Roll No.

24225

B. Tech. 5th Semester (EE) (Common with Special Chance) Examination – December, 2019

ELECTRICAL MACHINES-II

Paper : EE-311-F

Time : Three Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. **1** is ***compulsory***. Attempt any ***one*** question from each Section.

1. (a) State difference between squirrel cage and slip ring induction motor. 4

   (b) Explain cogging and crawling phenomenon. 4

   (c) Why synchronous motor is not self-starting ? 4

   (d) List out the methods used to improve power factor in induction motor. 4

(e) Why almost all large size synchronous machines are constructed with rotating field system type ? 4

SECTION – A

2. How Induction motor act as a generalized transformer ? Explain equivalent circuit of induction motor and derive power balance equation from these circuits. 20

3. (a) Explain rotor resistance control and stator frequency control method of speed control for induction motor. 10

   (b) Derive an equation for the torque developed in an induction motor. 10

SECTION – B

4. (a) Explain double -field revolving theory of single-phase Induction motor. 10

   (b) Draw and explain equivalent circuit of Induction motor with and without core losses. 10

5. Why single phase induction motor is not self-starting while three-phase IM is self-starting ? Describe starting methods used for single-phase IM. 20

SECTION – C

6. (a) Define voltage regulation of an alternator. Describe synchronous impedance method of determining regulation of an alternator. 10

   (b) A 4-pole, 50 Hz, star connected alternator has 15 slots per pole and each slot has 10 conductors. All the conductors of each phase are connected in series and the winding factor being 0.95. When running on no-load for a certain flux-per-pole, the terminal e.m.f. was 1825 volt. If the winding are lap-connected as in d.c. machine, what would be the e.m.f. between the brushes for the same speed and the same flux/pole ? Assume sinusoidal distribution of flux. 10

7. (a) Define pitch factor and distribution factor. What is the effect of harmonics on these factors ? 10

   (b) What are the conditions that must be satisfied for parallel operation of Alternators ? Derive voltage and current equations for parallel operation of 2 alternators. 10

SECTION – D

8. Explain detailed effect of excitation on armature current and power factor in case of synchronous motor. 20

9. (a) What are the methods of starting available for synchronous motor ? Also describe procedure adopted for the same. 10

   (b) Describe applications of synchronous motor in detail. 10