



C14-EE-302

4244

**BOARD DIPLOMA EXAMINATION, (C-14)
SEPTEMBER/OCTOBER - 2020
DEEE—THIRD SEMESTER EXAMINATION**

DC MACHINES

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

Instructions : (1) Answer **all** questions.
(2) Each question carries **three** marks.
(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. State Fleming's right-hand rule.
2. State the classification of DC generators.
3. State the function of commutator.
4. List different tests of DC motors.
5. Explain the working of overload relay (OLR) in brief.
6. Define commutation.
7. State the characteristics of DC generators.

- * 8. State power stages in DC motors.
9. List any three applications of DC shunt motors.
10. State the necessity of starter.

PART—B

10×5=50

Instructions : (1) Answer *any five* questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. Explain the working of a single-loop generator with neat sketch.

12. (a) Derive the condition for Max. efficiency of a DC generator.

(b) A shunt generator has a full load armature current of 196 A at 220 V. The stray losses are 720 W and shunt field coil resistance is 55 ohm. If it has a full load efficiency of 88%, find the armature resistance. Also find the load current corresponding to maximum efficiency.

13. Explain the armature reaction with neat diagrams.

14. (a) Derive the torque equation of DC motors. 4

(b) A 4 pole 220 V shunt motor has 540 lap wound conductors. It takes 32 A from the supply mains and develops output power of 5.595 kW. The field winding takes 1.0 A. The armature resistance is 0.9 ohm and the flux per pole is 30 mWb. Calculate the (i) speed and (ii) shaft torque. 3+3=6

- * 15. Draw the neat sketch of 4-point starter and explain its working.
16. When running on no load a 250 V shunt motor takes 4 A. Armature resistance is 0.3 ohm and field resistance is 250 ohm. Find the output of the motor and efficiency, when running on full load and taking a current of 60 A.
17. Explain the method of conducting brake test on DC motor.
18. Plot and explain (a) open circuit characteristics, (b) internal characteristics and (c) external characteristics of DC series generator.
