SE - sem IV - CBGS - Electrical

EM - I

4/12/15

QP Code : **5392**

(3 Hours) **[Total Marks : 140**

N.B.: (1) **Question no. 1** is compulsory
(2) Attempt any THREE from the remaining questions.
(3) Figures to right indicate full marks.

1. a) Why the shaft torque is less than a gross torque, in case of DC motor? **5**
   b) In armature control method for DC shunt motor, why we always obtain speed variation below the rated speed. **5**
   c) Derive the Emf equation of single phase transformer and hence prove that induced Emf lags the magnetizing flux by 90 degree. **5**
   d) What are the necessities for parallel operation of single phase transformers? **5**

2. a) Which are the different losses in DC machine and hence explain the power stages in DC motor. **5**
   b) What is energy balance equation and hence derive an expression for torque developed in singly excited magnetic field. **5**

3. a) Derive an expression for Demagnetizing ampere turns per pole (ATd/pole) and Cross-magnetizing ampere turns per pole (ATc/pole). **10**
   b) A starter is required for 220 V DC shunt motor. The maximum allowable armature current is 55A and minimum current is 35 A. Find the number of sections of starter resistance required and resistance of each section. The armature resistance of motor is 0.4 Ω . **10**

4. a) What is commutation and hence explain the commutation process of DC machine. List the methods to improve the commutation. **10**
   b) Two single phase transformers, rated at 600KVA and 500 KVA respectively, are connected in parallel to supply a load of 1000 KVA at 0.8 pf lagging. The resistance and leakage reactance of first transformer are 3% and 6.5% respectively and the second transformer1.5% and 8% respectively. Calculate the KVA load and power factor at which each transformer operates. **10**

[TURN OVER

5. a) The Hopkinson's test on two similar DC shunt machines gave the following reading at foil load. Line voltage: 230 V; Armature currents: 37A, 30A; Field currents:0.85A, 0.8A. Calculate the efficiency of both the machines if the armature resistance of each machine is 0.33Ω . 10

b) Find the all day efficiency of a transformer having maximum efficiency 98% at 15 KVA at unity power factor and loaded as follows. 10
For 12 hours, 2KWat 0.5 p.f. lagging,
For 6 hours, 12KW at 0.8 p.f. lagging,
For 6 hours, at no load.

6. a) Write short notes on 10
i) Copper saving in Auto Transformer.
ii) Doubly excited magnetic field

Course: S.E. (SEM. IV) (REV-2012) (CBSGS) (ELECTRICAL ENGG.) (Prog-T1224)

QP Code: 5392

Correction:

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1. TOTAL MARKS 80

2. QUESTION NO 2 a marks 10

3. QUESTION NO. 2 b marks 10

4. QUESTION NO 6 Total marks 20

Query Update time: 04/12/2015 03:59 PM