



C16-EE-304

5466

BOARD DIPLOMA EXAMINATION, (C-16)
MARCH/APRIL—2018
DEE—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. Classify DC generators based on field excitation.
3. Define (a) lap winding and (b) wave winding.
4. State the methods to improve commutation.
5. Define (a) critical resistance and (b) critical speed.
6. State the working principle of a DC motor.
7. Draw the power flow diagram of a DC motor.
8. What is the necessity of starter for a DC motor?
9. List the different methods of speed control of DC motors.
10. State the advantages of Swinburne's test.

/5466

*

1

[Contd...

*

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.** (a) Derive EMF equation of a DC generator. 5
(b) A shunt generator delivers 450 A at 230 V and the resistance of the shunt field and armature are 50 and 0.03 respectively. Calculate the generated EMF. Neglect brush drop. 5
- 12.** A 10 kW, 250 V DC shunt generator has total stray losses of 600 W. Its armature and shunt field resistance are 0.5 and 125 respectively. Calculate the efficiency at rated load. 10
- 13.** Derive the expressions for demagnetizing ampere turns per pole (AT_d) and cross-magnetizing ampere turns per pole (AT_c) of DC generator.
- 14.** (a) Explain the working of welding generator. 5
(b) Explain the internal and external characteristics of DC series generator. 5
- 15.** A 460 V DC series motor runs at 500 r.p.m. and draws a current of 40 A. Calculate the speed and percentage change in torque if the load is reduced so that the motor draws 30 A. Total resistance of the armature and field circuit is 0.8. Assume flux is proportional to field current.
- 16.** (a) Draw the electrical and mechanical characteristics of DC series motor. 5
(b) Mention one application of each type of self-excited DC motors. 5
- 17.** Explain the working of 3-point starter with a neat sketch.
- 18.** Explain Hopkinson's test with advantages and disadvantages.
