[3 Hours]   [Total Marks : 80]

N.B : 1. Question no. 1 is compulsory.
      2. Attempt any three from remaining question.
      3. Figures to the right indicate full marks.

1. Attempt any **four** questions.
   (a) Explain the Electrochemical energy convesion ?   5
   (b) What are the advantages of Hopkinson's test ?   5
   (c) Explain the core losses in transformer.   5
   (d) Draw the characteristics of D.C. shunt motor.   5
   (e) What is the role of commutator in D.C. machine ?   5

2. (a) With the help of phasor diagram derive the equation to obtain voltage regulation   10
       in single phase transformer.
   (b) Derive the expression for torque developed in singly excited magnetic field.   10

3. (a) 700 kVA single phase transformer with 0·12 p.u. resistance and 0·06 p.u. reactance   10
       is connected in parallel with 350kVA transformer with 0·014 p.u. resistance and
       0·045pu reactance to share a load of 850 KVA at 0·7 p.f. lagging. If transformer
       are having common voltage ratio, calculate load shared by each of them.
   (b) Explain all day efficiency of transformer.   10

4. (a) What are the different methods of Electrical braking.   10
   (b) Hopkinonsons test of two identical shunt machines gave following results.   10
       Input voltage = 400V, Input current = 10A, output current of generator = 100A,
       field currents are 3A and 4A. Armature resistance of each machine = 0·06 find the
       efficiency of motor and generator

5. (a) 5KVA, 200/600 V, 50 Hz single phase transformer gave following test result.   10
       O.C. test : 200V, 0·9 A, 60W (L.V.)
       S.C. test : 10V, 6A, 22W (H.V)
       Calculate (i) Efficency and voltage regulation and full load 0·8. (ii) Efficiency at
       25% load at unit p.f.
   (b) Draw what is the ned of starter ? Explain 3 point starter.   10

6. Write the short note on
   (a) Speed control of D.C. shunt motor.   10
   (b) Doubly excited magnetic field.   10

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