

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2019**

**D C 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. What is the function of commutator in d c generator ?
2. Define critical resistance.
3. What back emf ?
4. What are the functions of motor starter ?
5. State any two applications of permanent magnet d c motor. (5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. Derive emf equation of d c generator.
2. Distinguish between lap and wave winding.
3. Explain why shunt generator failing to build up voltage.
4. Explain the factors affecting the speed of a d c motor.
5. Describe the various losses in d c machines.
6. Derive the torque equation of d c motor from the fundamentals.
7. State the advantages and disadvantages of Swinburn's test. (5×6 = 30)

PART — C

(Maximum marks : 60)

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

UNIT — I

- III (a) Describe the working of single loop d c generator with relevant waveforms. 8
- (b) A 4 pole, lap wound, d c shunt generator has a useful flux per pole of 0.07 wb, the armature winding consists of 220 turns each of 0.004 ohm resistance. Calculate the terminal voltage when running at 900 rpm, if the armature current is 50 A. 7

OR

	Marks
IV (a) Describe with neat sketch the constructional details of d c generator.	8
(b) A 4 pole d c shunt generator with a shunt field resistance of 100 ohm and resistance of 1 ohm has 378 wave connected conductors in its armature. The flux per pole is 0.02 wb. If load resistance of 10 ohm is connected across the armature terminal and the generator is driven at 1000rpm, calculate the power dissipated in the load.	7
UNIT — II	
V (a) State and explain armature reaction with suitable diagrams.	9
(b) Draw and explain the load characteristics of d c shunt generator.	6
OR	
VI (a) Describe the different methods for improving commutation.	8
(b) Explain with neat sketch parallel operation of d c shunt generator.	7
UNIT — III	
VII (a) Explain with diagrams the classification of d c motor based on field connection.	8
(b) Explain with neat sketch the construction and working of four-point starter.	7
OR	
VIII (a) Explain with diagrams the different methods of speed control of d c shunt motor.	8
(b) A 250 V, 4 pole, wave wound d c series motor has 782 conductors on its armature. It has armature and series field resistance of 0.75 ohm. The motor takes a current of 40 A. Estimate the speed and gross torque developed, if the flux per pole is 25mWb. Assuming that the armature current is constant and equal to 25 A.	7
UNIT — IV	
IX (a) Draw and explain performance characteristics of d c shunt motor.	7
(b) Describe the construction and working of permanent magnet d c motor.	8
OR	
X (a) Draw and explain the electrical characteristics of d c series motor.	6
(b) A 200V, DC shunt motor develops an output of 17.158 Kw when taking 20.2 Kw. The field resistance is 50 ohm and armature resistance 0.06 ohm. What is the efficiency and Power input when the output is 7.46 Kw ?	9