CBCS SCHEME

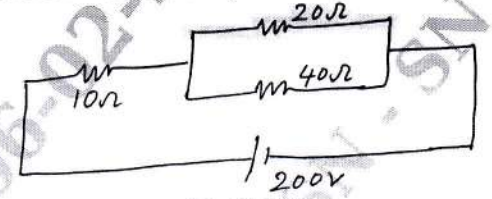
USN | | | | | | | | | | |

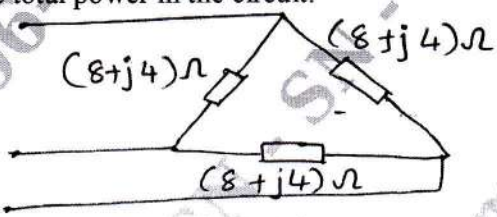
BEEE103/203

First/Second Semester B.E./B.Tech. Degree Examination, Dec.2023/Jan.2024
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 with an example.	6	L2	CO1
	b.	In the given Fig.Q.1(b). Find the current in each resistance and voltage across 10Ω resistance. Find also the power consumed in each resistances.  Fig.Q.1(b)	6	L3	CO1
	c.	i) State and explain Faraday's laws of Electromagnetic induction. ii) Derive the expression for energy stored in inductor.	8	L2	CO1
		OR			
Q.2	a.	Define the co-efficient of coupling and find its relation with L_1, L_2 and M.	7	L2	CO2
	b.	State Ohm's law. Mention its limitations.	6	L1	CO2
	c.	Two coils having 1000 turns and 1600 turns respectively are placed close to each other such that 60% of the flux produced by one coil links the other. If a current of 10A, flowing in the first coil, produces a flux of 0.5mWb, find the inductance of the second coil.	7	L3	CO2
		Module – 2			
Q.3	a.	Derive an expression for power in pure inductance circuit and draw voltage, current and power waveforms.	6	L3	CO2
	b.	A circuit consists of a resistance of 20Ω, an inductance of 0.05H connected in series. A supply of 230V at 50Hz is applied across the circuit. Find the current, power factor and power consumed by the circuit.	6	L3	CO2
	c.	Derive an expression for power in series resistance and inductance circuit and draw voltage, current and power waveforms.	8	L3	CO2
		OR			
Q.4	a.	Show that voltage and current in pure resistive circuit is in phase with each other. Also derive the equation for power consumed.	6	L3	CO2

	b.	An inductive coil takes a current of 33.24A from 230V, 50Hz supply. If the resistance of the coil is 6Ω, calculate the inductance of the coil and the power taken by the coil.	6	L3	CO2
	c.	Two impedances (150 – j157)Ω and (100 + j110)Ω are connected in parallel across 200V, 50Hz supply. Find branch currents, total current and total power consumed by the circuit.	8	L3	CO2
		Module – 3			
Q.5	a.	With a neat circuit diagram and phasor diagram, show that two wattmeters are sufficient to measure 3 phase power.	8	L3	CO2
	b.	Obtain the relationship between line and phase values of voltage and current in a balanced 3 phase delta connected system.	6	L3	CO2
	c.	A delta connected load is arranged as shown in Fig.Q.5(c). The supply voltage is 415V at 50Hz. Calculate: i) The phase currents ii) The live currents iii) The total power in the circuit.  Fig.Q.5(c)	6	L3	CO2
		OR			
Q.6	a.	In a three phase star connection. Find the relation between line and phase values of currents and voltages. Also derive the equation for three phase power.	6	L3	CO1
	b.	What are the advantages of 3 phase system over single phase system?	6	L2	CO3
	c.	Three 100Ω resistors are connected in i) STAR and ii) DELTA across a 415V, 50Hz, 3 phase supply. Calculate the line and phase currents and the power consumed in each case.	8	L3	CO3
		Module – 4			
Q.7	a.	With a neat diagram, explain the construction and working of megger.	6	L2	CO4
	b.	Explain two way and three way control of lamp with the truth table.	8	L2	CO5
	c.	Mention the difference between current transformer and potential transformer.	6	L2	CO4
		OR			
Q.8	a.	Explain the construction and working of Wheat Stone's bridge with necessary diagrams.	6	L2	CO4
	b.	Explain the construction of Maxwell's bridge and derive the expression for unknown inductance.	8	L2	CO4

	c.	Explain the construction and working of Kelvin's double bridge.	6	L2	CO4
		Module – 5			
Q.9	**a.**	Write a short note on fuse and MCB.	8	L2	CO5
	b.	Explain the working of ELCB with a neat diagram.	6	L2	CO5
	c.	What are the desirable characteristics of tariff and explain two part tariff.	6	L2	CO5
		OR			
Q.10	**a.**	With a neat diagram, explain the operation of RCCB.	6	L2	CO5
	b.	Explain necessity of earthing with a neat diagram explain pipe earthing.	8	L2	CO5
	c.	Write a short note on precautions against electric shock.	6	L2	CO5

*****