1. **Procedure:**

   a) **1. Select the   CT   ratio for each element.**

   b) **Select pickup and time dial wherever possible for (51)**

   c) **Select the pickup of the instantaneous Relay (50)_**

   You may use ETAP software program, if available

Report   :   Prepare a detailed report of your work with all figures and discussions.

Due date: April 20, 2021

Presentations: April 22, 2021

You may work in a group of two but no more

1. Enter the following data to the components for SC calculations

Element	Parameters
U1	3-phase: MVAsc = 2000, X/R = 55;
Gen1	Subtransient Model, Round-rotor, Typical Data
All Ind Mtr	Use "Std MF" Option
Lump1	70% Mtr Load; LRC = 650%, "High"; X/R = 15; Use "Std MF" Option
Cable	For all branch/equipment cables: Tmin = 50, Tmax = 75

2. Create two configurations

Configuration	Setup
Normal	Close tie-CB CB1

U1   2000 MVAsc
      115 kV
      0.09089 + j4.99917 %

CB3

Bus 1   115 kV

CB4   CB6   CB8

T1   10 MVA   T2   20 MVA   T3   15 MVA   Gen1   10 MW
      115/13.8 kV   115/13.8 kV   115/13.8 kV   13.8 kV
      7.5 %Z   7.5 %Z   6.5 %Z   12 %Xd''

CB5   CB7   CB9   CB12

Bus 2   13.8 kV   Bus 3   13.8 kV   Bus 4   13.8 kV

                   CB10   CB11

LUMP1   T4   -1.25% TapP   T5   -1.25% TapP
                        5 MVA   5 MVA
5 MVA   13.8/4.16 kV   13.8/4.16 kV
13.2 kV   6.5 %Z   7 %Z

                   CB16   CB13

Bus 5   4.16 kV   4.16 kV   Bus 6

CB17   CB1   CB15   CB14

Syn1   Cable1   CU   T6   -2.50001% TapP   Mtr5
                           3-1/C 750   2 MVA
                           1500 ft   4.16/0.48 kV   2000 HP
2*2000 HP   0.0223 + j0.0497 ohms/1000 ft   7 %Z   4 kV
4 kV   650 %LRC
650 %LRC
                                                     CB20

Bus 8   4.16 kV   Bus 7   0.48 kV

CB18   CB19   CB21   CB22   CB23   Fuse1

Mtr1   Load1   Mtr2   Mtr3   Mtr4   Load2

4*500 HP   2 MVA   4*200 HP   5*100 HP   250 HP   1 MVA
4 kV   4.16 kV   0.46 kV   0.46 kV   0.46 kV   0.48 kV
650 %LRC   600 %LRC   600 %LRC   600 %LRC