

B.Tech II Year I Semester (R13) Supplementary Examinations November/December 2016

ELECTRICAL MACHINES – I
(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- What is meant by statically and dynamically induced e.m.f?
 - Write the expression for self-Inductance.
 - What do you mean by commutation?
 - Define back e.m.f.
 - Give the applications of DC shunt generators.
 - What is the principle of operation of DC motor?
 - What are the factors that govern controlling of motor speed?
 - Write down the EMF equation of a single phase transformer.
 - What is retardation test?
 - Mention various types of losses in dc machines.

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

UNIT – I

- 2 Explain briefly about singly-excited and doubly-excited systems with suitable examples.

OR

- 3 Explain in detail about electro mechanical energy conversion process.

UNIT – II

- 4 Derive the E.M.F. equation in a dc machine.

OR

- 5 A shunt generator delivers 195 A at terminal voltage of 250 V. The armature resistance and shunt field resistance are 0.02 ohms and 50 ohms respectively. The iron and copper losses are equal to 950 W. Find: (a) E.M.F generated. (b) Cu losses. (c) Output of the prime mover. (d) Commercial, mechanical and electrical efficiencies.

UNIT – III

- 6 Explain briefly about the no load and the open circuit characteristics of a separately excited generator.

OR

- 7 Define the critical speed and critical resistance. Explain how these are determined from OCC of the DC shunt generator.

UNIT – IV

- 8 What is meant by armature reaction? Show that the effect of armature mmf on the main field is entirely cross-magnetizing.

OR

- 9 For OCC, A shunt DC motor has $E = 235 V$, $V_t = 250 V$ and $I_f = 1.35 A$. The motor is operating at 1200 rpm while supplying 25 HP to a coupled mechanical load. At the point of operation, the rotational losses are 550 W.

- Determine the value of developed torque.
- Calculate the value of armature current.
- Find the value of armature resistance.
- Determine the value of efficiency at the point of operation.

UNIT – V

- 10 Explain in detail about the working of Hopkinson's test with necessary calculations.

OR

- 11 Explain the Direct method of testing and Brake test in a dc machine.
