C14–EE–302

4244

BOARD DIPLOMA EXAMINATION, (C–14)
MARCH/APRIL—2017
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) Answer should be brief and straight to the point and shall not exceed *five* simple sentences.

1. List various parts of a DC generator.

2. Compare between lap winding and wave winding in 3 aspects.

3. Explain power stages in a DC generator.

4. Define commutation and state the methods to improve it.

5. Derive the torque equator of a DC motor.

6. Define MNA and GNA.

7. List the applications of DC motors.

8. List the methods of speed control of DC motor.

9. State the necessity of starter in DC motor.

10. List different tests of DC motors.

<center>**PART—B**</center>   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)* Explain the working of DC generator.   4

   (b) Calculate the EMF generated by a 6-pole wave wound armature having 45 slots with 18 conductors per slot. The flux per pole is 0·025 weber. The armature is driven at 1000 r.p.m.   6

12. *(a)* Classify the DC generator based on excitation.   4

   (b) A 4-pole long shunt lap wound generator supplies 25 kW at a terminal voltage of 500 V. The armature resistance 0 04   and shunt field resistance is 200   . The brush drop may be taken as 1 V. Determine the EMF generated.   6

13. Explain armature reaction with diagram.   10

14. *(a)* State the requirements of voltage build up in self-excited DC generator.   5

   (b) Explain the method of obtaining the OCC of a self-excited DC generator.   5

15. *(a)* Explain the working of DC motor. 5

(b) Explain the power stages in a DC motor. 5

16. 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 A. The armature resistance of 0 09   and flux per pole is 30 mWb. Calculate—*(a)* the speed and *(b)* the torque developed in newton meter. 10

17. *(a)* Explain the speed control of DC shunt motor with diagram. 5

(b) Write the differences of 3-point starter and 4-point starter. 5

18. Explain with diagram the brake test on a DC shunt motor.

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