductance **50 mH,** are connected in **(a) star** and, **(b) delta** to a **415 V, 50 Hz, 3-Φ, ABC** supply system. Determine the active, reactive and apparent power in each case. Sketch the power triangle in each case indicating the complex power.	**6**	**4**	**4**

Q No	Description	Marks	CO	Level
5 A	Three similar coils when connected in **star** across a **400 V**, **50 Hz**, **3-Φ** supply takes a line current of **10 A** at angle of **66.86^0** with respect to its line voltage. Determine the (i) circuit constants per phase, (ii) power factor, and (iii) complex power drawn from the source.	**4**	**4**	**3**
5 B	Using circuit representation, classify the different types of DC machines based on excitation. Considering their salient features, list the applications of each.	**3**	**5**	**2**
5 C	With a neat schematic discuss the working principle of a 3-phase digital energy meter.	**3**	**5**	**2**