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CBCS SCHEME

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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.  Fig. Q5 (c)	6	L3	CO2
		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 caping.	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 Tarrif? 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**

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