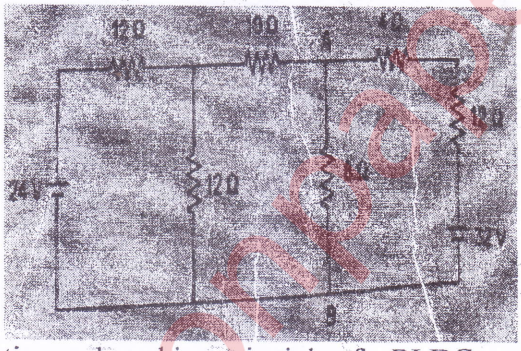
FE Sem-I (NEP) | Branch - All | NOV-2025 | Q.P. code - 00391 (1/2)

Date - 31.12.25

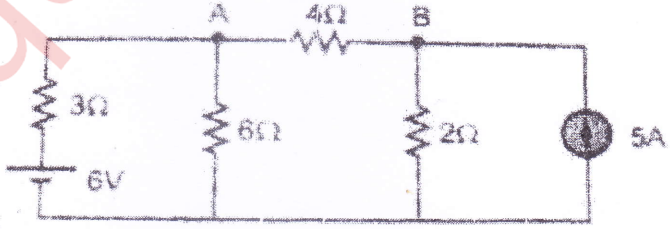
Time: 2 Hours **Marks: 60**

N.B.:
(1) Question **No.1** is compulsory.
(2) Attempt any **THREE** questions from remaining **FIVE** questions.
(3) Assume suitable data if necessary and mention the same clearly.
(4) Figures on the right indicate the marks.

Q.1	a.	State the condition of maximum power transfer in a circuit and write the expression for maximum power.	3
	b.	Find RMS value of current flowing through a 314μF capacitor when connected to 230V, 50Hz, single phase AC supply. Write the equation of instantaneous voltage and current.	3
	c.	How an actual (practical) transformer differs from an ideal transformer?	3
	d.	Compare single-phase and three-phase induction motors.	3
	e.	Explain working of a LED.	3
Q.2	a.	Find the current through 8 Ω resistance using Thevenin's Theorem.	10



	b.	Explain the construction and working principle of a BLDC motor.	5
Q.3	a.	A voltage e(t) = 100 sin 314 t is applied to a series circuit consisting of 10Ω resistance, 0.0318H inductance and a capacitor of 63.6μF. Calculate (i) impedance of a series circuit, (ii) expression for i(t), (iii) power factor (iv) active power, reactive power, and apparent power of a series circuit.	10
	b.	Draw the characteristics of Zener diode and Explain application of a Zener diode as a voltage regulator	5
Q.4	a.	Find Current through 4Ω resistance using Nodal analysis	5

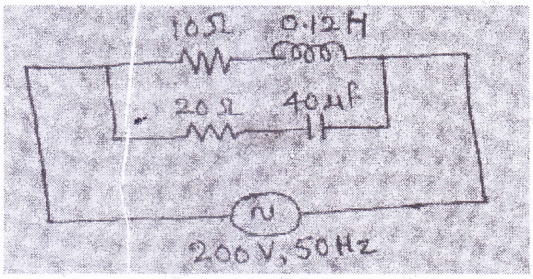


	b.	Explain CE configuration of BJT with the input and output characteristics.	5
	c.	Three identical coils each [4.2+j5.6] Ω are connected in star across 415 V, three-phase, 50 Hz, AC supply. Determine (a) the line current (b) the power factor and (c) the total power.	5

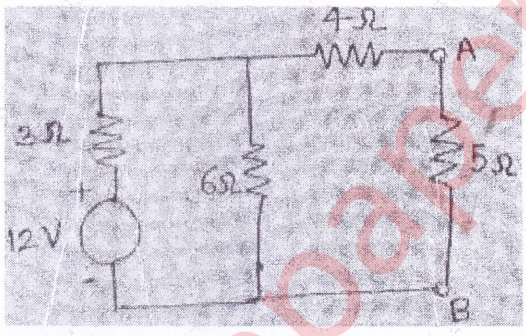
Q.5 a. Explain the construction and working principle of a single-phase transformer with a neat labelled diagram. 6

b. Draw the construction of a DC Motor and label its parts. What are the types of DC Motor? 4

c. Find supply current, current in each branch and total power factor. 5



Q.6 a. Determine Norton's equivalent circuit which may be used to represent the given network at the terminals AB and hence find current through 5 Ω resistance. 6



b. Define the following terms in the series RLC resonance circuit 5
(i) Resonance Frequency, (ii) Resonance curve, (iii) Half-power frequencies or Cut-off frequencies, (iv) Bandwidth, (v) Quality factor

c. Compare BJT and FET 4

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