TED (15/19) - 4031
(REVISION-2015/19)

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Reg.No……
Signature…….

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, APRIL - 2024

DC MACHINES

(Maximum Marks:100) (Time: 3 Hours)

PART - A
(Maximum Mark : 10)

Marks

I. Answer **all** the questions in one or two sentences. Each question carries 2 marks.

1. Write any two applications of a DC series motor.
2. Define commutation in a DC machine.
3. Define front pitch and back pitch.
4. State the torque equation of a DC motor.
5. State the necessity of compensating winding in a DC generator. (5 x 2 = 10)

PART - B
(Maximum Mark: 30)

II Answer ***any five*** questions from the following. Each question carries 6 marks.

1. Explain the significance of back emf in a DC motor.
2. State the methods of improving commutation in a DC machine.
3. Compare DC shunt and series motors.
4. Explain the concept of armature reaction with a neat sketch.
5. Calculate the e.m.f generated by a 4 pole lap wound armature with 160 slots and 8 conductors per slot, when driven at 800 rpm. The flux per pole is 0.05 Weber.
6. Explain load test in a DC motor with a neat sketch.
7. Illustrate the characteristics of DC series generator.

(5 x 6 = 30)

P.T.O

PART – C

(Maximum Mark: 60)

(Answer ***one full*** question from each unit. Each full question carries 15 marks.)

UNIT - I

III a) Compare lap winding and wave winding. (8)

b) A long shunt compound generator delivers a load of 50 A at 500V and has armature, series and shunt field resistances of 0.05Ω, 0.03 Ω and 250Ω respectively. Find the generated voltage and the armature current. Assume 1V per brush for contact drop. (7)

OR

IV a) Explain the different types of DC generators with connection diagrams. (8)

b) A four-pole generator with wave wound armature windings has 51 slots with each slot containing 20 conductors. Find the voltage generated in the machine when driven at 1500 rpm assuming the flux per pole to be 7mWb. (7)

UNIT – II

V a) Define critical field resistance. Explain any characteristic curve that can be drawn to determine the critical field resistance of a self-excited DC generator. (8)

b) Explain the concept of parallel operation of generators with necessary conditions. (7)

OR

VI a) Describe the concept of voltage build up in a DC shunt generator. (8)

b) Describe the methods to improve the commutation in a DC machine. (7)

UNIT – III

VII a) Explain the factors affecting the speed control of DC motors. (8)

b) Illustrate and explain the methods for speed control of DC series motors. (7)

OR

VIII a) Explain three –point starter with a neat sketch. (8)

b) Derive the torque equation of a DC motor (7)

UNIT – IV

IX a) Explain the load test in a DC shunt motor. (8)

b) List any three applications of DC series and shunt motors. (7)

OR

X a) Illustrate the various characteristics of DC series motor. (8)

b) Explain Swinburn's test in a DC motor. (7)

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