U.S.N.										

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

Autonomous Institute Affiliated to VTU

April 2024 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Electrical and Electronics Engineering **Duration: 3 hrs.**
Course Code: 23EE3PCTDC **Max Marks: 100**
Course: Transformers and DC Machines

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.

				CO	PO	Marks
			UNIT - I			
1	a)		Discuss the losses and methods of reducing losses in transformer.	*CO1*	*PO1,2, 3*	**06**
	b)		Draw the vector diagram of a practical transformer on load supplying i) Unity power factor load ii) lagging power factor load.	*CO1*	*PO1,2, 3*	**06**
	c)		The OC and SC test on a 10 KVA, 500/250V, 50 Hz single phase transformer gave the following results OC Test (LV side): 25 V, 3 A, 200W SC Test (HV side): 15 V, 30A, 300W Calculate i) efficiency at UPF ii) maximum efficiency at UPF iii) regulation at full load 0.8 pf lag.	*CO1*	*PO1,2, 3*	**08**
			UNIT - II			
2	a)		With neat sketch, explain the three phase star - delta connected transformer.	*CO2*	*PO3,4*	**10**
	b)		Discuss the necessity and conditions for parallel operation of phase transformers	*CO2*	*PO3,4*	**10**
			OR			
3	a)		With neat sketch, explain the three phase delta - star connected transformer.	*CO2*	*PO3,4*	**10**
	b)		Derive an expression for saving in conductor material in an autotransformer over a two-winding transformers of equal rating. State the advantages and disadvantages of autotransformer over two-winding transformers.	*CO2*	*PO3,4*	**10**
			UNIT - III			
4	a)		With relevant diagrams, explain armature reaction in D.C generators.	*CO3*	*PO1,2, 3*	**10**
	b)		A 4-pole shunt DC generator is delivering 20A to a load of 10Ω. If the armature resistance is 0.5 Ω and the shunt field resistance is 50 Ω, calculate the induced emf, voltage regulation of the machine. Allow a drop of 1V per brush.	*CO3*	*PO1,2, 3*	**06**

		c)	Distinguish between lap and wave winding used in a D.C. generator.	*CO3*	*PO1,2, 3*	**04**
			UNIT - IV			
	5	a)	Explain typical T/Ia and N/Ia characteristics of D.C series and shunt motors.	*CO3*	*PO1,2, 3*	**10**
		b)	A 240 V series motor takes 40 A when giving its rated torque at 1500 rpm. Its armature and series field resistance is 0.18 ohm and 0.12 ohm respectively. Find the external resistance which must be added to obtain rated torque (i) at starting and (ii) at 1000 rpm	*CO3*	*PO1,2, 3*	**10**
			UNIT - V			
	6	a)	With a neat sketch elaborate the Hopkinson's test performed on a DC machines.	*CO3*	*PO1,2, 3*	**10**
		b)	Explain Retardation test in detail.	*CO3*	*PO1,2, 3*	**10**
			OR			
	7	a)	With a neat sketch elaborate the Swinburne's test performed on a DC machines.	*CO3*	*PO1,2, 3*	**10**
		b)	Explain field test on DC series motor in detail.	*CO3*	*PO1,2, 3*	**10**

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