Lib

P4/RT-Ex-07-393

Con. 2365–07.

[REVISED COURSE]

ND–8300

(3 Hours)

[Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory**.
  (2) Attempt any **four** of remaining.
  (3) Assume **necessary** data if **required** and **justify** the same.

1. (a) Explain with the help of neat diagram, four point starter in details. State advantages of four point starter over three point starter. **10**

  (b) Explain mechanical forces developed in large transformers. **10**

2. (a) Explain excitation phenomenon in transformers **10**

  (b) Explain phenomenon of oscillating neutral with suitable phasor diagram. **10**

3. (a) A 200V dc series motor runs at 1000 rpm takes 20A, combine resist of arm. and series field is 0.4 Ω calculate resist to be inserted so as to reduce the speed to 800 rpm assuming torque proportional to the square of speed and linear magnetisation curve. **10**

  (b) Explain armature reaction in DC machines. **10**

4. (a) Starting from energy balance equation, obtain expression for electromagnetic torque for doubly excited system in terms of angular rates of change of self and mutual inductances of stator and rotor windings. **10**

  (b) Hopkinson test on two shunt machines gave following results Line voltage 250V, line current excluding field currents 50A, motor arm. current 380A, field currents 5A and 4.2 A. Calculate efficiency of each machine if arm.resist of each machine is 0.02 Ω. **10**

5. (a) Explain working of interpoles and compensating wdg used in DC machine. **10**

  (b) A 230V dc shunt motor takes an arm. current of 3 : 33A at rated voltage and at a no load speed of 1000 rpm. The resist of arm. current and field circuit are 0.3 Ω and 160 Ω resp. The line current at full load and rated voltage is 40 A. Calculate at full load, speed and developed torque in case the armature reaction weakens the no-load flux by 4%. **10**

6. (a) With the help of neat diagram, explain how back to back test is conducted on transformers. **10**

  (b) Two three phase transformers, rated at 500 KVA and 450 KVA resp., are connected in parallel **10** to supply a load of 1000 KVA at 0.8 pf lag. The per phase resist and per phase leakage reactance of the 1st transformer are 2.5% and 6% resp. and of second transformer 1.6% and 7% resp. Calculate the KVA load and power factor at which each transformer operates.

7. Write short notes on :– **20**
  (a) Characteristics of dc series motor.
  (b) Energy saving of copper in autotransformer
  (c) SCOH connection in transformers.