

THIRD SEMESTER DIPLOMA EXAMINATION IN ELECTRICAL AND
ELECTRONICS ENGINEERING—MARCH, 2012

DC MACHINES

[Time : 3 hours

(Maximum marks : 100)

PART—A

Marks

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

1. Define B-H curve.
2. What purpose is served by the pole shoe in a d.c. generator?
3. Define critical resistance of a d.c. shunt generator.
4. Define back e.m.f. in d.c. motor.
5. If the load is removed from a d.c. series motor in operation, what will happen?
(5×2=10)

PART—B

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

1. Classify magnetic materials and state the properties and application of ferro magnetic material.
2. Compare the properties of copper and aluminium as a conducting material.
3. Derive the e.m.f. equation of a d.c. generator.
4. Describe the methods of improving commutation by using interpole.
5. State the necessity of equalizer connections used in armature winding of d.c. generator.
6. State the advantages and disadvantages of swinburne's test.
7. Explain electrical and mechanical characteristics curves of d.c. shunt motor.
(5×6=30)

PART—C

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

UNIT—I

- | | |
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| III 1. State factors affecting dielectric strength. | 6 |
| 2. Classify the materials based on energy level concept. | 6 |
| 3. State the electrical properties of insulators. | 3 |

OR

	Marks
IV 1. Explain electrical properties of conducting materials.	6
2. State the properties of soft magnetic materials.	6
3. Define dielectric strength.	3

UNIT—II

V 1. Explain with neat sketch the constructional details of d.c. generators and state the function of each part.	10
2. A 4-pole lap wound d.c. shunt generator has a useful flux per pole of 0.07 weber. The armature winding consists of 220 turns each of 0.004 Ω resistance. Calculate the terminal voltage when running at 900 r.p.m., if the armature current is 50A.	5

OR

VI 1. Give the classification of d.c. generators according to the field excitation and draw the connection diagram for each type.	8
2. Compare lap and wave windings for armature.	4
3. Distinguish between terminal voltage and induced e.m.f.	3

UNIT—III

VII 1. Explain with neat sketch effect of armature reaction on the main field and armature field.	8
2. Why parallel operation of d.c. generators is necessary?	4
3. State the application of cumulative compound generator.	3

OR

VIII 1. Explain with neat sketch external characteristics of a d.c. shunt generator.	6
2. Mention the various causes for the failure of the d.c. shunt generator to build up of voltage.	6
3. What is geometrical neutral axis and magnetic neutral axis?	3

UNIT—IV

IX 1. Derive the torque equation of d.c. shunt motor.	6
2. Explain with sketch the methods of speed control of d.c. shunt motor.	6
3. List the application of d.c. series motor.	3

OR

X 1. State the necessity for a starter in d.c. motor.	3
2. Explain with neat sketch the working of a three point starter.	8
3. A d.c. motor takes an armature current of 110 A at 480 V. The armature circuit resistance is 0.2 Ω . The machine has 6-pole and the armature is lap connected with 864 conductors. The flux per pole is 0.05 weber. Calculate :	
(a) the speed	
(b) the gross torque developed by the armature.	4