

CBCS SCHEME

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BEEE103/203

First/Second Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.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. VTU Formula Hand Book is permitted.
 3. M : Marks , L: Bloom's level , C: Course outcomes.

Module – 1			M	L	C
Q.1	a.	State and explain Kirchoff's laws.	6	L2	CO1
	b.	A circuit consists of two parallel resistors having resistances of 20 Ω and 30 Ω respectively connected in series with 15 Ω. If the current through 15 Ω resistor is 3 A. Find (i) Current in 20 Ω and 30 Ω resistors. (ii) The voltage across the whole circuit (iii) The total power and power consumed in all resistances.	8	L3	CO3
	c.	State and explain Fleming's Rules.	6	L2	CO1
OR					
Q.2	a.	Define the co-efficient of coupling. Develop the relation between Self-inductances, mutual inductance with the co-efficient of coupling.	8	L2	CO1
	b.	A coil consists of 600 turns and a current of 10 A in the coil gives rise to a magnetic flux of 1 mWb. Determine (i) Self Inductance (ii) The emf induced (iii) Energy stored when the current is reversed in 0.01 sec.	6	L3	CO3
	c.	State and explain Ohm's law. List its limitations.	6	L1	CO1
Module – 2					
Q.3	a.	Develop the expression for effective value of an Alternating current which is sinusoidally varying.	6	L3	CO2
	b.	Given $V = 200 \sin 377t$ volts, $i = 8 \sin(377t - 30^\circ)$ Amps, for an AC circuit. Determine (i) Power factor (ii) True power (iii) Apparent power (iv) Reactive power.	8	L3	CO2
	c.	Justify with relevant circuit, waveform and phasor diagram, a pure inductor does not consume any power.	6	L3	CO2
OR					
Q.4	a.	Develop the expression for Real power in a series R-L circuit with necessary phasor diagram and equations.	6	L3	CO2
	b.	In a series-parallel circuit, the two parallel branches A and B are in series with C. The impedances are $Z_A = (10 - j8)\Omega$, $Z_B = (9 - j6)\Omega$, $Z_C = (3 + j2)\Omega$. The voltage across branch 'C' is 100 V. Find the currents I_A and I_B , and phase difference between them.	8	L3	CO3

	c.	Define the following terms with respect to A.C. circuits : (i) Frequency (ii) Time period (iii) Form factor (iv) Peak factor.	6	L1	CO2
Module – 3					
Q.5	a.	List the advantages of Three-phase system over single-phase system.	6	L2	CO2
	b.	Develop the relationship between the phase and line values of voltages and currents in a balanced delta connected system.	8	L3	CO2
	c.	A three phase, 230 V, supply is given to a balanced load which is delta connected. Impedance in each phase of the load is $(8+j6) \Omega$. Determine the phase current and total power consumed.	6	L3	CO2
OR					
Q.6	a.	Justify with relevant phasor diagram, that only two wattmeters are sufficient to measure three phase power.	8	L3	CO2
	b.	A balanced three phase star connected load draws power from 440 V supply. The two wattmeters connected indicate $W_1 = 5 \text{ kW}$, $W_2 = 1.2 \text{ kW}$. Find power, power factor, current in the circuit.	6	L3	CO2
	c.	Define phase sequence, balanced load, balanced supply with respect to three phase a.c. circuits.	6	L1	CO2
Module – 4					
Q.7	a.	Explain the construction and working principle of Wheatstone Bridge.	8	L2	CO4
	b.	Elaborate two-way and three-way control of load with relevant circuit and truth table.	6	L2	CO4
	c.	Compare between current transformer and potential transformer.	6	L2	CO4
OR					
Q.8	a.	Explain casing, capping type of wiring.	6	L2	CO5
	b.	Give an outline on Megger.	8	L2	CO5
	c.	Explain Schering Bridge used for measuring capacitance.	6	L2	CO5
Module – 5					
Q.9	a.	Explain the working principle of a Fuse. List its merits and demerits.	8	L2	CO5
	b.	Define Electric Shock. List the precautions to avoid shock.	6	L1	CO5
	c.	Elaborate Two-part tariff in electricity.	6	L2	CO5
OR					
Q.10	a.	Define Earthing. With neat sketch, explain plate Earthing.	8	L2	CO5
	b.	Give an outline on Earth Leakage Circuit Breaker (ELCB).	6	L2	CO5

	<p>c. Estimate the electricity bill amount for a month of 31 days. If the following devices are used as specified.</p> <p>(i) 3 bulbs of 40 W for 6 hrs (ii) 4 tube lights of 50 W for 8 hrs. (iii) A TV of 120 W for 6 hrs. Give rate of electricity = Rs.2.50 / watt</p>	6	L3	CO5
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