

THIRD SEMESTER DIPLOMA EXAMINATION IN ELECTRICAL AND  
ELECTRONICS ENGINEERING — MARCH, 2015

DC MACHINES

[Time : 3 hours

(Maximum marks : 100)

Marks

PART—A

(Maximum marks : 10)

I Answer the following questions in one or two sentences. Each question carries 2 marks.

1. What is the purpose of pole shoe in a pole ?
2. Define commutator.
3. What is coil span ?
4. Define shaft torque.
5. Define commutation.

(5x2=10)

PART—B

(Maximum marks : 30)

II Answer *any five* of the following questions. Each question carries 6 marks.

1. State the methods of improving commutation.
2. Write the conditions for voltage build up of a DC shunt generator.
3. Explain two speed control methods of DC shunt motor.
4. State the properties of carbon.
5. Briefly explain 3 point starter with sketch.
6. Mention the losses occur in a DC shunt motor.
7. Explain the tapped field and parallel field control of DC series motor.

(5x6=30)

PART—C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT – I

- III (a) Explain BH curve of a Ferromagnetic material. 8
- (b) Based on temperature how Insulating materials are classified. 7

OR

- IV (a) Write short notes on :
- (i) Eddy current losses
  - (ii) Hysteresis loss
  - (iii) Diamagnetic material
- (b) What is meant by soft ferrites ?

(4×3=12)

3

## UNIT – II

- V (a) Explain the working of a DC generator. 8
- (b) An 8-pole dc generator has 960 armature conductors and flux/pole of 20mwb. Calculate the generated emf running in 500 rpm.
- (i) When lap-connected
  - (ii) Wave connected

7

OR

- VI (a) Classify generators based on excitation. 8
- (b) A 4-pole long shunt lap connected generator supplies 25 KW at a terminal voltage of 500V. If the armature resistance  $0.03\Omega$ , series field resistance  $0.04\Omega$  and shunt field resistance  $200\Omega$  and brush drop may be taken as 1 volt. Find the generated emf. 7

## UNIT – III

- VII (a) State the effect of armature reaction. 8
- (b) Explain the steps for finding critical resistance from OCC. 7

OR

- VIII (a) Derive armature torque equation for a DC shunt motor. 7
- (b) Describe the need of parallel operation and draw the circuit for connecting two DC shunt generators in parallel. 8

## UNIT – IV

- IX (a) Explain the working of a DC motor. 7
- (b) Write the working of a DOL starter with sketch. 8

OR

- X (a) Explain the necessity of motor starters. 8
- (b) Write the working and construction of permanent magnet DC motor. 7