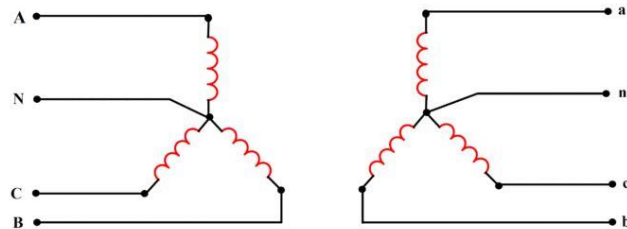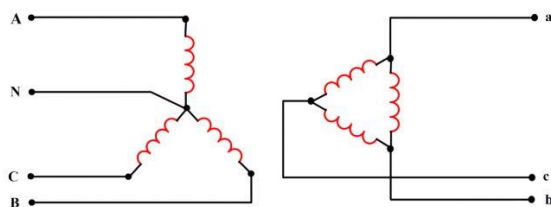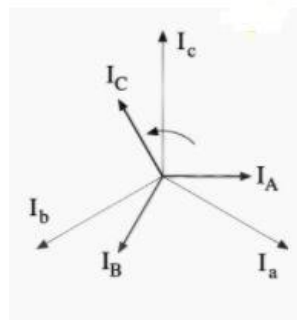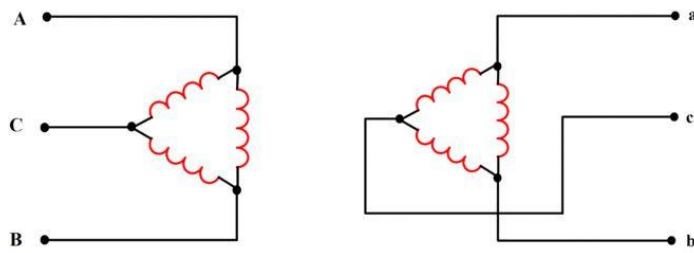|	
Title of the Exercise: 3 Phase Transformer Connections	
Date: 13/11/2020	
Aim: 3 Phase Transformer Connections Verification	
Tool used : MATLAB	
Electrical Circuit:	

Star-Star

Y-Y Connection

Star-Delta

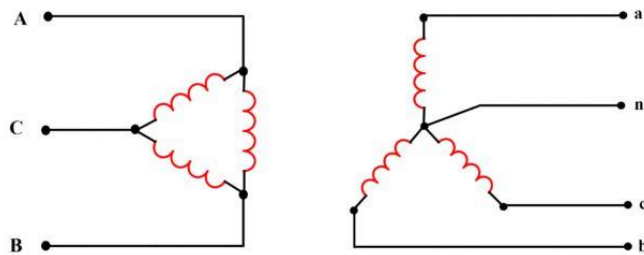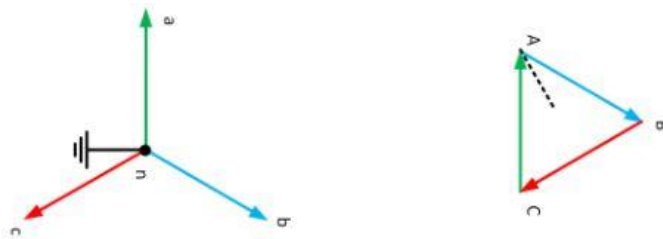**Y-Δ Connection**

Delta-Delta

Δ-Δ Connection

Delta-Star

Δ-Y Connection

Parameters used for the study

Transformer rating = 25KVA
  Frequency f=50 Hz
  Transformer ratio=2
  V1=400V
  V2=200V
  $R_1 = 0.7488$ **ohm (Primary winding resistance)**
  $X_{11} = 1.00224$ **ohm (Primary winding reactance)**
  $R_2 = 0.007488$ **ohm (Secondary winding resistance)**

$X_{12} = 0.0100224$ ohm (Secondary winding reactance)
$X_M = 5,008$ ohm (Magnetizing reactance)
$R_c = 33,391$ ohm (Resistance for core losses)

Theoretical Analysis

Three-phase Transformer Line Voltage and Current

Primary-Secondary Configuration	Line Voltage Primary or Secondary	Line Current Primary or Secondary
Delta – Delta	$V_L \Rightarrow nV_L$	$I_L \Rightarrow \dfrac{I_L}{n}$
Delta – Star	$V_L \Rightarrow \sqrt{3}.nV_L$	$I_L \Rightarrow \dfrac{I_L}{\sqrt{3}.n}$
Star – Delta	$V_L \Rightarrow \dfrac{nV_L}{\sqrt{3}}$	$I_L \Rightarrow \sqrt{3}.\dfrac{I_L}{n}$
Star – Star	$V_L \Rightarrow nV_L$	$I_L \Rightarrow \dfrac{I_L}{n}$

Simulation Diagram:

Star-Star

Star-Delta

Delta-Star
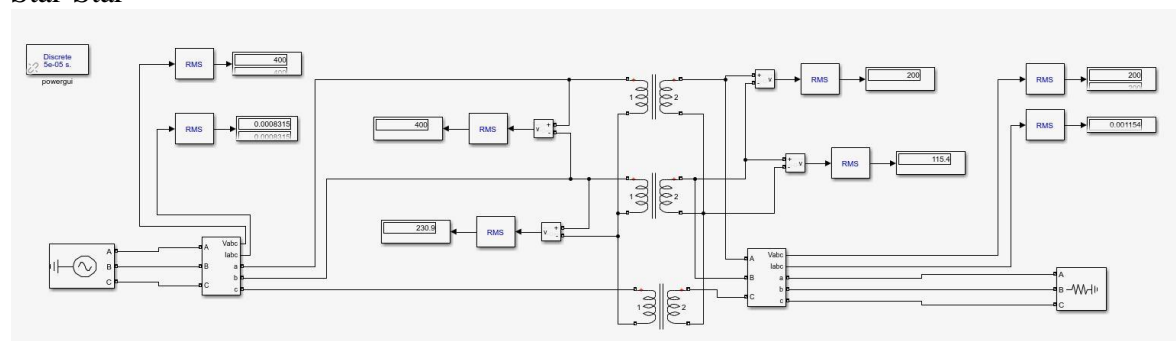
Delta-Delta
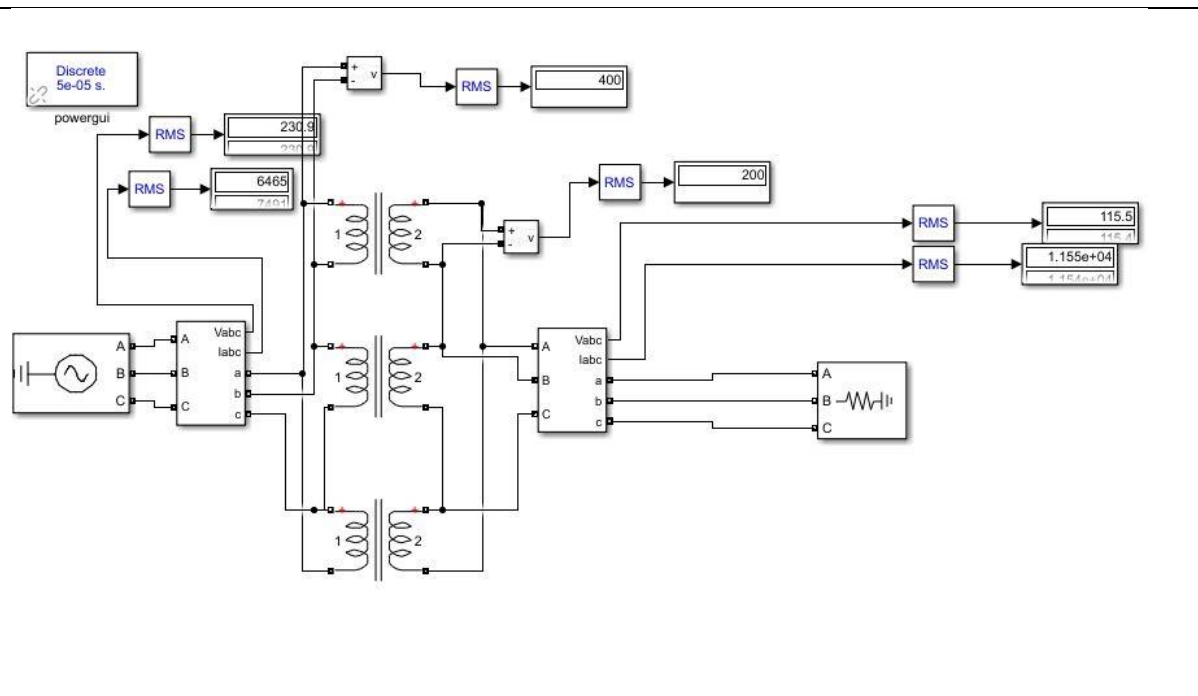
Procedure for simulation study

• Write the coding for initializing the input parameters and as per requirement of plots in m file and save it.
• Open new Simulink file and make mathematical modelling as per circuit diagram and save it. • Run the m file first, after that run Simulink file.
• View the result in Scope.
• Again, run m file and view the plots.
• Make various plots and write the results.

Results and Discussions

	VL(Primary)	VL(Secondary)	VP(Primary)	VP(Secondary)
Star-Star	400	200	230.9	115.4
Star-Delta	400	115.4	230.9	115.5
Delta-Delta	400	200	400	200
Delta-Star	400	345.7	400	200

Conclusion
Hence Verified voltage relations for each type of 3 phase transformer connection.

Inference
Theoretical analysis matched with observed readings.

References
NIL