4E4175

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4E4175

B. Tech. IV Sem. (Main/Back) Exam., June/July-2014

Electrical Engg.

4EE5A Electrical Machines-II

Common with EX

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

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1._____ 2._____

UNIT-I

Q.1. (a) Derive the basic emf equation for an induced emf per phase for full pitch, concentrated type of winding. [8]

(b) An alternator runs at 250 rpm and generates an emf of 50 Hz. The winding distribution factors k_d is 0.9597 and coil span factor or pitch factor k_c is 1. All the conductors of each phase are in series and flux per pole is 30mwb. Which is sinusoidally distributed. If the winding is star connected, determine the value of induced emf available across the terminals. [8]

OR

Q.1. (a) Explain the concept of rotating magnetic field. [8]

(b) Explain the different ways to eliminate the harmonics effect from generated voltage. [8]

UNIT-II

Q.2. (a) Explain the construction of a three phase induction motor with neat-drawing of different parts. [8]

(b) A 4-pole, 3-phase star connected induction motor is supplied from a 50Hz supply. Determine its synchronous speed. On full load, its speed is observed to be 1410 rpm. Calculate its full load slip. When the full load slip become 4%, Calculate the full load speed of the motor. [8]

OR

Q.2. (a) Explain the equivalent circuit of induction motor and draw basic equivalent circuit and approximate equivalent circuit. [8]

(b) A 440 volt, 3-ϕ, 50Hz , 6 pole induction motor running at 960 rpm takes 50kW at a certain load. The friction and windage losses = 1.8kW. Stator losses = 1.2kW. Calculate (i) The percentage slip

(ii) The rotor copper loss

(iii) The rotor output

(iv) Efficiency [8]

UNIT-III

Q.3. (a) Explain the general construction with neat drawing of a single phase induction motor with double revolving field theory. [8]

(b) What do you mean by split-phase motor? How many types of split phase are there? Explain the principle of operation of any one. [8]

OR

Q.3. (a) Describe the principle and operation of shaded pole motor with the neat drawing. [8]

(b) Explain the principle and operation of a.c. servo motor with neat drawing. [8]

UNIT-IV

Q.4. (a) Give the advantage for providing armature winding on stator circuit rather then rotor circuit and explain the working principle of a two pole synchronous generator. [8]

(b) Explain power angle characteristic of cylindrical rotor synchronous generator. [8]

OR

Q.4. (a) Explain the parallel operations of two alternators. Describe any one method by which two alternators could be put in parallel. [8]

(b) Why almost all large size synchronous machines are constructed with rotating field system type. Why synchronous generator ratings are in kVA and not in kW? [8]

UNIT-V

Q.5. (a) Describe the power factors control of synchronous motor under: [8]

(i) Under excitation

(ii) Normal excitation

(iii) Over excitation

(b) Describe in brief with a neat drawing the functional operation of synchronous induction motor. Draw the performance characteristics curve when operating at unity p.f. and at 0.8 p.f. leading. [8]

OR

Q.5. (a) Explain the principle of operation of a 3-phase synchronous motor. Why synchronous motor not Self starting? [8]

(b) Explain the hunting of synchronous machine. What is the prevention use for eliminating the hunting? [8]
