Assignment -4

Module V: Electrical Machines

1. Derive the condition for maximum efficiency in a transformer

2. A11000/230 V,150 KVA ,1-phase ,50 Hz transformer has core loss of 1.4kW and Full Load copper loss of 1.6 Kw .determine (i) The kVA load for maximum efficiency and the value of maximum efficiency at unity p.f (ii) The efficiency at half F.L 0.8 pf leading

3. The Emf per turn of a single phase, 6.6kV/440V, 50 Hz transformer is approximately 12V. Calculate the number of turns in the HV and LV windings and the net cross sectional area of the core for a maximum flux density of 1.5T.

4. Explain the principle of operation of a DC motor.

5. Draw and explain the mechanical characteristics of DC series and shunt motor.

6. Derive an expression for the torque developed in a DC machine.

7. Explain in detail about different methods of excitation.

8. A 6-pole DC generator has 150 slots. Each slots has 8 conductors and each conductor has resistance of 0.01Ω.The armature terminal current is 15 A. Calculate the current per conductor and the drop in armature for Lap and Wave winding connections.

9. Write notes on the Self and separately excited DC generators.

10. A 500V dc shunt motor running at 700 rpm takes an armature current of 50A.Its effective armature resistance is 0.4Ω. What resistance must be placed in series with the armature to reduce the speed to 600 rpm, the torque remaining constant?