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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Second Semester, B.E. - Semester End Examination; July/Aug. - 2022

Basic Electrical Engineering

(Common to all Branches)

Time: 3 hrs *Max. Marks: 100*

Course Outcomes

The Students will be able to:

CO1: Analyze single phase and three phase AC circuits.

CO2: Demonstrate their understanding about earthing and different types of wiring.

CO3: Demonstrate their understanding about different types of measuring instruments and their usage.

CO4: Identify and analyse the parts of DC machines, Transformers, alternators and Induction machines.

CO5: To get an overview of special electrical machines.

***Note**: I) **PART - A** is compulsory. **Two** marks for each question.*

*II) **PART - B**: Answer any **Two** sub questions (from a, b, c) for a Maximum of **18 marks** from each unit.*

Q. No.		Questions	Marks
		I : PART - A	**10**
I	a.	Define from factor and obtain the value of it for an AC quantity.	2
	b.	What is phase sequence? Explain the same with the help of relevant figure.	2
	c.	Bring out the difference between statically induced emf and dynamically induced emf.	2
	d.	Define the terms; i) Self-inductance and ii) Mutual inductance, giving the expression for each.	2
	e.	Mention any four applications of a permanent magnet stepper motor.	2
		II : PART - B	**90**
		UNIT - I	**18**
1	a.	Starting with the methods of generation of sinusoidal ac voltages, obtain the expression for alternating emf. With the help of figure.	9
	b.	With relevant circuit diagram and phasor diagram prove that the average power consumed by a pure capacitor is zero.	9
	c.	A choke coil takes a current of 2 A, lagging 60° behind the applied voltage of 200 V at 50 Hz, Calculate the inductance, resistance and impedance of the coil. Also determine the power consumed when it is connected across 100 V, 25 Hz supply.	9
		UNIT - II	**18**
2	a.	A balanced 3-ϕ, *y* connected load of 150 kW takes a leading current of 100 A with a line voltage of 1100 V, 50 Hz. Find the circuit constants of load per phase.	9
	b.	With neat circuit diagram, derive the relationship for voltages and currents in star connected system.	9
	c.	What is electric shock? State the causes and precautions to be taken to prevent it.	9

Contd…2

UNIT - III **18**

3 a. What is DC generator? Explain with the help of connection diagram and important relations, the various classifications of DC generators. 9

b. A 4 pole lap wound shunt generator delivers 200 amperes at terminal voltage of 250 volts, It has a armature and field resistance of 0.05 Ω and 50 Ω, respectively. Neglecting the brush drop, Determine; 9

i) Armature current ii) The current per armature parallel path

iii) EMF generated iv) Power developed

c. Bring out the difference between synchronous generator and DC generator. Derive the emf equation of synchronous generator. With suitable notations. 9

UNIT - IV **18**

4 a. What is transformer? Discuss the various types of losses occurring in a transformer and hence, obtain the expression for efficiency of transformer. 9

b. A 600 kVA, 1-ϕ transformer has an efficiency of 92% both at full load and half load at unity power factor. Determine its efficiency at 75% of full load at 0.9 power factor lag. 9

c. State the advantages and disadvantages of 3-ϕ, IM (induction motor).what is slip? Obtain the expression for slip and give its significance. 9

UNIT - V **18**

5 a. What is the difference between brushless DC motor and normal DC motor. Explain with help of neat sketch the construction and working of brushless DC motor. 9

b. What is stepper motor? Explain the construction and working of permanent magnet stepper motor. 9

c. What is servomotor? With neat diagram, explain the working principle of the same. 9

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