Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

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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.

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.

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.