TED (15) – 4031

(REVISION — 2015)

Reg. No...

Signature ....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2018

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. State the function of brush of a DC Generator.

2. Define commutation.

3. What is the significance of back e.m.f. in DC motor ?

4. What is the necessity of starters in DC motor ?

5. Write the condition for maximum efficiency of a DC Machine.   (5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. Compare lap and wave windings.

2. What are the requirements of voltage build up in self excited DC Generators.

3. Draw and explain the internal characteristics of a DC shunt generator.

4. Explain the necessity of parallel operation of DC Generators.

5. Derive the Torque equation of a DC Motor.

6. Show the power stages in a DC Machine.

7. List the applications of series, shunt and compound motors.   (5×6 = 30)

Marks

PART — C
(Maximum marks : 60)
(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT — I

III (a) Write the voltage and current equations of different types of generators.   8

(b) The armature of a DC generator has 51 slots each contains 20 conductors. The flux per pole is 0.007Wb. Compute the generated e.m.f. When the speed is 1500 rpm, if the armature is

     (i) Lap connected   (ii) Wave connected   7

OR

IV (a) Briefly explain the working of a DC Generator.   8

(b) A long shunt compound generator delivers a load current of 50A at 500V and has Armature, series and shunt field resistances of 0.05 ohm, 0.03 ohm and 250 ohm respectively. Calculate the generated e.m.f. and armature current. Allow 1 V per brush.   7

UNIT — II

V (a) Explain the OCC of a separately excited DC Generator.   8

(b) Explain different methods of improving commutation.   7

OR

VI (a) Describe the effect of armature reaction with the aid of figures.   8

(b) List the applications of DC Generators.   7

UNIT — III

VII (a) Draw a three point starter with its protective devices.   8

(b) Explain the classification of DC Motors based on the field winding connection to armature with figures.   7

OR

VIII (a) Explain the different methods of speed control of DC Series motor.   8

(b) The armature of a DC shunt motor has a lap winding with 1200 conductors. If the useful flux per pole is 23 mWb, calculate the torque developed in armature in N-M, when the armature current is 50 A.   7

UNIT — IV

IX (a) Draw the electrical and mechanical characteristics of DC shunt motor.   8

(b) What are the advantages and disadvantages of PMDC Motor ?   7

OR

X (a) Explain the Brake Test on a DC motor with diagram.   8

(b) What are the various losses occurring in a DC machine ? Explain.   7

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