

The first part will be a **closed book, no calculator** questions, ~ 15 - 25 points. Rest of Exam is **closed book**, except for the note sheets handed out in class for exam 1 and exam 2. You may add to these sheets.

The exam will coverPossible questions

1. Non-ideal transformer model

%VR η

%VR η

2. Auto-transformers

Wiring
New rating

3. 3-phase transformers

Y or Δ

4. One-Line Diagrams, variations and Per-Unit analysis

Base Values S_{base} V_{base} I_{base} Z_{base}
Basic per-unit modeling and calculations

Common symbols, why PU
Bases, why and when do they change
Why per-unit?

5. Motor Basics

Terms, Stator, Rotor, etc.
Armature, Field, back EMF
Torque, Speed, Power
Friction, Windage
Slip rings, brushes

6. Synchronous generators and motors

Know the phasor diagram! Problems like Hw SG1 & SG2

losses, construction,
limits, operation
poles - speed

7. 3-phase induction motor basics

Operation
Slip and frequencies
Poles - speed
Questions from homework Ind1
Typ torque-speed curves

8. Homeworks 8 - Ind1

9. Labs 1 - 3

Transformer modeling
Bringing a generator on line