TED (15) — 4031

(REVISION — 2015)

Reg. No...

Signature ....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2017

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.   List two functions of pole shoe in a DC machine.

2.   List two functions of commutator in a DC generator.

3.   Write any two applications of DC compound generator.

4.   State Fleming's rule in connection with DC motor.

5.   List any two applications of DC shunt motor.   (5×2 = 10)

PART — B

(Maximum marks : 30)

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

1.   List the important points regarding simplex lap winding.

2.   Derive the emf equation of a DC generator, and write the emf equation of both lap and wave wounded.

3.   Explain need of compensating winding.

4.   Illustrate open circuit characteristics of shunt generator.

5.   List out the classification of DC motor based on field connection, and give its emf equations.

6.   Derive shaft torque equation of DC motor.

7.   State the advantages and disadvantages of Swinburne's test.   (5×6 = 30)

[40]

[P.T.O.

Marks

PART — C

(Maximum marks : 60)

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

UNIT — I

III (a) A four - pole generator having wave-wound armature winding has 32 slots each contains 20 conductors. What will be the voltage generated in the machine when driven at 1500 rpm assuming the flux per pole to be 7 mWb ? And also calculate the speed for the same generated emf, if the armature is lap wound. 8

(b) Describe the working principle of DC generator. 7

OR

IV (a) Illustrate constructional details of DC generator. 8

(b) List the important points regarding simplex wave winding. 7

UNIT — II

V (a) State .and explain armature reaction. 8

(b) Explain why shunt generator failing to build up of voltage. 7

OR

VI (a) State the methods of improving commutation. 8

(b) Explain the parallel operation and load sharing of shunt generators. 7

UNIT — III

VII (a) Illustrate the methods of speed control of DC shunt motors. 8

(b) A 250V shunt motor runs at 1000rpm at no-load and takes 8A. The total armature and shunt field resistance are respectively 0.2 Ohm and 250 Ohms. Calculate the speed when loaded and taking 50A. Assume the flux to be constant. 7

OR

VIII (a) Draw and explain four point starter. 8

(b) Explain working principle of DC motor. 7

UNIT — IV

IX (a) Describe the direct loading method to determine the efficiency of DC shunt motor with the help of relevant circuit diagram. 8

(b) Describe the construction and working of permanent magnet DC motor. 7

OR

X (a) Illustrate the performance characteristics of shunt motor. 8

(b) Illustrate the electrical characteristics of series motor. 7