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Total No. of Pages : 02

Total No. of Questions : 08

M.Tech.(EE) (2013 Onwards) (Sem.-1)
ADVANCED ELECTRICAL MACHINES
Subject Code : MTEE-103
M.Code : 70727

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

1.
 - a) In order to ensure power invariance in transforming one set of variables to another, show that the transpose of the transformation matrix should be equal to its inverse.
 - b) Derive the transformations for currents between a rotating balanced 2-phase (α, β winding and a pseudo-stationary two phases (d,q) winding. Assume equal turns on all coils.
2.
 - a) A synchronous machine, connected to an infinite bus, is working at unity power factor. An increase in excitation causes it to operate at leading power factor. Is this machine working as a generator or a motor? Illustrate your answer with a phasor diagram.
 - b) A synchronous machine is connected to an infinite bus. Its armature current is leading the terminal voltage. An increase in its field current causes a decrease in its armature current. Is this machine working as a generator or a motor? Illustrate your answer.
3. Explain the various reactances associated with an alternator and how they are caused.
4. Explain the transient analysis of synchronous machine under the condition of sudden reactive loading and unloading.
5. Write short notes on :
 - a) Measurement of reactances of synchronous machine.
 - b) Effect of short circuit ratio on performance of synchronous machine.





6. Through qualitative approach and analytical approach, analyze transformer transients on the basis of inrush of magnetizing current.
7. Describe in detail the unbalanced operation of three phase transformers. Also write the effects of using tertiary winding.
8. Three identical single phase transformers have their primary, secondary and tertiary windings connected in star, star and delta respectively. In each transformer, the secondary and tertiary turns are equal but the ratio of primary to secondary turns is 4. The primary is fed from three wire supply.
 - a) For a single phase load taking 60A at 0.8 pf lag between one line and neutral, calculate the current in each winding of the transformer.
 - b) In addition to the single phase load of part(a), a balanced three phase load taking a line current of 80A at unity pf is supplied by transformer secondary. Calculate the current in each winding of the transformer.

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.

