



C14-EE-302

4244

**BOARD DIPLOMA EXAMINATION, (C-14)**  
**OCT/NOV—2017**  
**DEEE—THIRD SEMESTER EXAMINATION**

DC MACHINES

Time : 3 hours ]

[ Total Marks : 80

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**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. State the purpose of pole-shoe.
3. Define mechanical and electrical efficiency of a DC generator.
4. What is the necessity of parallel operation of DC generator?
5. State the applications of DC shunt and DC series generators.
6. Classify the DC motors based on excitation.
7. Draw the electrical and mechanical characteristics of DC series motor.

- \* 8. List the methods of speed control of DC motors.
9. State the function of NO-volt release in a 3-point starter.
10. Draw the performance curves of the DC shunt motor.

**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. Explain the construction of a DC generator with a neat sketch.

12. A long shunt generator running at 1000 r.p.m. supplies 22 kW at a terminal voltage of 220 volts. The resistance of armature, shunt field and series fields are 0.05, 110 and 0.06 respectively. The overall efficiency at the above load is 88%. Find (a) copper losses and (b) iron and friction losses.

13. Derive the equation for demagnetizing and cross magnetizing ampere turns per pole.

14. Explain OCC, internal and external characteristics of DC shunt generator.

15. (a) Draw the schematic diagram of DC short shunt motor and write the back emf. voltage and current equations. 5

(b) A 4-pole, 500 V wave wound DC shunt motor has 720 conductor on its armature. The full load armature current is 60 Amps and the flux per pole is 0.03 Wb. The armature resistance is 1.2 and the brush contact droop is 1 volt/brush. Calculate the full load speed of the motor. 5

- \* 16. (a) Explain the power stages of a DC motor. 5  
(b) List the applications of DC motors. 5
17. (a) Explain the flux control method in speed control of DC shunt motor with a neat sketch. State the merits and demerits. 5  
(b) What is the necessity of starter for a DC motor? 5
18. Explain the method of testing of DC shunt motor using brake test.

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