Exam. Code: 0933
Sub. Code: 33742

2076

B.E. (Electrical and Electronics Engineering)

Third Semester

PC-EE-302: Electric Machinery - I

Time allowed: 3 Hours Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.

x-x-x

1. (a) Write the significance and condition for Hopkinson's test.
   (b) Draw the internal and external load characteristics of a DC shunt generator.
   (c) Why induction motor draws high current at starting?
   (d) Why is the equivalent resistance of a transformer referred to the primary side?
   (e) Define armature reaction in dc generator. (5x2)

UNIT - I

2. (a) Explain the load characteristics of shunt generator.
   (b) A 25 kVA, 250 dc shunt generator has armature and field resistance of 0.06 and 125 respectively. Calculate the total power developed by the armature when it delivers at full load output. (2x5)

3. (a) Drive the induced EMF equation of transformer.
   (b) A 10 kVA single-phase transformer provides a no-load secondary voltage of 110 volts. If the equivalent secondary winding resistance is 0.015Ω and its total resistance is 0.04 Ω, determine its voltage regulation when supplying a load at 0.85 power factor lagging. (3,7)

4. (a) Explain the field controlled D.C. series motor. What are its advantages?
   (b) A D.C. Series motor operates at 800 RPM with a line current of 100A from 230V mains. Its armature circuit resistance is 0.15 Ω and its field resistance 0.1Ω. Find the speed at which the motor runs at a line current of 25A, assuming that the flux at this current is 45 percent of flux at 100A. (2x5)

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UNIT - II

5. (a) Derive and explain rotating magnetic field in a three-phase induction motor.

   (b) Obtain the relation between rotor input, rotor copper losses and rotor output in terms of slip. (2x5)

6. The power input to the rotor of a 400V, 50Hz, 6-pole, 3-phase induction motor is 75kW. The rotor electromotive force is observed to make 100 complete alterations per minutes. Calculate (i) slip (ii) rotor speed (iii) rotor copper losses per phase (iv) mechanical power developed. (10)

7. (a) Explain the procedure of conducting No-load test and blocked rotor test on three-phase induction motor.

   (b) A three-phase induction motor has 2 poles and is connected to 400V, 50Hz supply. Calculate the actual rotor speed and rotor frequency when the slip is 4%. (2x5)

x-x-x