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C14-EE-302

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BOARD DIPLOMA EXAMINATION, (C-14)  
OCT/NOV—2018  
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) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Write a short note on electro mechanical energy conversion.
2. State the function of commutator.
3. List various losses that occur in a DC generator.
4. What is meant by commutation? List the methods to improve it.
5. Define critical resistance and critical speed.
6. State the working principle of DC motor.
7. Define torque of a DC motor.

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8. State the factors that affect the speed of a DC motor.
9. Write a short note on armature control method and speed control of a DC shunt motor.
10. Draw the performance curves of a DC series motor.

**PART—B**

10×5=50

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

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

(3) The answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. (a) Derive the e.m.f equation of a DC generator.
- (b) A 100-kW, 240-volts shunt generator has a shunt field resistance of 55  $\Omega$  and armature resistance of 0.667  $\Omega$ . Find the full load generated voltage.
12. (a) Explain the power flow diagram of a DC generator.
- (b) A long shunt compound generator gives 240 volt at full load output of 100 amp. The armature, series field and shunt field resistance are 0.1  $\Omega$ , 0.02  $\Omega$ , and 100  $\Omega$  respectively. The iron loss at full load is 1000 watt, total windage and friction losses are 500 watt. Calculate full load efficiency of the machine.
13. Explain the armature reaction with neat sketches.
14. (a) State the conditions for building up e.m.f in a DC generator.
- (b) What is the necessity of equalizer ring in parallel operation of a DC generator?

15. (a) Derive the torque equation of a DC motor.  
(b) The armature conductors in a 6-pole lap-connected DC motor are 628. The armature torque developed is 60Nm for an armature current of 20 amps. Determine flux per pole.
16. (a) Draw the electrical and mechanical characteristics of a DC shunt motor.  
(b) List the applications of DC motor.
17. Explain the working of 3-point starter with a neat sketch.
18. Explain Swinburne's test on a DC motor with a neat sketch.

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