B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

December 2023 Supplementary Examinations

Programme: B.E.   **Semester: I / II**
Branch: Common to all Branches   **Duration: 3 hrs.**
Course Code: 22EE1ESIEE / 22EE2ESIEE   **Max Marks: 100**
Course: Introduction to Electrical Engineering
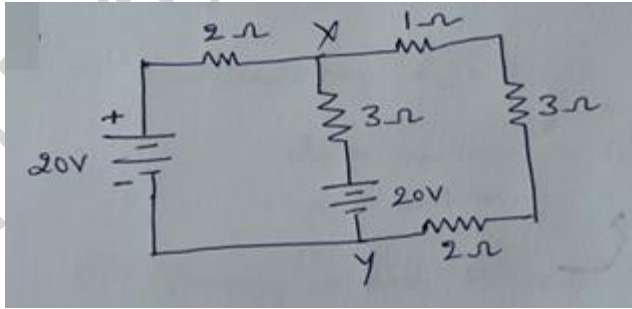
Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

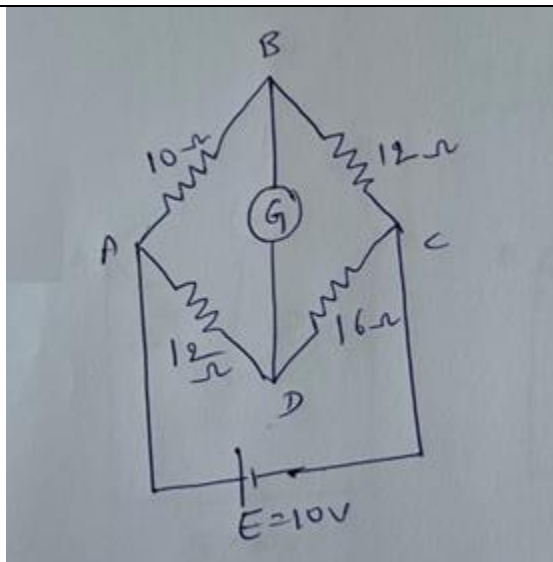|				CO	PO	Marks
			UNIT - I	*CO*	*PO*	**Marks**
1	a)		Elaborate on the general structure of power system with the help of a single line diagram.	*CO3*	*PO6*	**08**
	b)		Explain KVL and KCL and illustrate the same with an example.	*CO1*	*PO1*	**05**
	c)		A Wheatstone bridge circuit has $R_{AB}=R_{CD}$ 60Ω, $R_{BC}=R_{AD}=40$ Ω, $R_{BD}=100$ Ω. Supply is connected to points A and C. If the current drawn from the supply is 100mA, find the currents through R_{BC}, R_{CD} and R_{BD}.	*CO2*	*PO2*	**07**
			UNIT - II			
2	a)		Find the current flowing in the branch XY of the circuit shown in Fig.2.a. by applying Superposition theorem. Fig.2.a.	*CO2*	*PO2*	**08**
	b)		Derive the expression for energy stored in an inductor.	*CO1*	*PO1*	**06**
	c)		A coil consists of 600 turns and a current of 10A in the coil gives rise to a magnetic flux of 2 mwb, Calculate (i) self inductance (ii) induced emf (iii) energy stored when the current is reversed in 0.01 sec.	*CO2*	*PO2*	**06**
			OR			
3	a)		Apply Thevenin's theorem to find the current through the galvanometer in the circuit shown in Fig.3.a. The galvanometer has a resistance of 5Ω. All resistors are in Ohms.	*CO2*	*PO2*	**08**

Left margin text: **Important Note:** Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

Fig.3.a.

	b)	What is coefficient of coupling? Establish the relation between coefficient of coupling, self inductance and mutual inductance.	CO1	PO1	06
	c)	Two identical coils of 1000 turns each are placed such that, 70% of flux produced by one links with the other. A current of 4A in coil A produces a flux of 0.06mwb in it. If the current in coil A changes from +5A to -5A in 0.01 sec, what is induced emf in coil B? Find the self inductance of each coil and their mutual inductance.	CO2	PO2	06
		UNIT - III			
4	a)	Define the following with respect to an alternating current with appropriate expressions. (i) Time period (ii) phase difference (iii) RMS value (iv) form factor (v) peak factor (vi) Average value	CO1	PO1	08
	b)	With necessary circuit, phasor diagrams and waveforms, Justify the statement that "current in RL series circuits lags behind the voltage".	CO1	PO1	06
	c)	In a RLC series circuit, if capacitive reactance is greater than inductive reactance, what will be the nature of current? Explain with necessary waveforms and phasor diagram.	CO2	PO2	06
		UNIT - IV			
5	a)	Explain different types of losses in a transformer. What are the measures taken to reduce these losses.	CO1	PO1	08
	b)	Derive the expression for back emf of a DC motor.	CO1	PO1	05
	c)	A 220 V, dc shunt motor runs at 500 rpm when it is drawing a line current of 51 A. Armature and field resistances are 0.2 Ω and	CO2	PO2	07

			200 Ω respectively. Calculate the speed of the motor when the line current is reduced to 26 A. Consider Voltage drop / brush is 1 V.			
			OR			
	6	a)	A 600 kVA transformer has an efficiency of 92% at full load at UPF as well as at half load, 0.9 power factor. Determine its efficiency at 75% of full load at 0.9 power factor and also determine its Iron loss and copper loss at full load.	*CO2*	*PO2*	**08**
		b)	Differentiate between core and shell type transformers, with neat sketch.	*CO1*	*PO1*	**05**
		c)	A 4 pole, wave connected dc motor has 48 armature slots with 4 conductors per slot. The flux per pole is 58.7 mwb and armature resistance is 0.2 Ω. When connected to a 400 V supply, the motor runs at a speed of 1050rpm. Calculate the value of the back emf developed by the motor and the armature current.	*CO2*	*PO2*	**07**
			UNIT - V			
	7	a)	What is earthing? Explain pipe earthing with a neat diagram.	*CO3*	*PO6*	**08**

		b)	Define the following:
			  1. Fuse
			  2. Fusing current
			  3. Rated current of a fuse
				CO3	*PO6*	**05**

		c)	With a neat diagram, explain different parts of an electric vehicle.	*CO3*	*PO6*	07

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