

**THIRD SEMESTER DIPLOMA EXAMINATION IN ELECTRICAL AND  
ELECTRONICS ENGINEERING—MARCH, 2014**

**DC MACHINES**

[Time : 3 hours

(Maximum marks : 100)

**PART—A**

(Maximum marks : 10)

Marks

- I Answer all questions in one or two sentences. Each question carries 2 marks.
1. Write any two properties of carbon.
  2. List the applications of compound generators.
  3. What is the use of equaliser ?
  4. What is back emf ?
  5. List the advantages of PMDC Motor. (5×2=10)

**PART—B**

(Maximum marks : 30)

- II Answer *any five* of the following questions. Each question carries 6 marks.
1. Describe the insulating materials used in machines.
  2. Compute the condition for maximum efficiency of a dc motor.
  3. Find the voltage equation of dc motor.
  4. Derive the emf equation of a dc generator.
  5. Describe the necessity of starter in dc motors.
  6. Draw the external characteristics of shunt generator.
  7. Describe any two methods of speed control of dc series motors. (5×6=30)

**PART—C**

(Maximum marks : 60)

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

**UNIT—I**

- III (a) What is hysteresis ? Find an equation for hysteresis loss. 8
- (b) State the properties and applications of ferromagnetic materials. 7

OR

	Marks
IV (a) Compare the properties of copper and aluminium.	7
(b) Draw and explain hysteresis loop of magnetic material.	8

## UNIT—II

V (a) Explain the classification of generators according to excitation.	10
(b) A 4 pole long shunt lap wound generator supplies 25 KW at a terminal voltage of 500V. The armature resistance is 0.03 ohm, series field resistance is 0.04 ohm and shunt field resistance is 200 ohm. The brush drop may be taken as 1.0 V. Determine the emf generated.	5

OR

VI (a) Explain the constructional details of dc generator.	8
(b) A short shunt compound generator delivers a load current of 30A at 220V, and has armature, series-field and shunt field resistance of 0.05 ohm, 0.03 ohm and 200 ohm respectively. Calculate the induced emf and armature current. Allow 1.0V per brush for contact drop.	7

## UNIT—III

VII (a) Explain commutation in dc generators.	8
(b) State the conditions for voltage build up of a shunt generator.	7

OR

VIII (a) Draw and explain the OCC of shunt generator.	8
(b) Describe the parallel operation of dc generators.	7

## UNIT—IV

IX (a) Derive the torque equation of dc motor.	8
(b) Explain the method to determine the efficiency of dc shunt motor.	7

OR

X (a) Explain a three point starter with a neat sketch.	7
(b) Explain the construction of permanent magnet dc motor.	8

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