



C14-EE-302

4244

BOARD DIPLOMA EXAMINATION, (C-14)
OCT/NOV—2018
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. Write a short note a on electro mechanical energy conversion.

2. State the function of commutator.

3. List various losses that occur in a DC generator.

4. What is meant by commutation? List the methods to improve it.

5. Define critical resistance and critical speed.

6. State the working principle of DC motor.

7. Define torque of a DC motor.

- * 8. State the factors that affect the speed of a DC motor.
9. Write a short note on armature control method and speed control of a DC shunt motor.
10. Draw the performance curves of a DC series motor.

PART—B

10×5=50

- Instructions :** (1) Answer *any five* questions.
(2) Each question carries **ten** marks.
(3) The answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. (a) Derive the e.m.f equation of a DC generator.
(b) A 100-kW, 240-volts shunt generator has a shunt field resistance of 55 Ω and armature resistance of 0.667 Ω . Find the full load generated voltage.
12. (a) Explain the power flow diagram of a DC generator.
(b) A long shunt compound generator gives 240 volt at full load output of 100 amp. The armature, series field and shunt field resistance are 0.1 Ω , 0.02 Ω , and 100 Ω respectively. The iron loss at full load is 1000 watt, total windage and friction losses are 500 watt. Calculate full load efficiency of the machine.
- * 13. Explain the armature reaction with neat sketches.
14. (a) State the conditions for building up e.m.f in a DC generator.
(b) What is the necessity of equalizer ring in parallel operation of a DC generator?

- * **15.** (a) Derive the torque equation of a DC motor.
(b) The armature conductors in a 6-pole lap-connected DC motor are 628. The armature torque developed is 60Nm for an armature current of 20 amps. Determine flux per pole.
- 16.** (a) Draw the electrical and mechanical characteristics of a DC shunt motor.
(b) List the applications of DC motor.
- 17.** Explain the working of 3-point starter with a neat sketch.
- 18.** Explain Swinburne's test on a DC motor with a neat sketch.
