



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

(An Autonomous Institution affiliated to VTU, Belagavi)

First Semester, B.E. - Semester End Examination; April - 2021

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 Maximum of 18 marks from each unit.

Q. No.	Questions	Marks	BLs	COs	POs
PART - A		10			
1 a.	Define RMS value of alternating quantity.	2	L1	CO1	PO3
b.	Mention the necessity of Earthing.	2	L3	CO2	PO3
c.	What is dynamically induced EMF.	2	L1	CO3	PO3
d.	Define mutually induced EMF.	2	L1	CO4	PO3
e.	Mention the applications of stepper motor.	2	L2	CO5	PO3
PART - B		90			
UNIT - I		18			
1 a.	Mathematically show that, the power consumed by a pure capacitor is zero. Also sketch the current, voltage and power curves.	9	L5	CO1	PO3
b.	The impedances $Z_1 = (10 + j15) \Omega$ and $Z_2 = (6 - j8) \Omega$ are connected in parallel. The total current is 15 A. What is the power taken by each branch?	9	L5	CO1	PO3
c.	I) Define the following:	3			
	i) Apparent power ii) Real power iii) Reactive Power		L1	CO1	PO3
	II) Define average value of an AC current and derive an expression for the same.	6			
UNIT - II		18			
2 a.	With neat sketch, explain the construction and working of single phase induction type energy meter.	9	L2	CO2	PO3
b.	i) Develop the relation between line and phase values for three phase balanced delta connected system.	6			
	ii) List out any three advantages of three phase system over single phase system.	3	L3	CO2	PO3

c. i)	A balanced star connected load of $(8+j6) \Omega$ per phase is connected to three phase 230 V supply. Find the line current, power factor, power, reactive power and total volt amperes.	6	L1		
				CO2	PO3
ii)	With the help of circuit diagram, explain two way control of lamp.	3	L5		
UNIT - III		18			
3 a.	With a neat sketch, explain the construction and working principle of a DC machine.	9	L2	CO3	PO3
b. i)	Distinguish between Salient pole and Non salient pole alternator.	6	L2	CO3	PO3
ii)	Explain the significance of Back EMF.	3			
c. i)	A 4 pole generator wave wound armature has 51 slots, each having 24 conductors. The flux per pole is 0.01 wb. At what speed must be armature rotate to give an induced EMF of 270 V?	4	L5	CO3	PO3
ii)	With usual notations, derive an EMF equation of a synchronous generator.	5			
UNIT - IV		18			
4 a. i)	A 1kW single phase transformer has core loss of 15 W and full load copper loss of 20 W. Calculate the efficiency at;	6			
	I) Full load 0.9 pF lag II) Half full load UPF		L5	CO4	PO3
ii)	Explain the concept of slip and its significance.	3			
b.	Explain the concept of rotating magnetic field in a three phase induction motor.	9	L2	CO4	PO3
c. i)	Mention different types of induction motors with their constructional features.	6	L2	CO4	PO3
ii)	Explain the constructional features of shell type transformer.	3			
UNIT - V		18			
5 a.	Explain the construction and working of BL DC motor. Mention its application.	9	L2	CO5	PO3
b.	Explain the construction and working of capacitor start induction motor.	9	L2	CO5	PO3
c.	With neat sketch, explain the working of stepper motor.	9	L2	CO5	PO3

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