

4E1226

Roll No. _____

Total No of Pages: **3****4E1226****B. Tech. IV - Sem. (Main) Exam., May - 2019****PCC Electrical Engineering****4EE4 - 05 Electrical Machine - II****EE, EX****Time: 3 Hours****Maximum Marks: 120****Instructions to Candidates:**

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL2. NIL**PART - A****(Answer should be given up to 25 words only)****[10×2=20]****All questions are compulsory**

- Q.1 What is meant by distribution factor and pitch factor? [2]
- Q.2 Explain armature and field mmfs in AC machines. [2]
- Q.3 Show that three phase current in a three phase winding always produce a rotating magnetic field. [2]
- Q.4 State the operating conditions of the motor when the slip is either positive, greater than one or negative. [2]
- Q.5 Explain why rotor of an induction motor can never attain synchronous speed? [2]
- Q.6 Write short note on "Rotor resistance control". [2]

- Q.7 Explain that the starting torque of a single phase induction motor is zero. [2]
- Q.8 Why single phase induction motor is not self starting? [2]
- Q.9 Define armature reaction, its bad effects on synchronous generator. [2]
- Q.10 What is synchronizing of alternator? Write various methods of synchronizing. [2]

PART - B

(Analytical/Problem solving questions)

[5×8 = 40]

Attempt any five questions

- Q.1 Explain how in a synchronous motor by changing the field excitation it is possible to operate the motor from lagging to leading power factor while keeping speed constant. [8]
- ✓ Q.2 Describe with neat sketches the construction and principle of operation of a three phase induction motor. Why rotor of an induction motor can never attain synchronous speed. [8]
- ✓ Q.3 Explain in detail why a single phase induction motor is not self starting? Explain its operation based on double revolving field theory. [4+4 = 8]
- Q.4 Explain by help of neat diagram about cascade connection in induction motor. [8]
- Q.5 Explain zero power factor characteristics and concept of Potier Triangle Method of voltage regulation of synchronous generator. [8]
- Q.6 Explain 'V' and inverted 'V' curves for synchronous motor. [8]
- ✓ Q.7 Explain mmf generation in distributed winding with the help of suitable diagrams and waveforms. [8]

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) [4×15=60]

Attempt any four questions

- ✓ Q.1 (a) Draw the torque slip characteristic of 3 phase induction motor and show with suitable derivation that maximum torque is independent of rotor resistance. [10]
- (b) A 8-pole, 50Hz, 3-phase induction motor develops a maximum torque of 150 N-m at 650 rpm. The rotor resistance is 0.6Ω / phase. Find torque at 4% slip. Neglect stator Impedance. [5]
- ✓ Q.2 Explain various methods of speed control in 3-phase induction motor. [15]
- Q.3 Write short notes on the following- <http://rtuonline.com>
- (a) Double revolving field theory. [5]
- (b) Split phase induction motor. [5]
- (c) Shaded pole single phase induction motor. [5]
- Q.4 (a) Explain the two reaction theory of salient pole synchronous machines? [8]
- (b) State the conditions for parallel operation of a synchronous generator. Explain the need of parallel operation. [7]
- Q.5 Describe with the help of diagrams, the principle, construction and phasor diagram of synchronous motor at various excitation mode and derive expression for the power developed.

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