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C14–EE–302

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BOARD DIPLOMA EXAMINATION, (C–14)

MARCH/APRIL—2016

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. State the Fleming's right-hand rule.

2. Define MNA and GNA. 1½+1½=3

3. State the functions of yoke, commutator and pole core in DC generator. 1+1+1=3

4. What is armature reaction? List different effects of it. 1+2=3

5. Derive the e.m.f. equation of a DC generator.

6. Explain the significance of back EMF.

7. Explain power stages in a DC motor.

8. State the factors that affect the speed of a DC motor.

9. State the necessity of 3-point starter.

10. What is the main difference between brake test and Swinburne's test?

PART—B

10×5=50

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

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

11. Explain the working of simple loop generator.

12. *(a)* List various losses in a DC generator. 4

(b) A 4-pole DC generator is delivering 20 A to a load of 10 . If the armature resistance is 50 , calculate the induced EMF of the machine. Allow a drop of 1 V per brush. 6

13. *(a)* A 4-pole DC generator has an output of 120 A at 400 V, the wave connected armature has 980 conductors. The brushes are advanced by 3 degrees from the neutral axis. Find *(a)* AT_d/pole, *(b)* AT_c/pole. 6

(b) Write the advantages of parallel operation of DC generator. 4

14. Explain the process of commutation with neat sketch.

15. *(a)* Derive the torque equation of DC motor. 6

(b) Determine the torque established by the armature of a 4-pole DC motor having 774 conductors, two paths in parallel, 24 milliWebers of pole flux and the armature current is 50 A. 4

16. *(a)* Classify DC motors. 4

(b) Draw the electrical and mechanical characteristics of a DC shunt motor. 6

17. *(a)* State the function of No volt coil and overload coil in a 3-point starter. 6

(b) List the advantages and disadvantages of Wand Leonard methods. 4

18. Explain the method of conducting Swinburne's test with a neat circuit diagram.

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