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C14–EE–302

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BOARD DIPLOMA EXAMINATION, (C–14)

OCT/NOV—2015

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. Explain the working principle of DC generator.

2. State the Fleming's right hand rule.

3. Classify DC generators based on excitation.

4. State the methods to improve commutation.

5. Define critical resistance and critical speed. 1½+1½

6. State the working principle of DC motor.

7. Derive the torque equation of a DC motor.

8. What is the necessity of starter for DC motor?

9. List the methods of speed control of DC motors.

10. List the various methods of motor testing.

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 the EMF equation of a DC generator. 5

(b) A shunt generator delivers 450A at 230V and the resistance of the shunt field and armature of 50 and 0 03 respectively. Calculate the generated EMF. Neglect brush drop. 5

12. *(a)* Derive the condition for maximum efficiency of a DC generator. 4

(b) A 10kW, 250V DC shunt generator has total rotational losses of 600W. Its armature and shunt field resistance are 0 5 and 125 respectively. Calculate the efficiency at rated load. 6

13. Derive the equation for demagnetizing (AT_d) and crossmagnetizing (AT_c) ampere turns per pole. 5+5

14. *(a)* State the conditions for parallel operations of DC generators. 5

(b) Explain OCC, internal and external characteristics of DC shunt generator. 5

15. *(a)* Explain the significance of back EMF and write its formula. 5

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

16. *(a)* Draw the electrical and mechanical characteristics of DC series motor. 6

(b) List the applications of DC motor. 4

17. Explain the working of 3 point starter with neat sketch. 10

18. Draw the circuit diagram to perform a brake test on DC shunt motor and explain. 10

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