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M.Tech.(EE)/(Power System) (Sem.-1) ADVANCED ELECTRICAL MACHINES Subject Code : ELE-505/PEE-505 M.Code : 36002

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

- 1. Attempt any FIVE questions out of EIGHT questions.
- 2. Each question carries TWENTY marks.
- 1. a) What is V-Curve ? Explain the method for drawing the curve for a synchronous machine.
 - b) From the equivalent circuit of a cylindrical rotor alternator, derive the expression for its input and output power.
- 2. a) Draw the external and internal characteristics of an alternator and also discuss its shape with phaser diagram.
 - b) Determine the short circuit ratio for cylindrical rotor synchronous machine.
- 3. a) Discuss the steady state analysis of a synchronous machine.
 - b) Compare the steady and transient states of a synchronous motor operation.
- 4. a) An alternator having synchronous impedance of (0+j1.25) p.u. delivers rated current to Infinite bus bars at pf0.8 lagging .For the same excitation, find the current and power factor just before falling out of step.
 - b) A 3-phase star connected alternator is delivering 20MW and 8MVAr to an infinite bus at 11kV. If alternator has a synchronous impedance of (0+j3) Ohms. Determine the load angle and the excitation emf of the alternator.
- 5. a) Define transformer. Explain how energy is transferred from one circuit to another circuit?
 - b) Develop the equivalent circuit of a three phase transformer referred to primary and secondary side.

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- 6. a) Explain the constructional features and operation of three phase induction regulator.
 - b) A 10 kVA, 400/200 volt single phase 50Hz transformer has a maximum efficiency of 90% at 86% of full load at unity power factor. Determine the efficiency at full load and half load with 0.8 p.f. lagging.
- 7. a) Discuss the unbalance operation of a 3 phase transformer. Draw its phaser diagram also.
 - b) What are causes of harmonics in a 3 phase transformer? How is it reduced?
- 8. Write short notes on :
 - a) Effect damper winding
 - b) Open and short circuits in 3 phase transformer
 - c) Hunting in synchronous machine
 - d) Dynamics of synchronous machine.

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NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.