ASIA PACIFIC UNIVERSITY OF TECHNOLOGY & INNOVATION

EE001-3-1 ANALYSIS OF CIRCUITS
GUIDED LAB MANUAL
VERIFICATION OF TWO PORT PARAMETERS

MODULE DESCRIPTOR VERSION: VE2		
No.	**Course Learning Outcomes**	**Assessments**
1	Apply circuit theory to DC circuits. (C3, PLO1)	Quizzes
2	Apply circuit theory to first-order transient and AC circuits. (C3, PLO2)	Final Exam
3	Construct two-port network to verify network parameters. (P4, PLO5)	Lab Report

No.	**Lab Report Experiment No.**	**Question Vs Taxonomy**																	
		Cognitive Level						**Psychomotor Level**							**Affective Level**				
		1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**
CLO3	1										100M								
	POM										**100%**								

OBJECTIVE

1. Measure the parameters of a two-port network using experimental result.

EQUIPMENT LIST

1. Power supply
2. Ammeter
3. Voltmeter
4. Resistors with different values ($R_1 = 1000\Omega, R_2 = 2000\Omega, R_3 = 3000\Omega$)

PROCEDURE

T-Network Verification (z-parameter)

1. Construct a T-Network as shown in Figure 1 using breadboard and resistors.

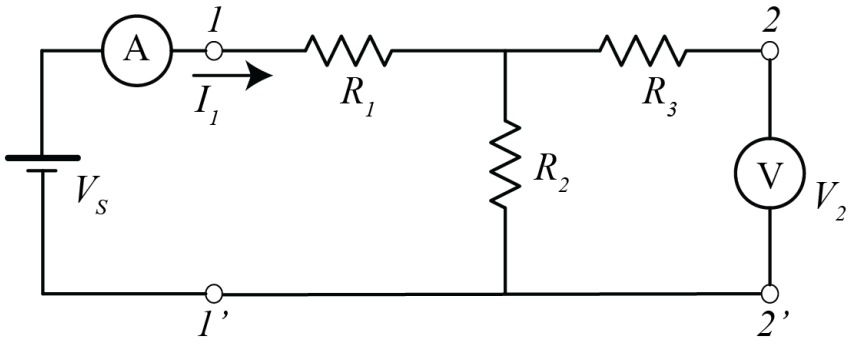

Figure 1: T-Network Verification (z-parameter) Circuit 1

2. Fix the power supply to 5V.
3. Measure the value of I_1 and V_2 and record them in result Table 1.
4. Repeat Step 2 and Step 3 with power supply of $10V$ and $15V$.
5. Construct a T-Network as shown in Figure 2.

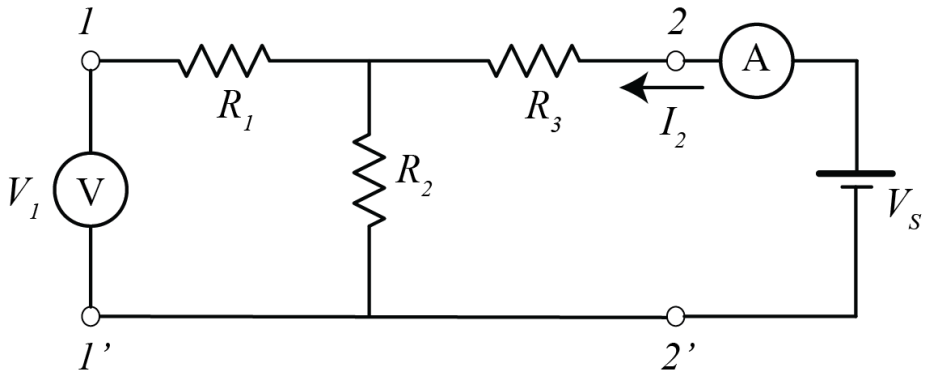

Figure 2: T-Network Verification (z-parameter) Circuit 2

6. Fix the power supply to $5V$.
7. Measure the value of I_2 and V_1 and record them in result Table 1.
8. Repeat Step 2 and Step 3 with power supply of $10V$ and $15V$.

π-Network Verification (y-parameter)

1. Construct a π -Network as shown in Figure 3.

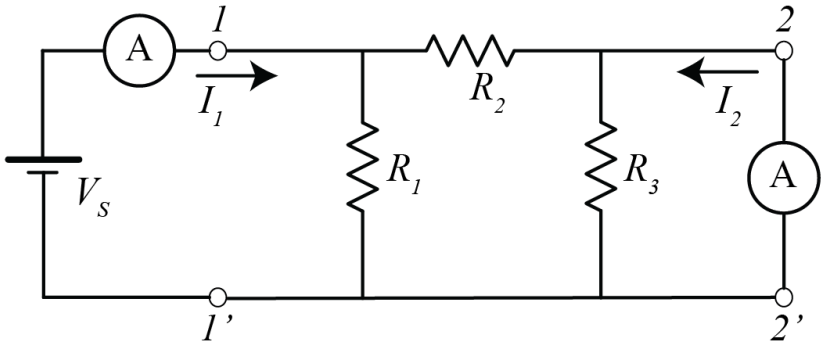

Figure 3: π-Network Verification (y-parameter) Circuit 1

2. Fix the power supply to $5V$.
3. Measure the value of I_1 and I_2 and record them in the result Table 2.
4. Repeat Step 2 and Step 3 with power supply of $10V$ and $15V$.
5. Construct the π -Network as shown in Figure 4.

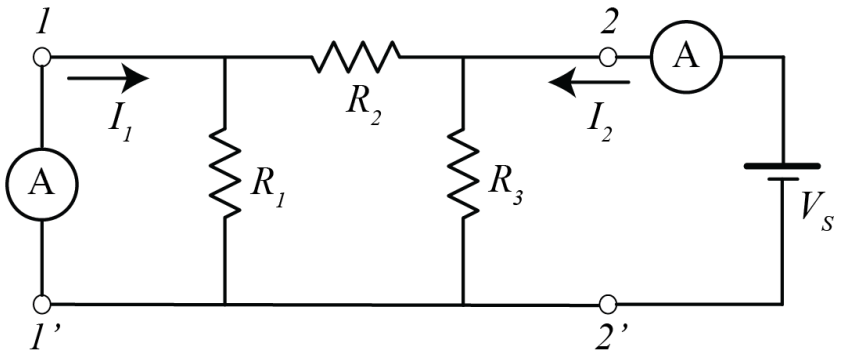

Figure 4: π-Network Verification (y-parameter) Circuit 2

6. Fix the power supply to $5V$.
7. Measure the value of I_1 and I_2 and record them in the result Table 2.
8. Repeat Step 2 and Step 3 with power supply of $10V$ and $15V$.

RESULT

Table 1: T-Network Verification Result

$I_2 = 0$	V_1	$5V$	$10V$	$15V$
	I_1			
	V_2			
$I_1 = 0$	V_2	$5V$	$10V$	$15V$
	I_2			
	V_1			

Table 2: π-Network Verification Result

$V_1 = 0$	V_2	$5V$	$10V$	$15V$
	I_1			
	I_2			
$V_2 = 0$	V_1	$5V$	$10V$	$15V$
	I_1			
	I_2			

MARKING RUBRICS

Criteria	Fail	Marginal Fail	Pass	Credit	Distinction
Demonstrate the lab work based on the procedures (30 Marks)	**0 - 11**	**12 - 14**	**15 - 19**	**20 - 22**	**23 - 30**
	Demonstrated minimum lab-work.	Demonstrated poor lab-work without following the procedure.	Demonstrated average lab-work by partially following the procedure.	Demonstrated good lab-work by following the procedure.	Demonstrated excellent lab-work by following the procedure.
Measure all relevant parameters using appropriate tools (30 Marks)	**0 - 11**	**12 - 14**	**15 - 19**	**20 - 22**	**23 - 30**
	Measured incorrect parameters, incorrectly and with incorrect selection of tools and techniques.	Measured incorrect parameters incorrectly and with poor selection of tools and techniques. Experimental results do not match expected results.	Measured incorrect parameters incorrectly, but with correct selection of tools and techniques. Experimental results do not match expected results.	Measured correct parameters correctly, with correct selection of tools and techniques. Experimental results partially match expected results.	Measured correct parameters correctly, with correct selection of tools and techniques. Experimental results match expected results with high accuracy.
Construct tables &/or plots from measured quantities with the aid of appropriate tools and techniques (10 Marks)	**0 – 3**	**4**	**5**	**6 – 7**	**8 – 10**
	Constructed no/minimal tables &/or plots, with the aid of appropriate tools and techniques.	Constructed a few tables &/or plots, with the aid of appropriate tools and techniques.	Constructed partial tables &/or plots, with the aid of appropriate tools and techniques.	Constructed some plots/results, with the aid of appropriate tools and techniques.	Constructed all plots/results, with the aid of appropriate tools and techniques.
Demonstrate report writing skills to discuss and analyse the results obtained, with the aid of appropriate tools and techniques (20 Marks)	**0 - 7**	**8 – 9**	**10 – 12**	**13 – 15**	**16 – 20**
	Demonstrated incorrect/minimal analysis on the experimental results.	Demonstrated weak analysis on some of the experimental results.	Demonstrated average analysis on some of the experimental results.	Demonstrated good analysis on some of the experimental results.	Demonstrated excellent analysis on all the experimental results.
Demonstrate report writing skills to conclude on the objectives. (10 Marks)	**0 – 3**	**4**	**5**	**6 – 7**	**8 – 10**
	Demonstrated none/very poor conclusion of the guided labwork.	Demonstrated poor conclusion of the guided labwork.	Demonstrated average conclusion of the guided labwork.	Demonstrated good conclusion of the guided labwork.	Demonstrated excellent conclusion of the guided labwork.