

THIRD SEMESTER DIPLOMA EXAMINATION IN ELECTRICAL AND ELECTRONICS
ENGINEERING, OCTOBER 2011
DC MACHINES

Time: 3 Hrs.

Max. Marks: 100

PART - A

(Answer in one or two sentences. Each question carry 2 marks)

- I. 1) State any two advantages of grain oriented sheet steel.
 2) State working principle of DC Generator.
 3) List any two specific applications of dc shunt generator.
 4) Write voltage equation of a dc shunt motor.
 5) List any two applications of permanent magnet dc motor. (5x 2= 10 marks)

PART B

(Answer any five questions. Each question carry 6 marks.)

- II. Compare the properties of Copper and Aluminium.
 III. list out the insulating materials used in electrical machines and specify main properties.
 IV. Briefly explain classification of DC Generators according field excitation with neat sketch.
 V. Explain the methods of improving commutation.
 VI. State necessity of parallel operation of DC Generator.
 VII. Derive the torque equation of a DC Motor.
 VIII. A lap wound DC Machine running at 1000 rpm has 6 poles, 100 armature conductors. The flux per pole is 0.015 Wb. Calculate emf. (5 x 6 = 30 marks)

PART C**UNIT I**

- IX. a) Define Hysteresis loss. 3
 b) With neat sketch, Explain Hysteresis loop. 10
 c) List methods to reduce Hysteresis loss. 2

OR

- X. a) Define: 1) Residual magnetism. 2) Retentivity. 3) Coercive force. 6
 b) List four important properties of Carbon. 2
 c) Explain Eddy current loss and state factors affecting eddy current loss. 7

UNIT II

- XI. a) Derive emf equation of DC Generator. 6
 b) Explain the functions of commutator in dc machines. 4
 c) A six pole lap wound dc generator has 600 conductors on its armature. The flux per pole is 0.02 Wb. Calculate : i) the speed at which the generator must be run to generate 300V. ii) What would be the speed if the generator were Wave wound ?. 5

OR

- XII. a) Explain with neat sketch the constructional details of dc machine. 12

b) Compare LAP and WAVE Winding.

3

UNIT III

- XIII. a) Draw and Explain Open Circuit Characteristics DC Shunt generator. 6
b) List out the reasons of failure to build up voltage in DC Shunt generator. 6

c) List three applications of Cumulative Compound generator. 3

OR

- XIV. a) Explain with sketch external characteristics of DC Shunt generator. 10
b) What are the effects of Armature reaction? 5

UNIT IV

- XV. a) State the necessity of starters for starting DC Motors. 5
b) Explain with the neat sketch 3 point starter. 10

OR

- XVI. a) State the losses in a DC machine. 4
b) State the advantages and Disadvantages of Swinburne's test. 4
c) A 400 V DC Motor running at 1200 rpm ,takes an armature current of 32.8 A. The armature resistance is 0.5 ohm. If the load torque is increases by 25 % and the flux increases by 10 % ,Find :i) Armature current. ii) Speed and iii) Output of the machine. Neglect iron and frictional losses. 7

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