Code: 13A02301 **R13**

B.Tech II Year I Semester (R13) Supplementary Examinations June 2016

ELECTRICAL MACHINES – I

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Express magnetic stored energy in terms of B and H.
(b) Write any four advantages of field energy method.
(c) Write any four differences between lap winding and wave winding.
(d) What are the various methods of improving commutation?
(e) Draw the load characteristics of D.C shunt generator.
(f) Give the necessity of parallel operation of generators.
(g) What is the significance of back e.m.f?
(h) What is the necessity of starter?
(i) What are the constant losses and variable losses?
(j) Write any two advantages and two disadvantages of Brake test.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 Explain energy conversion via electric field by considering following:
(a) Electric field energy stored.
(b) Analysis of energy conversion.
(c) Co-energy calculations.

OR

3 Explain about types of magnetic systems.

UNIT – II

4 Explain principle of operation of D.C generator with a neat diagram.

OR

5 (a) Define lap winding and wave winding.
(b) In a D.C generator fluxes are directly proportional to 1.2 times field current. The generator is working at a speed of 200 r.p.m. and flux per pole is 30 mWb. If the generator is lap wounded with 600 conductors in series, find the e.m.f generated. If the winding is wave wound, find the change in excitation current to obtain the same voltage as above. Number of poles in machine are 6.

UNIT – III

6 Classify the generators on the basis of excitation and give their e.m.f equations.

OR

7 Draw and explain the load characteristics of D.C shunt generator.

UNIT – IV

8 A D.C. series motor is running with a speed of 800 r.pm. While taking a current of 20 A from supply. If the load is changed such that the current drawn by the motor is increased to 50 A, calculate the speed of motor on new load. The armature and series field winding resistance are 0.2 Ω and 0.3 Ω respectively. Assume the flux produced is proportional to the current. Assume supply voltage as 250 V.

OR

9 (a) Derive expression for power equation of a D.C motor.
(b) Derive the torque equation of a D.C motor.

UNIT – V

10 (a) Derive the condition for maximum efficiency in a D.C machines.
(b) Explain about various losses in D.C machines.

OR

11 Explain about the following methods of testing of D.C machines:
(a) Swinburne's test.
(b) Field's test.

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