4E2111

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B.Tech. IInd Year IVth Semester Examination, June - 2010

Electrical Engineering

4EE3 Electrical Machines - II

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt overall **five questions** selecting **one question** from **each unit**. All questions carry **equal marks**.*

Unit - I

1. a) Define and express the distribution factor, pitch factor, winding factor. **(8)**

b) Discuss the production of rotating magnetic field in three phase induction motor. **(8)**

OR

a) Drive general equation of induced emf and explain the effects of harmonic on induced voltage. **(8)**

b) A 10 KW, 400 Volt three phase Induction motor has full load efficiency of 0.87, and power factor of 0.85, at standstill and at rated voltage motor draws 5 times its full load current and develops a starting torque of 1.5 times its full load torque. An auto transformer is install to reduce the starting current and to give full load torque at starting. Neglecting existing current of auto transformer, determine at the time of starting find the voltage applied to the motor terminals. **(8)**

Unit - II

2. a) Neglecting stator impedance, so that torque T at slip, S, can be expressed as

OR

a) Determine the efficiency and power factor of induction motor by the circle diagram. **(8)**

b) Three phase 50 Hz 8-pole induction motor has full load slip of 2% the rotor resistance and standstill rotor reactance per phase are 0.001 and 0.005 ohm respectively find the ratio of full load torque and the speed at which maximum torque occurs. **(8)**

Unit - III

3. a) How a single phase induction motor can be made self started, explain any two methods. **(8)**

b) Explain the double revolving field theory. **(8)**

OR

a) Write in brief the speed control methods of induction motor and discuss in detail cascade speed control method. **(8)**

b) Different starting methods of induction motor, and explain star - delta method in detail. **(8)**

Unit - IV

4. a) Describe the various conditions of synchronization of alternators and explain three lamp method of synchronization of two alternators. **(8)**

b) Define and explain the armature reaction, its bad effects on synchronous generator. **(8)**

OR

a) Write various voltage regulation methods and explain Potier triangle method of voltage regulation of synchronous generator. **(8)**

b) A three phase star connected synchronous generator supply current of 10 amp. Having phase angle of 20 degree lagging at 400 volt find the load angle and the components of armature current Id and Iq. If Xd = 10 ohm and Xq = 6.5 ohm assume arm. Resistance to be negligible. **(8)**

Unit - V

5. a) Synchronous motor does not have starting torque. Why? Explain the starting methods of synchronous motor. **(8)**

b) Explain the effect of excitation on armature current and power factor. **(8)**

OR