SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR

ROLL No: | | | | | | | | | | | | | **Total number of pages:02**
Total number of questions: 05

M.TECH. || EE || 1st Sem
ADVANCED ELECTRICAL MACHINES
Subject Code: MTEE-103
Paper ID:

Time allowed: 3 Hrs **Max Marks: 60**

Important Instructions:

- **Attempt all questions**
- **Each question carries equal marks**
- **Assume any missing data**

Q. 1. Derive the general equations of various self and mutual inductances for synchronous machine and deduce them for cylindrical rotor synchronous machines.

OR

Discuss the physical concept and salient feature of Park's transformation.

Q. 2. Sketch and explain the phasor diagrams and magnetic field relations for a synchronous generator operating at leading power factor.

OR

A 3-phase, 50 Hz cylindrical rotor synchronous machine has the following parameters:

Self inductance of a phase = 3.15 mH

Armature leakage inductance = 0.35mH

Calculate the mutual inductance between armature phases and its synchronous reactance.

Q. 3. Derive the field and armature phase current expressions during transient period of a 3-phase cylindrical type synchronous machine, when symmetrical 3-phase short circuit is established at its armature terminals.

OR

Derive swing equation of synchronous machine. Explain linearized analysis technique and non linear analysis method to deal with machine oscillations.

Q. 4. Discuss why inrush current appears during switching in process of transformers. How these currents in transformers can be estimated? Briefly describe the methods employed to limit this inrush current.

OR

Discuss the experimental method to determine the equivalent circuit of a 3-winding transformer. Why leakage flux is modeled in a transformer equivalent circuit as an inductor?

Q. 5. Discuss advantages of having the third winding in a transformer from application point of view for both 1-phase and 3-phase systems.

OR

Write short notes on:

(a) Suppression of transformer harmonics.

(b) Single phasing in 3-phase transformers.