M 26857

Reg. No. : .....

Name : .....

VIII Semester B.Tech. Degree (Reg./Supp. – Including Part Time) Examination, April 2015
(2007 Admn. Onwards)
PT2K6/2K6 EE 803 : ELECTRICAL MACHINE DESIGN

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions*

PART – A

I. a) Define specific magnetic loading. **5**

b) Derive expression for eddy current loss in the armature core of a 4 pole machine. **5**

c) Define window space factor. **5**

d) Derive the condition for maximum efficiency. **5**

e) Define short circuit ratio. **5**

f) Comment on the shape of pole face for sinusoidal flux distribution. **5**

g) Discuss about different shapes of rotor slots for Induction machines. **5**

h) Explain harmonic synchronous torques. **5**

(8×5=40)

PART – B

II. a) Derive the expression for output equation of a DC machine. **15**

OR

b) Explain the calculation of reactance voltage. Derive Pitchel Mayer's equation. **15**

P.T.O.

III. a) Derive the output equation of a transformer. **15**

OR

b) Explain the stepped core design of transformers. **15**

IV. a) Determine a suitable number of slots and conductor per slot for the stator winding of a 3 phase 3300 V, 50 Hz, 300 rpm alternator. The diameter is 2.3 m and the axial length of core is 0.35 m. The maximum flux density in the air gap should be approximately 0.9 wb/ m^2. Assume sinusoidal flux distribution. Use single layer winding and star connection for the stator. **15**

OR

b) Describe the design of Damper winding. **15**

V. a) Find the main dimensions of a 15 kw, 3 phase, 400 V, 50 Hz, 2810 rpm squirrel cage induction motor having an efficiency of 0.88 and a full load power factor of 0.9. Assume :

Specific magnetic loading = 0.5 wb/m^2
Specific electric loading = 25000 A/m.
Take the rotor peripheral speed approximately 20 m/s at synchronous speed. **15**

OR

b) Discuss the effect of skewing in Induction motor. **15**

(15×4=60)