QP Code : 1442

(3 Hours)   [Total Marks : 100

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

1. (a) Explain the different losses in transformer & measures to minimise them.   5
   (b) Derive torque equation for dc motar.   5
   (c) Explain transformer is a constant flux machine.   5
   (d) Explain necessity of starter in dc motor.   5

2. (a) Explain armature reaction in dc machine.   10
   (b) Draw & explain characteristics of dc series motor.   10

3. (a) Derive an expression for torque developed in doubly excited machine.   10
   (b) Explain saving of copper in autotransformer.   10

4. (a) A dc series motor runs at 800 rpm with a line circuit of 100A from 230V   10
       mains. Its armature circuit resistance is 0.15Ω & its series field resistance is
       $0.1\ \Omega$. Find the speed when motor takes 25 A from mains. Assume drop in he
       flux is 45% that of flux at 100A.
   (b) Explain field test on dc series motor.   10

5. (a) Explain back to back test on transformers.   10
   (b) The Hopkinson's test on two indentical shunt machines gave following results   10
           Input Voltage = 500V   Input current = 15A
           Output current of Generator = 120 A
           Field current of generator = 4 A
           Field current of motor = 3A
           Armature resistance of each machine = 0.06Ω
           Find efficiency of both the machines.

6. (a) Explain open circuit & short circuit tests on single phase transformer.   10
   (b) Two single phase transformer A & B rated at 600 KVA & 500 KVA respectively,   10
       are operated in parallel to supply a load of 1000 KVA at 0.8 pf lag. The resistance
       & reactance of transformer. A are 3% & 6.5% while of transformer B are 1.5 &
       8% . Calculate KVA loading & power factor at which each transformer operates.

7. (a) Explain construction & working of 4 point starter. State its advantages over 3   10
       point starter.
   (b) Explain swinburne's test on dc machine.   10

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