

EEE210 – Energy conversion and power system fundamentals

In class quiz 2

Department of Electrical and Electronic Engineering, XJTLU

The quiz will:

- last for 50 minutes;
- account for 5% of your overall marks for EEE210.

After completing the quiz. You need to upload the softcopy of your answers on LMO.

Q1

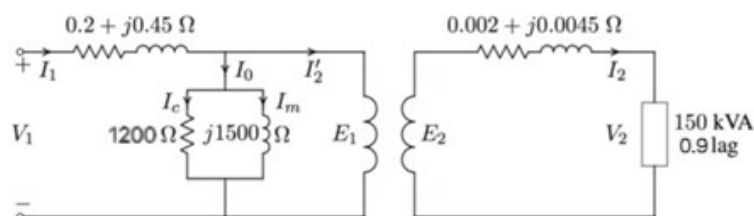
Q2

Total

1. A 60-MVA, 57.7 (line to line voltage) -kV, three phase synchronous generator has a synchronous reactance of $18 \Omega/\text{phase}$ and negligible armature resistance. [25]
 - (a) The generator is delivering rated power at a power factor of 0.9 lagging at the rated terminal voltage to an infinite bus. Determine the magnitude of the generated emf per phase and the power angle δ . [9]
 - (b) If the generated emf is 45 kV per phase, what is the maximum three-phase power that the generator can deliver before losing its synchronism? [8]
 - (c) The generator is delivering 72 MW to the bus bar at the rated voltage with its field current adjusted for a generated emf of 36 kV per phase. Determine the armature current and the power factor. State whether power factor is lagging or leading. [8]

Answers:

2. A 150-kVA, 2200/220-V single-phase transformer has the parameters as shown in the following figure. [25]



- (a) Draw the equivalent circuit referred to the low-voltage side with component symbols. [5]
- (b) When the transformer is operating at full load 0.9 power factor lagging, determine the transformer i) equivalent impedance Z_{e2} , ii) current I_2 , iii) sourcing voltage V'_1 referred to the low-voltage side. [10]
- (c) Find the voltage regulation and transformer efficiency. [10]