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

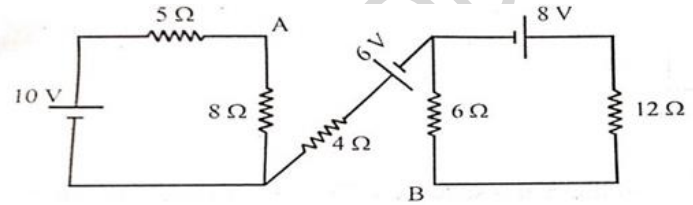
Autonomous Institute Affiliated to VTU

February / March 2024 Semester End Main Examinations

Programme: B.E. **Semester: I**
Branch: Electrical and Electronics Engineering **Duration: 3 hrs.**
Course Code: 22EE1ESEEE **Max Marks: 100**
Course: Elements of 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.

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.

		UNIT - I	CO	PO	Marks
1	a)	Two incandescent lamps rated 40W and 80W, each designed to work on 200V are connected in parallel. Find the current drawn from the source. If the lamps are connected in series across the same supply, what is the current drawn.	CO1	PO1	**06**
	b)	Derive the equation of torque of a DC motor.	CO1	PO1	**06**
	c)	Find the potential difference between the points A and B in the network shown below. 	CO2	PO1	**08**
		OR			
2	a)	A resistance of 10 Ω is connected in series with two resistances each of 15 Ω arranged in parallel. An unknown resistance is connected across this parallel combination. Determine the power consumed by the unknown resistance. The total current taken shall be 1.5 A with 20 V applied.	CO2	PO1	**07**
	b)	With neat circuit diagram and graph, explain the characteristics of DC shunt motor.	CO3	PO2	**07**
	c)	A 250V, DC shunt motor takes 6A line current on no-load and runs at 1000 rpm. The resistance of the field winding and armature are 250 ohms and 0.2 ohms respectively. If the full load line current is 26A, calculate the full load speed, assume constant airgap flux.	CO3	PO2	**06**
		UNIT - II			
3	a)	Define the following: i) Time period ii) Amplitude iii) Phase iv) Phase Difference	CO1	PO1	**04**

		b)	Derive the expression for impedance, phase angle and power for series R-L AC circuit.	*CO2*	*PO1*	**06**
		c)	A circuit consists of R-L-C of 10 ohms, 16 m H, 150 micro Farads connected in series. A supply of 100V, 50Hz is given to the circuit. Calculate the current, pf, and power consumed by the circuit. Draw the phasor diagram and mention the voltage drops.	*CO2*	*PO1*	**10**
			UNIT - III			
	4	a)	Mention the advantages of three phase system.	*CO1*	*PO1*	**06**
		b)	In a three phase star connection, show the relation between line and phase values of current and voltage. Also derive the equation for three phase power.	*CO3*	*PO2*	**07**
		c)	A three phase delta connected load consists of 10 ohms and a capacitance of 100 micro farads in each phase. A supply of 410V, 50Hz is applied to the load. Calculate the line current, pf and power consumed by the load.	*CO3*	*PO2*	**07**
			UNIT - IV			
	5	a)	Derive the emf equation of a transformer.	*CO1*	*PO1*	**06**
		b)	A single phase transformer working at 0.8 pf has an efficiency of 94% at both three-fourth full load and full load of 600kW. Determine the efficiency at half full load, unity power pf.	*CO3*	*PO2*	**10**
		c)	Define slip. Explain the significance of slip.	*CO3*	*PO2*	**04**
			OR			
	6	a)	Explain the concept of rotating magnetic field of three phase induction motor.	*CO3*	*PO2*	**10**
		b)	Derive the condition for which the efficiency of a transformer is maximum.	*CO3*	*PO2*	**06**
		c)	A three phase, 4 poles, 440V, 50Hz induction motor runs with a slip of 4%. Calculate the rotor speed and frequency of rotor current.	*CO3*	*PO2*	**04**
			UNIT - V			
	7	a)	Define fuse and explain its working.	*CO4*	*PO6*	**06**
		b)	When a person has received a shock, what care must be taken to protect him from the shock.	*CO4*	*PO6*	**06**
		c)	Draw and explain the block diagram of electric vehicle.	*CO4*	*PO6*	**08**

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