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May 2024 (ENDSEM) EXAM

F.Y.B. TECH. (SEMESTER - II)

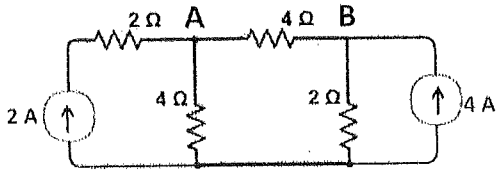
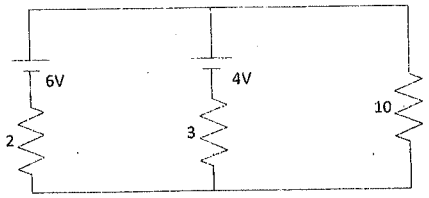
COURSE NAME: Basic Electrical Engineering | **Branch: Electronics and Telecommunication Engineering** | **COURSE CODE: ET12233**

(PATTERN 2023)

Time: [1Hr. 30 Min] **[Max. Marks: 40]**

(*) Instructions to candidates:

1) **Figures to the right indicate full marks.**
2) **Use of scientific calculator is allowed**
3) **Use suitable data wherever required**
4) **All questions are compulsory. Solve any one sub question from each Question 1 and 2 and any three sub questions each from Questions 3 and 4.**

Q. No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) Calculate the current in branch AB in the circuit as shown in figure 1 using superposition theorem.  **Figure 1**	[5]	CO1	Apply
	b) Find the voltage drop across 10Ω resistance in the circuit as shown in figure 2 using Thevenin's theorem.  **Figure 2**	[5]	CO1	Apply
Q2	a) A resistance of 5 Ω is connected in series with an inductance L across 200V, 50 Hz single-phase ac supply. The voltage across resistance is 50 V. Calculate: i) current in circuit ii) voltage across inductance iii) value of inductance.	[5]	CO2	Apply
	b) A coil having a resistance of 8.66 Ω and an inductive reactance of 5 Ω is connected in series with a capacitor of 100 μF capacitance. If this series combination is connected across 200 V, 50 Hz, ac supply, calculate: - i) impedance of the circuit	[5]	CO2	Apply

	(in rectangular form) ii) current drawn by the circuit iii) power factor of the circuit and iv) active power consumed by the circuit.			
Q.3	a) A 100 kVA, single-phase transformer has an iron loss of 600 W and a copper loss of 1.5 kW at full-load current. Calculate the efficiency at (i) 100 kVA output at 0.8 lagging p.f. (ii) 50 kVA output at unity power factor.	[5]	CO3	Apply
	b) A 40 kVA, 6600V/230V, 50 Hz, single-phase transformer has 30 turns on its secondary winding. Calculate the number of turns of the primary winding. Also calculate the primary and secondary winding full load currents.	[5]	CO3	Apply
	c) An Iron loss of a 250 kVA, single-phase transformer is 1.8 kW and full load copper loss is 2 kW. Calculate: i)percentage efficiency at full load, 0.8 lagging power factor ii) kVA supplied at maximum efficiency iii)maximum efficiency at 0.8 lagging power factor	[5]	CO3	Apply
	d) A 440/220 V, 10 kVA, 50 Hz, single-phase transformer has an equivalent resistance and leakage reactance as referred to secondary as 0.09 Ω and 0.29 Ω respectively. Calculate percentage voltage regulation on full load for i) 0.8 lagging p.f. ii) 0.8 leading p.f. iii) unity p.f.	[5]	CO3	Apply
Q.4	a) Three similar coils, connected in star, take a total power of 3 kW at a p.f. of 0.8 lagging from a 3- phase, 400 V, 50 Hz ac supply. Calculate the resistance and reactance of each coil.	[5]	CO4	Apply
	b) Three identical coils, each having a resistance of 15 Ω and an inductance of 0.03 H are connected in delta across 400 V, 50 Hz supply. Calculate i) phase current ii) line current iii) total active power consumed if circuit is working at a power factor of 0.846 lagging.	[5]	CO4	Apply
	c) The input power to a 3-phase induction motor measured by a 2 wattmeter method gives W_1 = 7.9 kW and W_2 = -1.7 kW. If line voltage is 400 V, calculate total active power, reactive power, power factor and line current.	[5]	CO4	Apply
	d) Draw a neat phasor diagram for a three-phase balanced star-connected resistive load in each phase across a symmetrical three-phase ac supply and hence derive the relationship between the line voltage and phase voltage. Also write relation between line current and phase current.	[5]	CO4	Apply