

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

BE/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

Third Semester

Electrical and Electronics Engineering

EE3303 – Electrical Machines I

Regulations - 2021

Duration : 3 Hrs

Maximum : 100 Marks

PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	Define the term statically induced EMF	RE	1	2
2.	Relate the significance of leakage flux in machines.	UN	1	2
3.	State the function of interpoles in DC generators.	RE	2	2
4.	Interpret the effects of armature reaction in a DC generator.	UN	2	2
5.	What is back emf?	RE	3	2
6.	Why are starters needed for a DC motor?	RE	3	2
7.	Draw the phasor diagram of an ideal transformer.	UN	4	2
8.	Define the term all day efficiency	RE	4	2
9.	Compare a two-winding transformer with a single-winding transformer.	UN	5	2
10.	What are the benefits of a three-phase transformer?	RE	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Explain the principle of electromechanical energy conversion. Or	UN	1	13
	b Derive the multi excited magnetic field excited system	AP	1	13
12.	a Describe the principle of operation of a DC generator and state its types. Or	UN	2	13
	b i Derive EMF equation of a DC generator	AP	2	8
	ii Illustrate the conditions for paralleling two machines	UN	2	5
13.	a i Derive torque equation of a DC motor	AP	2	8
	ii Explain in detail the armature speed control of a DC motor Or	UN	2	5
	b Apply a brake test to determine the performance of a motor	AP	3	13

14.	a	Build an equivalent circuit of a single-phase transformer with the necessary steps	AP	4	13
		Or			
	b	Calculate the voltage regulation of the transformer when it is supplying full load for the given specifications: $V_s = 230$ V (no-load voltage), Rated Power = 5 kW (full-load power), Equivalent Resistance of the transformer (R) = 1.5 Ω , Equivalent Reactance of the transformer (X) = 3.0 Ω .	AP	4	13
15.	a	Explain the principle of operation of an autotransformer.	UN	5	13
		Or			
	b i	Explain scott connection with the necessary diagrams	UN	5	10
	ii	List the applications of scott connection	RE	5	3

*PART – C (Marks 1*15 = 15)*

<i>Q.No</i>		<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
16.	a	A 240 V shunt motor has an armature resistance of 0.5 Ω and a field resistance of 120 Ω . The motor is drawing a current of 20 A from the supply. calculate the following: The armature current, The field current, The torque produced by the motor if the motor runs at 1200 RPM, assuming it has a constant power factor and the mechanical losses are negligible.	AN	5	15
		Or			
	b	Analyze the detailed connections and configurations of a three-phase system, including star (Y) and delta (Δ) connections, their advantages and disadvantages, and their impact on system performance	AN	5	15