MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM

(Government Aided Autonomous Institution)

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Second Sessional Examination October 2026

B24EE3T03: ELECTRICAL MACHINES II

S5 EEE

Max. Marks :40 Time : 1 hr 30 min

Answer all questions

PART A (3 x 4=12 Marks)

1. Explain the necessary condition for synchronizing an alternator to infinite busbar. (3 Marks) [CO2]
2. Draw and explain V and inverted V curves of synchronous motor. (3 Marks) [CO3]
3. Derive the expression for the rotor frequency in an induction motor in terms of slip. (3 Marks) [CO3]
4. Explain the Torque Slip Characteristics of a three-phase induction motor. (3 Marks) [CO3]

PART B (2 x 14=28 Marks)

5.a) A 3-phase, 500V, star-connected synchronous motor gives net output of 17kW on full load operating at 0.9 lagging power factor. Its armature resistance is 0.8Ω/phase. The rotational losses are 1300W. Identify the current drawn by the motor and full load efficiency. (9 Marks) [CO3]

b) Explain Starting of synchronous Motor using a variable frequency drive. (5 Marks) [CO3]

6. The stator resistance of a 400 V, 30 kW, 50 Hz 3- phase induction motor is 0.015 Ω per phase and gave the following test data: No load test: 400 V, 20 A, 1.2 kW. Blocked rotor test: 100 V, 45 A, 2.75kW. Calculate equivalent circuit parameters of the motor and represent it with a neat diagram. (14 Marks) [CO4]

****

Students will be able to:
CO2: Evaluate voltage regulation and efficiency of alternators using standard methods and to demonstrate understanding of synchronization techniques. (Cognitive Knowledge Level: Apply)
CO3: Analyze performance characteristics of induction motor using phasor diagrams, torque-slip curves, and equivalent circuit models; and understand the detailed analysis of synchronous motor. (Cognitive Knowledge Level: Apply)
CO4: Improve the performance of induction motor and apply speed control and starting methods for induction motors. (Cognitive Knowledge Level: Apply)