(c) A 3 phase induction motor has a staring torque of 100% and a max torque of 200% of the full load torque determine :

(i) Slip at which maximum torque occurs

(ii) Full load slip

(iii) Rotor current at starting in per unit of full load rotor current.

—x—

Printed Pages : 4

*1326 *

400

EIC-602

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 132603

Roll No.

B.Tech. (Sem.VI) Even Semester

SPL. THEORY EXAMINATION, 2014-15

ELECTRICAL MACHINES

Time : 2 Hours] *[Total Marks : 50*

Note: Attempt all questions. All questions carry equal marks.

1. Attempt any two parts of the following : 7x2=14

(a) From the construction point of view, enumerate the common essential features of rotating electrical machine. Give also the basic characteristics of rotating electrical machine.

(b) A 3-phase pole, star connected synchronous generator revolves at 1000 rpm. The stator has 90 slots and 8 conductors per slot. The flux per pole is 0.05 Wb. Calculate the voltage generated, if the winding factor is 0.96.

(c) Draw the speed torque characteristics, giving examples with justification, of the following types of loads :

(i) Constant Power

(ii) Torque directly proportional to speed

2. Attempt any two parts of the following : 6x2=12

(a) Discuss the magneto motive force method of determining the voltage regulation of an alternator.

(b) Explain the process of commutation in a dc machine and describe the methods to improve it. A dc shunt machine, connected to 250V supply has an armature resistance (including brushes) of $0.12\,\Omega$ and the resistance of the field circuit is $100\,\Omega$. Find the ratio of the speed as a generator to the speed as a motor, the line current in each case being 80A.

(c) Describe the working principle of (a) split phase (b) Capacitor - start single phase induction motor with the help of neat sketch.

3. Attempt any two parts of the following : 6x2=12

(a) Define armature reaction. How it affects the main field under unity, 90 lagging and 90 leading power factor conditions. Explain with the help of suitable diagram.

(b) Explain the hunting in a synchronous machine. Discuss causes of hunting. What the purpose of damper winding in synchronous machine?

(c) A 3 phase synchronous motor of 8000 W at 1100 V has synchronous reactance of $8\,\Omega$ per phase. Find the minimum current and the corresponding induced emf for full load condition. The efficiency of the machine is 0.8 neglect armature resistance.

4. Attempt any two parts of the following : 6x2=12

(a) Using double revolving field theory, explain why a single phase induction motors is not self starting.

(b) Describe with construction diagram the working of the following starters:

(i) Direct on-line starter

(ii) Auto transfer starter

(iii) Star delta starter