**MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM**

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**First Sessional Examination Aug 2026**

**B24EE2T02 Electrical Machines-I**

**(S3_ EA &B)**

***(Use of Graph sheet permitted)***

Max. Marks 40 Time : 1.5 Hours

**Answer all questions from Part A and Part B**

**PART A (4X3=12 Marks)**

1. Derive EMF equation of DC generator. (CO1)
2. Explain the need of equalisers in a Lap Winding. (CO1)
3. List out the methods of improving Commutation in DC Machines (CO2)
4. A 6-pole, 400 kW, 500 V, lap connected DC generator has 1000 conductors and is delivering full load current. If the brushes are shifted by 12° (electrical), calculate the demagnetising ampere-turns per pole. (CO2)

**PART B (14X2=28 Marks)**

5. a. Explain the construction of a 2 pole DC Machine with a neat end view.

(CO1)(6 Marks)

b. A 75 kW , 250 V Compound DC Generator has the following data: Ra= 0.04 Ω, Rse=0.004 Ω, Rf= 100 Ω., Brush contact drop = 1 V per brush. Compare the generator induced EMF when fully loaded in a) Long Shunt Compound b) Short Shunt Compound

(CO1) (8 Marks)

6. a. The following figures were obtained from an open circuit test on a shunt generator driven at 400 r.p.m.:

| Field current (A): | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| O.C. Voltage (V): | 110 | 155 | 186 | 212 | 230 | 246 | 260 | 271 |

If the field resistance is 34Ω, find graphically:

I. The emf to which the machine will excite when the field circuit resistance is is 34 Ω.

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