Total number of printed pages – 7 **B. Tech**

CPEE 5304

Sixth Semester Examination – 2008

ELECTRICAL MACHINES – II

Full Marks – 70

Time : 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2 ×10

   (i) What are the advantages of short-pitch coil in the armature winding in an ac machine ?

   (ii) A full-pitched coil of Ni ampere-turns placed in the stator slots. What is the peak amplitude of the fundamental mmf wave ?

   (iii) From the stator of an induction motor what frequency of rotor currents would you observe ?

   (iv) A synchronous motor is floating on infinite mains at no load. If its excitation is now increased, what is going to happen ?

   (v) For controlling the speed of an induction motor the frequency of the supply is increased by 10%. For maximum torque to remain constant what you will do ?

   (vi) Why block rotor test is done in an induction motor ?

   (vii) The power input to an induction motor is 40 kW when it is running at 5% slip. The stator resistance and core loss are assumed negligible. What is the magnitude of torque developed in synchronous watt ?

(viii) A single phase self-starting motor has two stator winding placed at what electrical degree apart and what kind of supply is given ?

(ix) Where is the Delta-Delta connection applied ?

(x) Two 3 limb, 3-phase delta-star connected transformers are supplied from the same source. One of the transformers is Dy1 and the other is Dy11 connection. What would be the phase difference of the corresponding phase voltage of the secondaries ?

2. (a) Explain how the Potier triangle can be drawn with the help of OCC and any points on the zpfc. 4

(b) Explain the method of determining the voltage regulation by Potier triangle method. 4

(c) How it is different than other methods ? 2

3. (a) In an alternator, a lagging current has the effect of weakening the main field, but in a synchronous motor, the effect of lagging current is to strengthen the main field. Explain. 5

(b) An alternator connected to an infinite bus, is supplying some power. For constant power input from the primemover, if the field current is increased, explain what happens to the load angle. Will the rotor move towards the resultant air-gap mmf or away from it ? 5

4. (a) From the equivalent circuit of a cylindrical rotor alternator, derive an expression for its power input and power output. 5

(b) A 3-phase star connected alternator has synchronous impedance of $1 + j\,10\ \Omega$ per phase. It is operating at a constant voltage of 6.6 kV and its field current is adjusted