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

Autonomous Institute Affiliated to VTU

September / October 2024 Supplementary Examinations

Programme: B.E. Semester: I / II
Branch: Common to all Branches **Duration: 3 hrs.**
Course Code: 21EE1ESBEE / 21EE2ESBEE **Max Marks: 100**
Course: Basic 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			
1	a)		With an appropriate example, state and explain Kirchhoff's Laws.	CO2	PO1	**06**
	b)		What is RMS value of a sinusoidal current wave? Arrive at an expression for the same in terms of peak value.	CO3	PO2	**07**
	c)		An ac circuit consists of a pure resistance of 10 Ω and is connected to an ac supply of 230 V, 50 Hz. Calculate the (i) current (ii) power consumed and (iii) equations for voltage and current.	CO3	PO2	**07**
			UNIT - II			
2	a)		A series circuit with R=10Ω , L=50mH and C= 100μF is supplied with 200V, 50Hz. Find i) the impedance ii) current iii) power and iv) power factor.	CO3	PO2	**07**
	b)		Derive the relationship between line and phase current in a 3 phase delta connection with vector diagram.	CO2	PO1	**08**
	c)		List the advantages of 3 Ø system over 1 Ø system.	CO1	PO1	**05**
			UNIT - III			
3	a)		Explain principle of operation of a single phase transformer and derive the emf equation.	CO2	PO1	**07**
	b)		Describe the construction of a DC Motor with a neat labelled sketch.	CO3	PO2	**07**
	c)		For a 25kVA, 2000/200 V transformer, Iron and copper losses are 350 watts and 400 watts respectively. Calculate, the efficiency at half and 3/4th full load and upf.	CO3	PO2	**06**
			OR			
4	a)		Deduce the equation for armature torque of a DC motor.	CO2	PO1	**06**
	b)		With neat diagrams, explain shell type and core type transformers.	CO2	PO1	**06**
	c)		A 4 pole, 220 V. lap connected DC shunt motor has 36 slots, each slot containing 16 conductors. It draws a current of 40 A from the	CO3	PO2	**08**

			supply. The field resistance and armature resistance are 110, 0.1 respectively. The motor develops an output power of 6 kW. The flux per pole is 40 mwb. Calculate a) the speed b) the torque developed by the armature and c) the shaft torque			
			UNIT - IV			
5	a)		With a neat sketch, explain the different types of rotors in a 3 phase induction motor.	*CO1*	*PO1*	**08**
	b)		With the usual notations, derive the expressions for phase emf and line emf of a 3Ø star connected alternator.	*CO3*	*PO2*	**07**
	c)		A 2 pole, 3-φ alternator running at 3000 rpm has 42 armature slots with 2 conductors in each slot. Calculate flux/ pole required to generate a line voltage of 2300 volts. Kd = 0.952 and Kp = 0.956.	*CO3*	*PO2*	**05**
			OR			
6	a)		With the help of relevant phasor diagrams, show that when the three phase supply is given to the stator winding of the three phase induction motor, a rotating magnetic field is produced in the airgap.	*CO3*	*PO2*	**08**
	b)		With the help of neat sketches, compare the salient pole rotor and non-salient pole rotors in an alternator.	*CO2*	*PO1*	**08**
	c)		A 4 pole, 3 phase, 50 Hz induction motor runs at a speed of 1470 r.p.m. Find the synchronous speed and the slip.	*CO3*	*PO2*	**04**
			UNIT - V			
7	a)		Compare MCB and fuse.	*CO4*	*PO6*	**04**
	b)		With the help of detailed block diagram, explain the working of EV.	*CO4*	*PO6*	**07**
	c)		Define earthing. Why earthing is necessary? Explain with the help of neat diagram the pipe earthing.	*CO4*	*PO6*	**09**

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