Question Paper Code	12449

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023
Fourth Semester
Electrical and Electronics Engineering
20EEPC401 - SYNCHRONOUS AND INDUCTION MACHINES
(Regulations 2020)

Duration: 3 Hours   Max. Marks: 100

PART - A (10 × 2 = 20 Marks)
Answer ALL Questions

		Marks, K-Level, CO
1.	Classify the types of rotor in an alternator.	2,K2,CO1
2.	Compare EMF and MMF Methods.	2,K2,CO1
3.	Discuss how can we change the operating speed of synchronous motor.	2,K2,CO2
4.	Express the causes of hunting.	2,K2,CO2
5.	A 50Hz, 6 pole three phase induction motor runs at 970 rpm find the slip.	2,K3,CO3
6.	Explain why an induction motor, at no-load, operates at very low power factor.	2,K3,CO3
7.	Relate the staring torque and full load torque of DOL Starter.	2,K2,CO4
8.	Summarize the different methods of speed control from rotor side of induction motor.	2,K2,CO4
9.	Illustrate why capacitor-start induction motors are advantages.	2,K2,CO5
10.	Discuss the double revolving field theory.	2,K2,CO5

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

11. a)	Describe the principle and construction of slow speed operation synchronous generator with neat diagram.	13,K2,CO1

OR

b)	List the methods used to predetermine the voltage regulation of synchronous machines and explain the EMF method.	13,K2,CO1

12. a)	Explain briefly the features and principle of operation of three-phase synchronous motor.	13,K2,CO2

OR

b)	Examine in detail the effect of varying excitation on armature current and power factor of synchronous motor.	13,K2,CO2

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **12449**

13. a) Describe the construction and working principle of three phase induction motor. *13,K3,CO3*

OR

b) A 100kW, 330V, 50Hz, 3 phase, star connected induction motor has a synchronous speed of 500 rpm. The full load slip is 1.8% and full load power factor 0.85. Stator copper loss is 2440W, iron loss is 3500W, and rotational loss is 1200W. Calculate (i) rotor copper loss, (ii) the line current and (iii) the full load efficiency. *13,K3,CO3*

14. a) Discuss the starters used for three phase wound rotor induction motor. *13,K2,CO4*

OR

b) Explain in detail about conventional slip power recovery system. *13,K2,CO4*

15. a) Give the classification of single phase motors. Explain any two types of single phase induction motors. *13,K2,CO5*

OR

b) Describe the no-load test and blocked rotor test for obtaining the equivalent circuit parameters of a single phase induction motor. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) The following table gives the open circuit and full-load zero power factor saturation characteristics data for 40 KVA, 3-phase, 50 Hz, star connected alternator: *15,K3,CO1*

Exciting current in (Amps)	6	8	12	18	24	28
Open circuit line Volts	282	-	400	435	459	474
Zero p.f. line volts	-	0	-	-	-	400

Find the values of armature reaction (in equivalent field current) and armature leakage reactance. Also determine the voltage regulation at 0.8 p.f. lagging. Neglect armature resistance.

OR

b) Sketch and explain the torque slip characteristics of the three phase cage and slip-ring induction motors. How the stable region in the graph. *15,K3,CO3*