MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM

(Government Aided Autonomous Institution)

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

First Sessional Examination August 2026

EET413: ELECTRIC DRIVES

S7 EEE

Max. Marks :40 Time : 1 hr 30 min

Answer all questions

PART A (3 x 4=12 Marks)

1. Draw the block diagram of an electric drive and explain (3 Marks) [CO1]
2. Explain the different components of load torque. (3 Marks) [CO1]
3. Draw the armature voltage waveform of a single-phase fully controlled rectifier fed separately excited DC motor working in motoring mode (continuous conduction).
   (Draw the necessary waveforms in the answer booklet itself) (3 Marks) [CO2]
4. Draw the circuit diagram of a 3-phase semi-converter fed separately excited DC motor drive. (3 Marks) [CO2]

PART B (2 x 14=28 Marks)

5. a) Explain the four-quadrant operation of a motor driving a hoist load. (12 Marks) [CO1]
   b) Derive the fundamental torque equations of motor - load system. (2 Marks) [CO1]
6. a) Why a single-phase semi converter can deliver only single-quadrant operation? Explain the operation with a circuit diagram and necessary waveforms.
   (Draw the necessary waveforms in the answer booklet itself) (7 Marks) [CO2]
   b) A 200 V, 875 rpm, 150 A separately excited DC motor has an armature resistance of 0.06 Ω. It is fed from a 1-phase fully controlled rectifier with an AC source voltage of 220 V, 50 Hz. Assuming continuous conduction, Calculate,
   1) Firing angle for rated motor torque & 750 rpm
   2)Firing angle for rated motor torque & -500 rpm (7Marks)[CO2]

Students will be able to:
CO1: Describe the transient and steady state aspects electric drives.
CO2: Apply the appropriate configuration of controlled rectifiers for the speed control of DC motors.

VISION

Endeavour to Ensure Excellence

MISSION

Mould technically competent and morally strong Engineers
Achieve dynamic leadership through quality Education
Cater to the needs of industry and community through Emulation
Empower the students to serve the nation with Dedication