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BEEE103/203

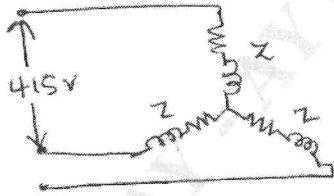
First/Second Semester B.E./B.Tech. Degree Examination, June/July 2026 Elements of Electrical Engineering

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
Q.1	a.	State and explain Kirchhoff's Laws.		8	L2	CO1
	b.	A resistance R is connected in series with a parallel circuit consisting of two resistors of 20 Ω and 48 Ω . Total power dissipated in the circuit is 1000 W and the applied voltage is 250 V. Calculate R.		6	L3	CO3
	c.	Derive an expression for co-efficient of coupling between the two coils.		6	L3	CO1
OR						
Q.2	a.	State Ohm's law and mention its limitations.		8	L2	CO1
	b.	A solenoid consists of 2000 turns of wire wound on a length of 70 cm. A search coil of 500 turns having a mean area of 30 cm ² is placed centrally inside the solenoid. Assuming K = 1, calculate (i) the mutual inductance, (ii) the emf induced in the search coil if the solenoid uniformly changes at a rate of 260 A/s.		6	L3	CO3
	c.	State and explain Faraday's laws of Electromagnetic induction.		6	L2	CO1
Module – 2						
Q.3	a.	Define the following and write the expressions: (i) Average value (ii) RMS value (iii) Form factor (iv) Peak factor		8	L1	CO2
	b.	Show that the power consumed in a pure inductive circuit is zero with the help of voltage current and power waveforms.		6	L3	CO2
	c.	A circuit consists of a resistance of 20 Ω , an inductance of 0.05 H connected in series. A supply of 230 V at 50 Hz is applied across the circuit. Find the current, power factor and power consumed by the circuit. Draw the vector diagram.		6	L3	CO2
OR						
Q.4	a.	Derive an equation for the power consumed by an R-L series circuit. Draw the waveforms of voltage, current and power.		8	L3	CO2

	b.	In a parallel RLC circuit, when a line voltage of 250 V at 50 Hz is applied, the currents in the resistance, inductance and capacitance are 1.5 A, 2.5 A and 1.7 A respectively. Calculate the line current power factor of the circuit and power supplied.	6	L3	CO2
	c.	Define Power Factor. Draw the vector diagram showing the power factor angle for different loading conditions.	6	L2	CO2
Module – 3					
Q.5	a.	What are the advantages of three phase systems over single phase systems?	6	L2	CO2
	b.	In a three phase delta connection, find the relation between line and phase values of currents and voltages. Also derive the equation for three phase power.	8	L3	CO2
	c.	When three balanced impedances are connected in star, across a 3 phase, 415 V, 50 Hz supply, the line current drawn is 20 A, at a lagging p.f of 0.4. Determine the parameters of the impedance in each phase.	6	L3	CO2
 Fig. Q5 (c)					
OR					
Q.6	a.	Explain the effect of power factor on two wattmeter readings connected to measure 3 phase power.	8	L2	CO2
	b.	What is phase sequence? Write its significance.	6	L2	CO2
	c.	Two wattmeters connected to measure the power in a 3 phase circuit read 5 kW and 1 kW, the latter being read after reversing the potential coil ends. Calculate the power, power factor, total volt-amperes and reactive volt-amperes.	6	L3	CO2
Module – 4					
Q.7	a.	With a neat circuit diagram and truth table explain two way control of lamp.	6	L2	CO5
	b.	Explain the various factors that are required to be considered in selecting the type of wiring for domestic wiring.	6	L2	CO5
	c.	With a neat diagram, explain Whetstone's bridge.	8	L2	CO4
OR					
Q.8	a.	With a neat diagram, explain working principle of schering bridge for the measurement of capacitance.	6	L2	CO4
	b.	List the advantages and disadvantages of wooden casing and capping.	6	L2	CO5
	c.	With a neat diagram, explain working of a Megger.	8	L2	CO4

Module – 5

Q.9	a.	What is an Electric Shock? What are the precautions to be taken to prevent shocks from occurring?	6	L2	CO5
	b.	With a neat schematic diagram, explain the operation of RCCB.	8	L2	CO5
	c.	What is Tariff? Explain two-part tariff.	6	L2	CO5
OR					
Q.10	a.	What is Earthing? With a neat diagram, explain plate earthing.	7	L2	CO5
	b.	Write short note on : (i) Miniature circuit breaker (ii) Fuse	8	L2	CO5
	c.	Calculate the total electricity bill of a load of 3 kW, if the tariff of electric supply company is as follows: (i) 0 – 50 units = 4.1 Rs./unit (ii) 50 – 100 units = Rs.5.55 per unit (iii) 100 – 200 units = Rs.7.1 per unit Total number of units consumed = 120 units, Fixed cost up to 1 kW = Rs.85 > 1 kW = Rs.95	5	L3	CO5
