
JOE
DATE:
TEST


AMPROBE®
MODEL: PF1050
VOLT/AMP/POWER FACTOR
ELECTRICAL ENGINEERING
CERTIFICATE
PLANT NO B72720.
VOLTS/AMPS RANGE
0-999
0-999
AMPS
PF
VOLTS
LEADING P.F.
INDICATOR
00.9
434996

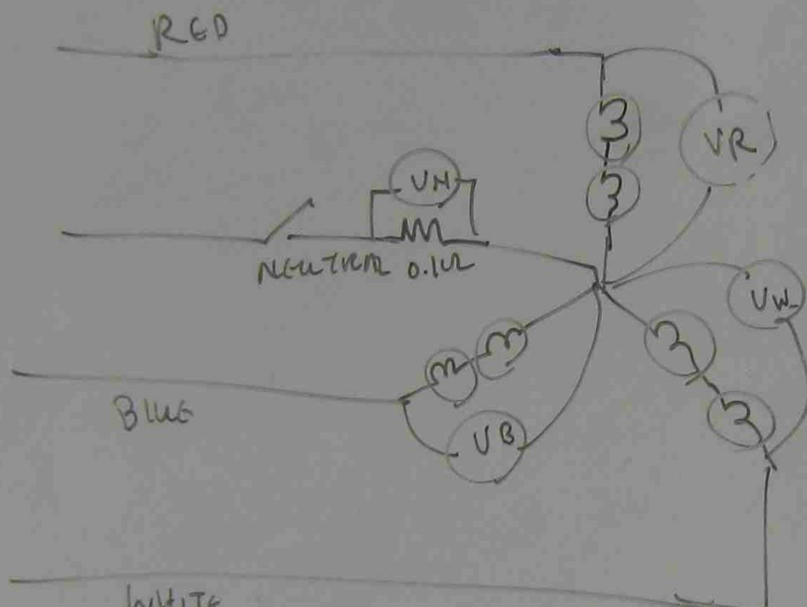

AMPROBE®
MODEL: PF1050
VOLT/AMP/POWER FACTOR
ELECTRICAL ENGINEERING
CERTIFICATE
PLANT NO B72720.
VOLTS/AMPS RANGE
0-999 0-999
AMPS PF
VOLTS
LEADING P.F.
INDICATOR
23.3
434996


EARTH
240V G.P.O.
240V MAIN SWITCH
110 VOLTS
AMPROBE®
MODEL: PF1050
VOLT/AMP/POWER FACTOR
ELECTRICAL ENGINEERING
CERTIFICATE
PLANT NO B72720.
VOLTS/AMPS RANGE
0-999 0-999
AMPS PF
VOLTS
LEADING P.F.
INDICATOR
86.5


Joe

3φ 4 WIRE / 3 WIRE BALANCED & UNBALANCED LOAD

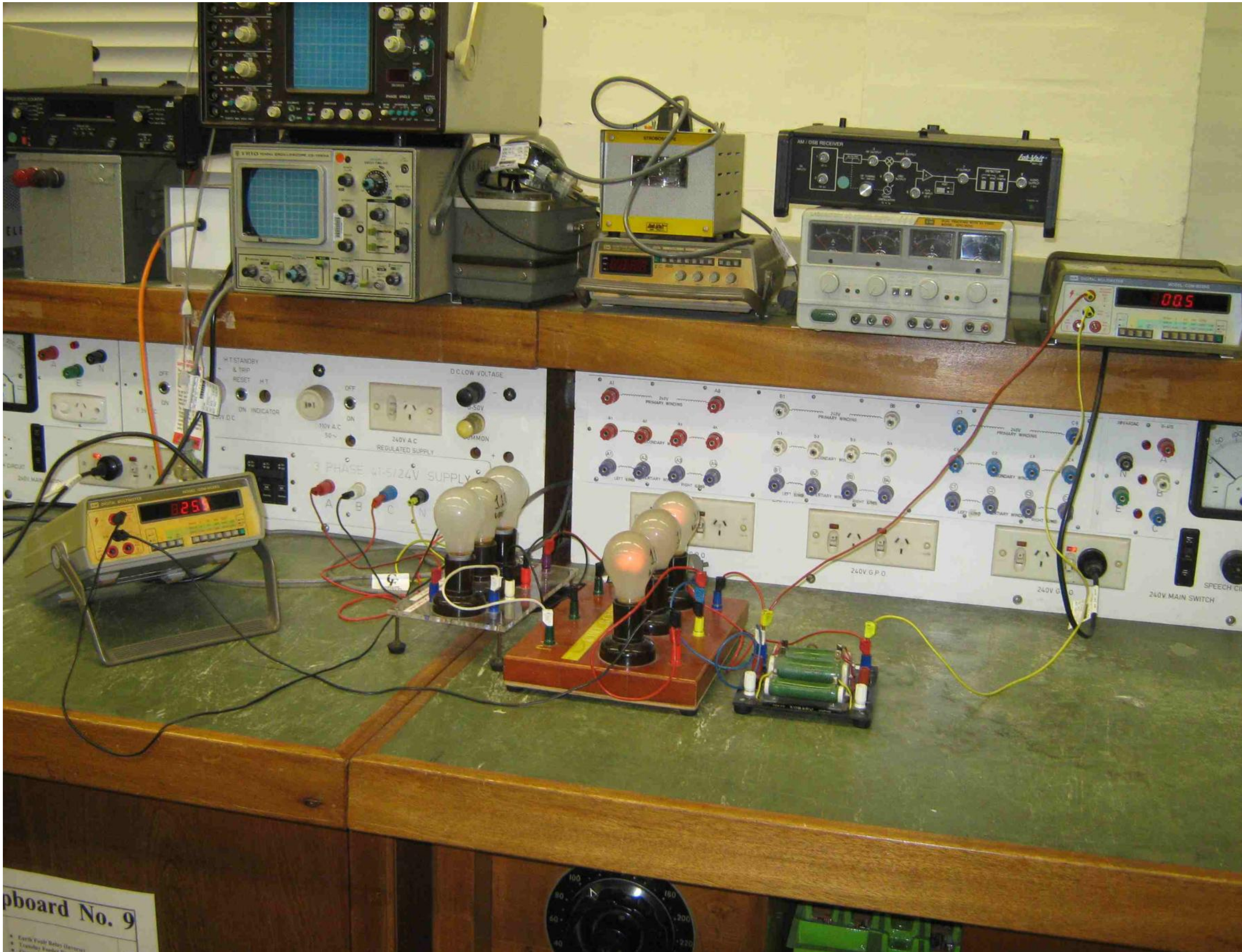
CONNECT THE CIRCUIT

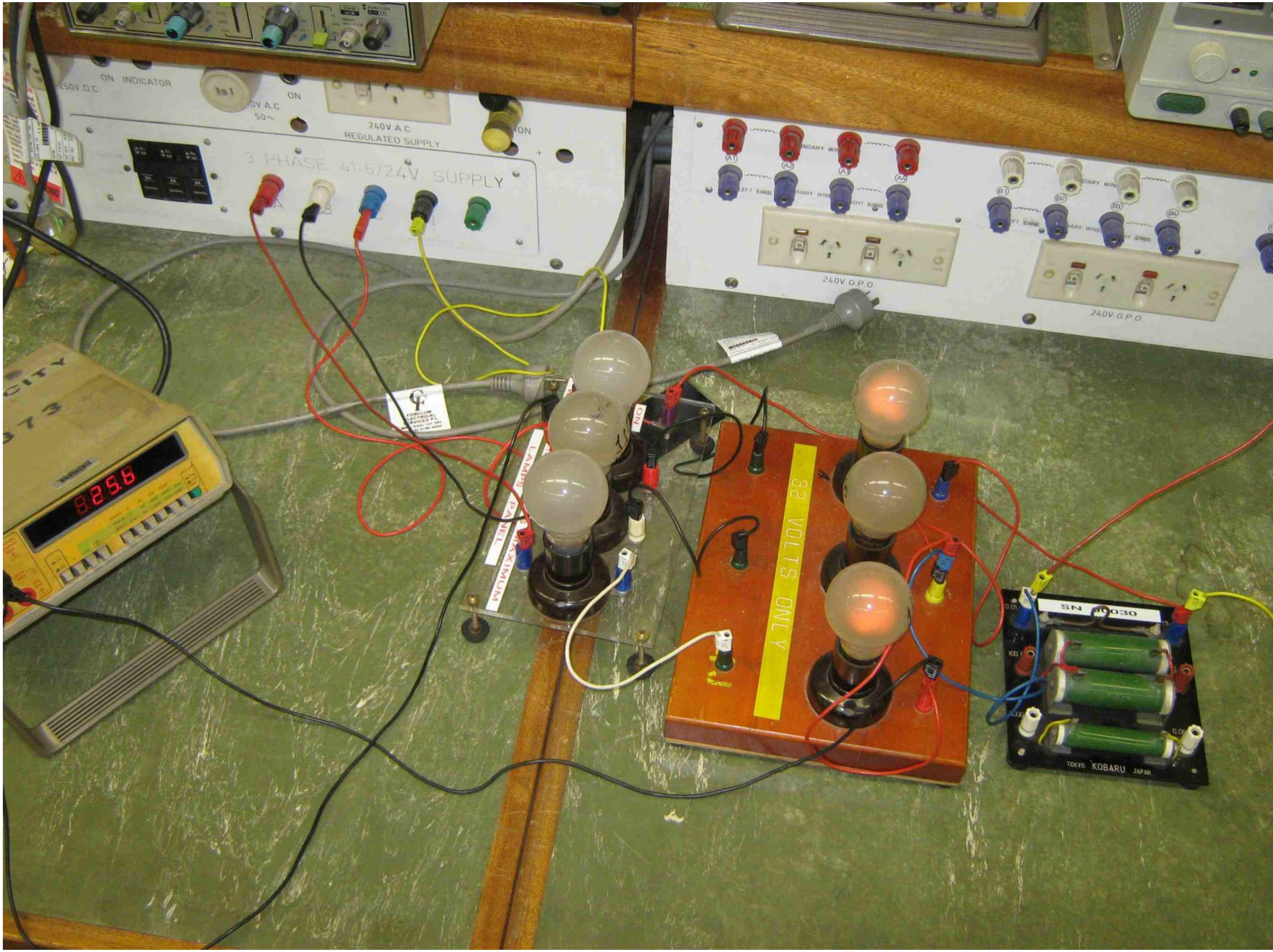


CONDITION	NEUTRAL WIRE
ALL LAMPS	ON
ONE LAMP IN BLUE PHASE IS OFF	ON
ONE LAMP IN BLUE PHASE IS OFF	OFF

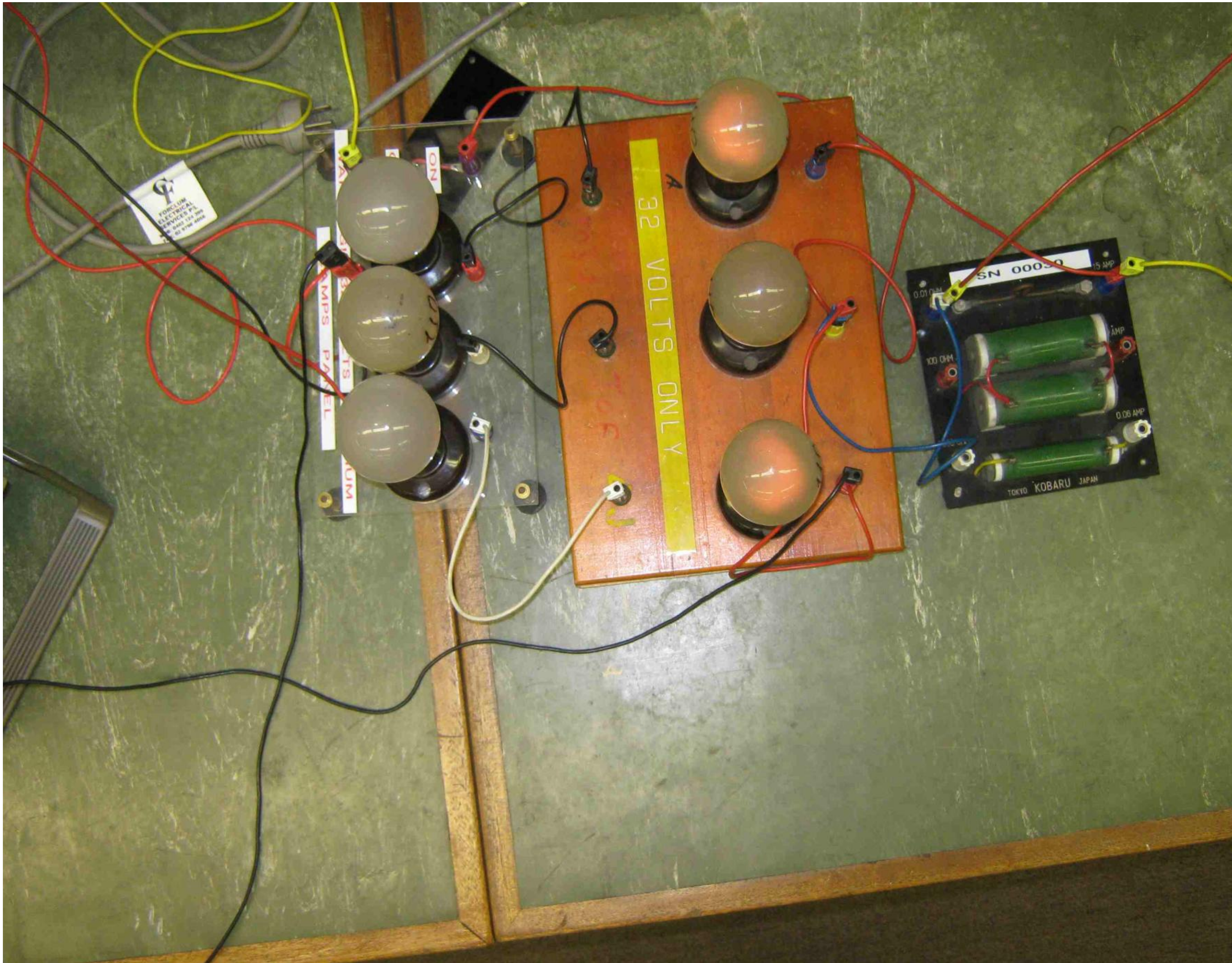
CONDITION	NEUTRAL WIRE	V_R	V_W	V_B	V_N	$I = \frac{V_N}{0.1\Omega} =$
ALL LAMPS	ON					
ONE LAMP IN BLUE PHASE IS OFF	ON					
ONE LAMP IN BLUE PHASE IS OFF	OFF					


AM / DSB RECEIVER
H.T STANDBY
& TRIP
RESET
H.T
ON INDICATOR
D.C LOW VOLTAGE
110V A.C
240V A.C
REGULATED SUPPLY
3 PHASE 41-5/24V SUPPLY
A B C N E
240V
PRIMARY WINDING
240V G.P.O
240V MAIN SWITCH
KOBARU


AM / DSB RECEIVER
D.C LOW VOLTAGE
H.T STANDBY
& TRIP
RESET
INDICATOR
240V A.C
REGULATED SUPPLY
COMMON
3 PHASE
SUPPLY
PRIMARY WINDING
240V G.P.O
240V MAIN SWITCH
SPEECH CIRC
pboard No. 9



250V D.C
ON INDICATOR
ON
240V A.C
REGULATED SUPPLY
3 PHASE 41-5/24V SUPPLY
240V G.P.O.
240V G.P.O.
LAMPS PANEL
32 VOLTS ONLY
TOKYO KOBARU JAPAN

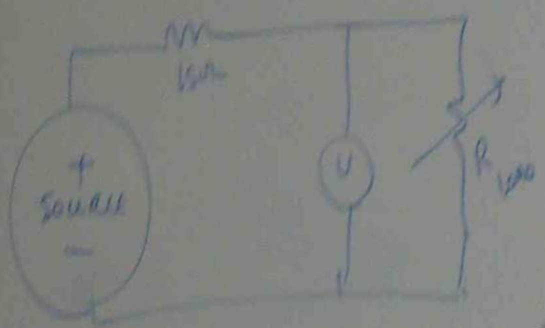

32 VOLTS ONLY
ON
AMPS PANEL
100 OHM
0.06 AMP
TOKYO KOBARU JAPAN


32 VOLTS ONLY
ON
FORCLUM
ELECTRICAL
SERVICES P/L
JOE
0.01 OHM
100 OHM
TOKYO

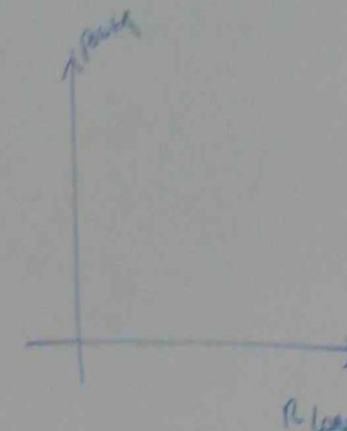
MAXIMUM POWER TRANSFER THEOREM

WHEN LOAD RESISTANCE IS EQUAL TO SOURCE RESISTANCE, MAXIMUM POWER IS TRANSFERRED

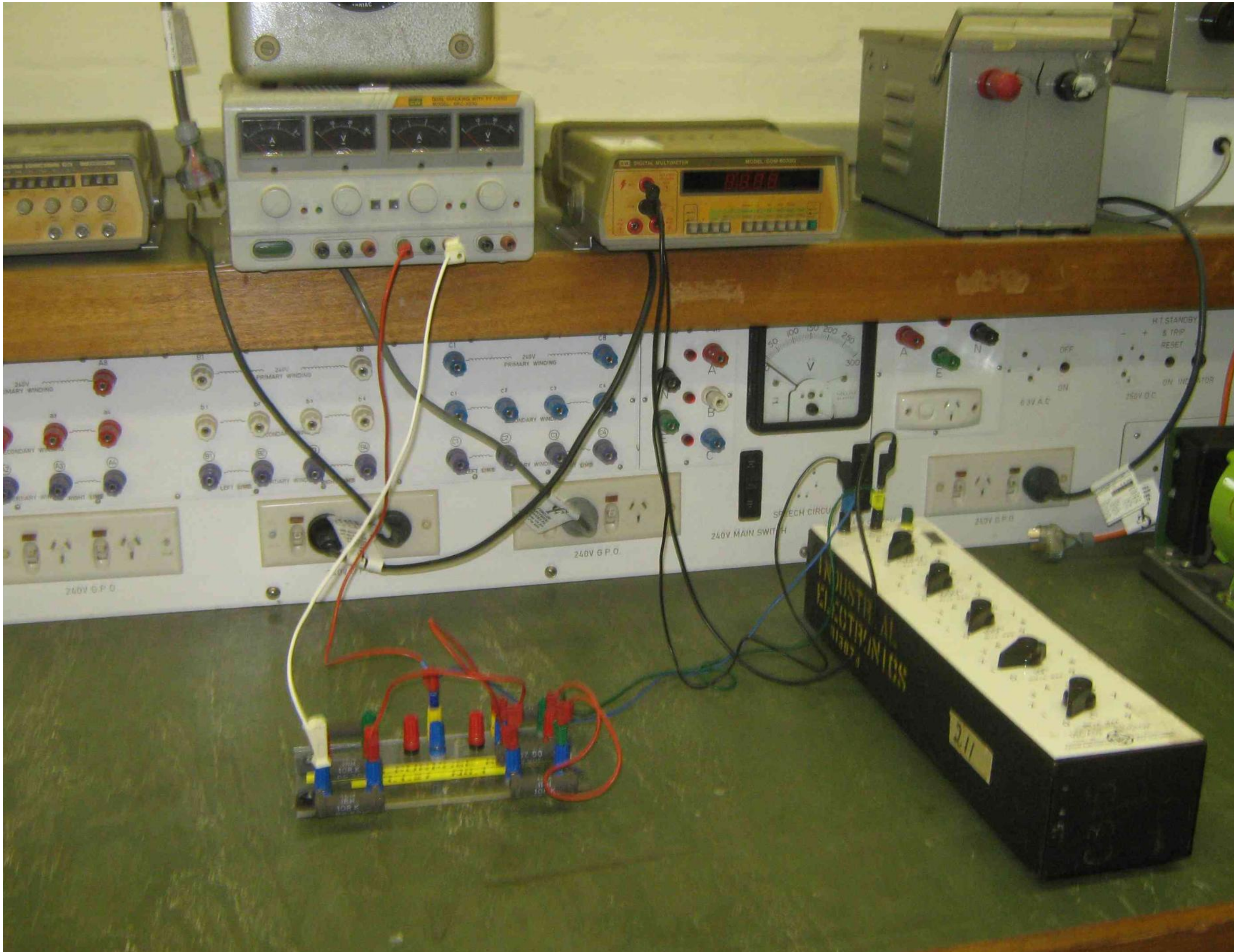
CONNECT THE CIRCUIT



STEP	V	R LOAD	POWER $\frac{V^2}{10\Omega}$
1	—	10Ω	POWER =
2	—	11Ω	POWER =
3	—	12Ω	
4	—	13Ω	
5	—	14Ω	
6	—	15Ω	
7	—	16Ω	
8		17Ω	
9		18Ω	
10		19Ω	
11		20Ω	



DRAW THE GRAPH

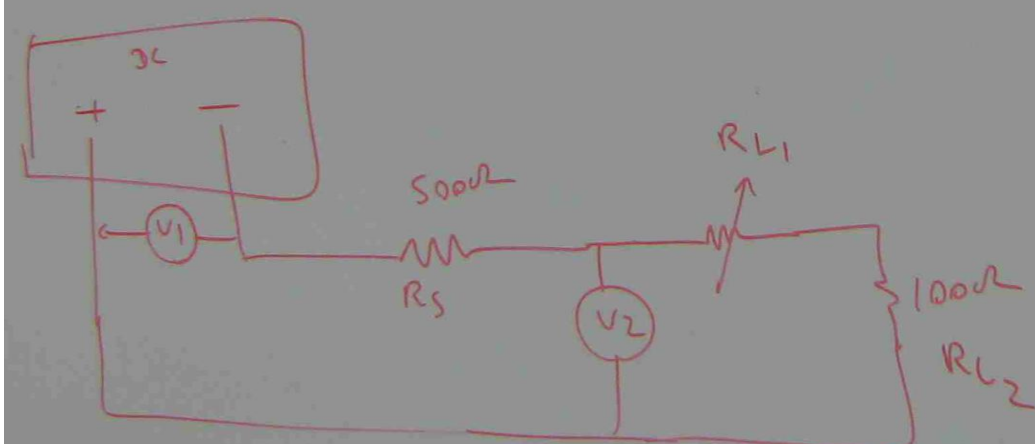

DIGITAL MULTIMETER
240V
PRIMARY WINDING
240V G.P.O.
240V MAIN SWITCH
H.T. STANDBY
RESET
OFF
ON
INDUSTRIAL
ELECTRONICS
2.11

PRACTICAL

MAXIMUM POWER TRANSFER THEOREM

MAXIMUM POWER IS TRANSFERRED WHEN SOURCE IMPEDANCE IS EQUAL TO LOAD IMPEDANCE

CONNECT THE GIVEN CIRCUIT



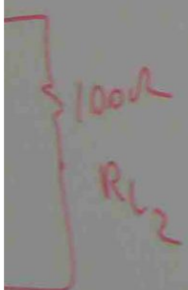
VARY R_{L_1} & NOTE V_2

R_{L_1}	R_{L_2}	R_{L_T}
0	100Ω	
100	100	
200	100	
300	100	
400	100	
500	100	
600	100	
700	100	
800	100	

DRAW THE GRA

VARY RL_1 & NOTE V_2

RL_1	RL_2	$RL_T = RL_1 + RL_2$	V_2	$P = \frac{V_2^2}{RL_T}$ WATT
0	100Ω			
100	100			
200	100			
300	100			
400	100			
500	100			
600	100			
700	100			
800	100			

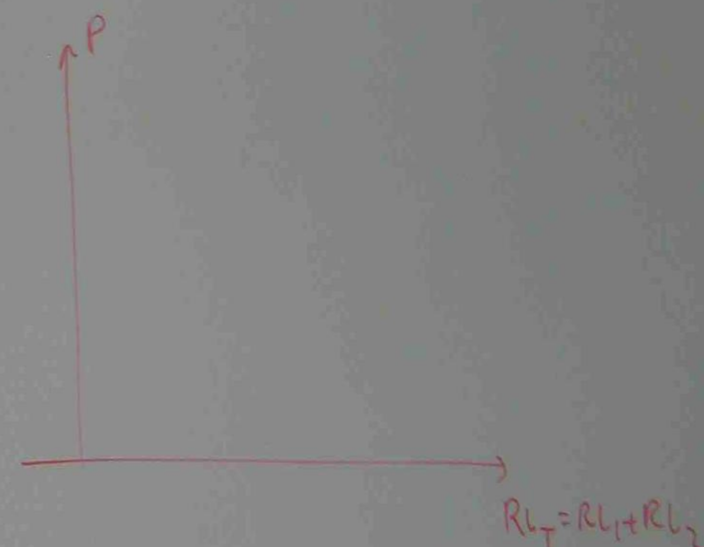


EQUAL TO LOAD

RY RL_1 & NOTE V_2

RL_1	RL_2	$R_{LT} = RL_1 + RL_2$	V_2	$P = \frac{V_2^2}{RL_T}$ WATT
0	100 Ω			
100	100			
200	100			
300	100			
400	100			
500	100			
600	100			
700	100			
800	100			

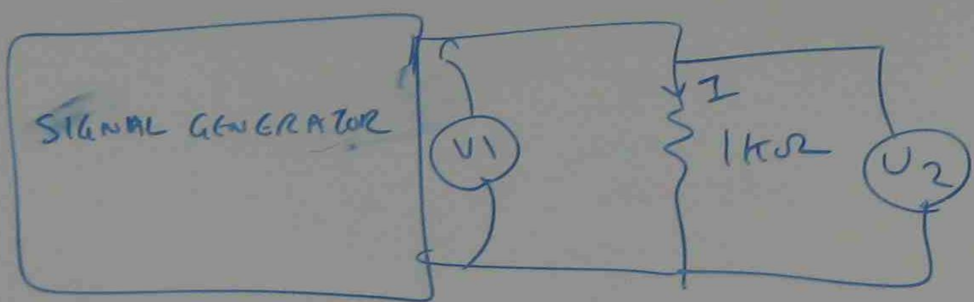
DRAW THE GRAPH



SERIES RLC CIRCUIT

TO STUDY THE BEHAVIOUR OF RLC CIRCUIT

(I) CONNECT THE CIRCUIT



$$I = \frac{V}{R}$$

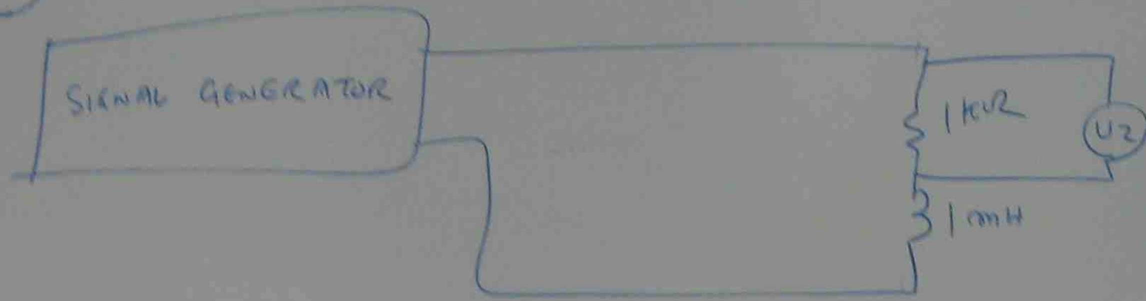
INCREASE FREQUENCY 10 TO 100 HZ,

f	V_2	$I_R = \frac{V_2}{1000\Omega}$
10 Hz		
20 Hz		
50 Hz		
70		
100 Hz		

COMMENT = ?

(I)

CONNECT THE CIRCUIT



INCREASE FREQUENCY, MAKE COMMENT

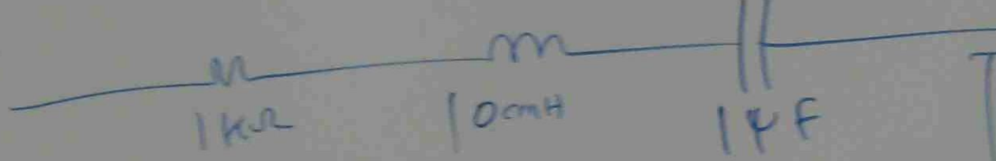
f	U2	$I = \frac{U_2}{1k\Omega}$
10		
20		
50		
70		
100Hz		

$$I = \frac{V}{\sqrt{R^2 + X_L^2}}$$

$$= \frac{V}{\sqrt{R^2 + (2\pi f L)^2}}$$

MAKE COMMENT = ?

CONNECT THE CIRCUIT



$$Z = R + jX_L + (-jX_C)$$
$$= R + j(X_L - X_C)$$

CALCULATE RESONANT FREQUENCY

$$X_L = X_C \Rightarrow 2\pi f L = \frac{1}{2\pi f C}$$

$$2^2 \pi^2 f^2 LC = 1$$

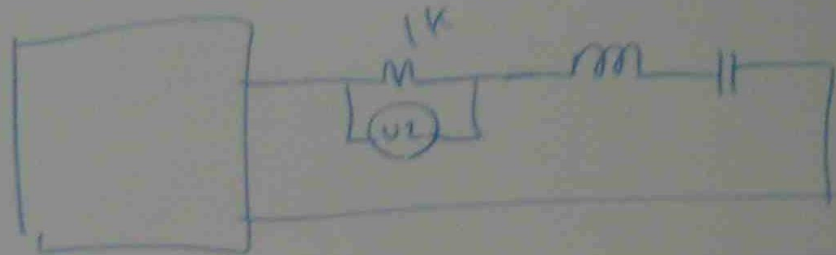
$$f = \sqrt{\frac{1}{2^2 \pi^2 LC}} = \frac{1}{2\pi\sqrt{LC}}$$

$$= \frac{1}{2 \times 3.1416 \sqrt{10 \times 10^{-3} \times 1 \times 10^{-6}}}$$

$$= 50 Hz$$

III

CONNECT THE CIRCUIT



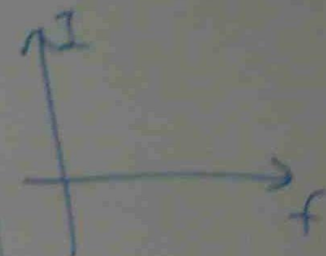
AT RESONANT POINT

$$I = \frac{V}{R + j(X_L - X_C)}$$

CANCEL

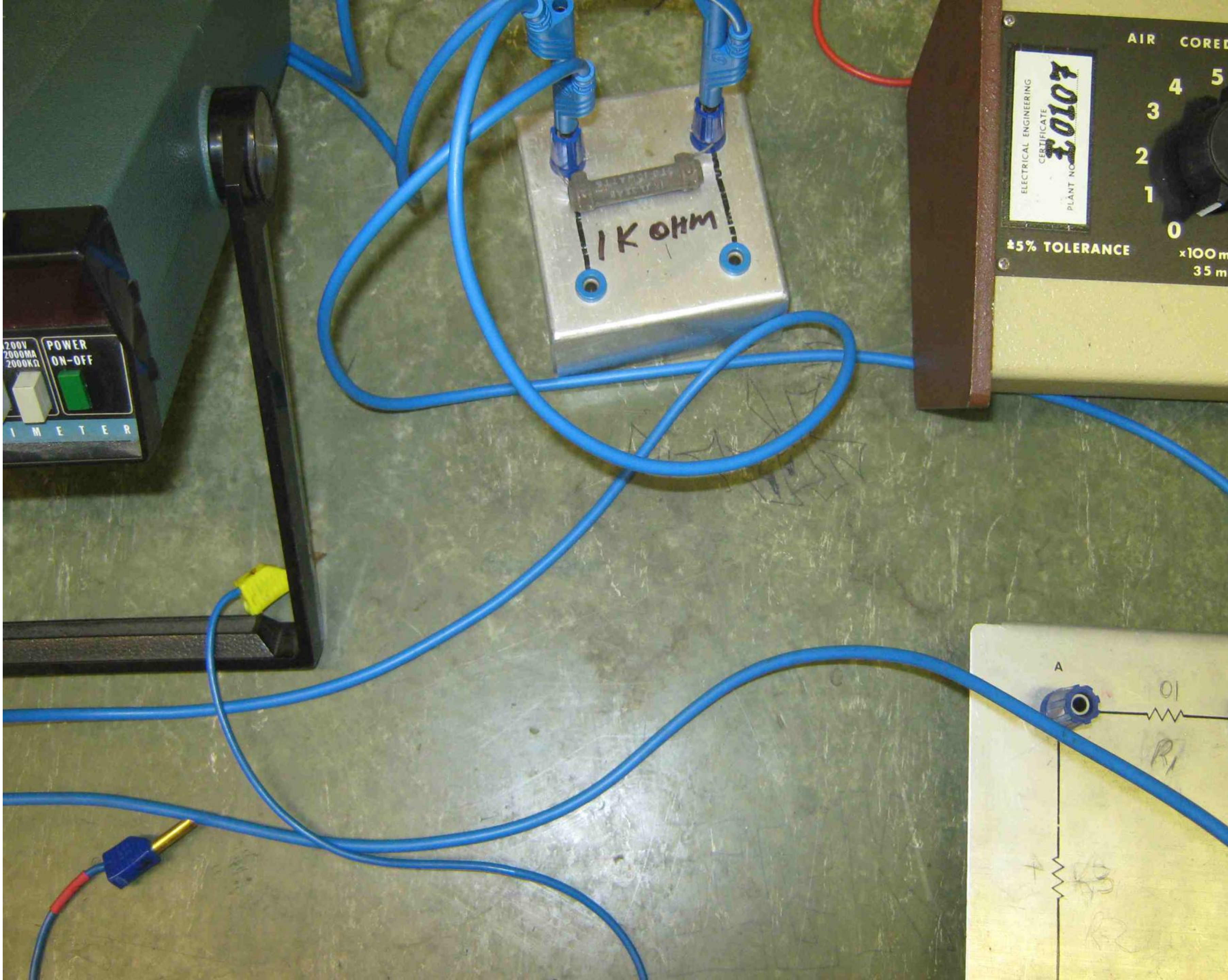
f	U2	$I = \frac{U2}{1K}$
10		
20		
30		
40		
50		
60		
70		
80		
90		
100		

HOW HAPPENS TO CURRENT?

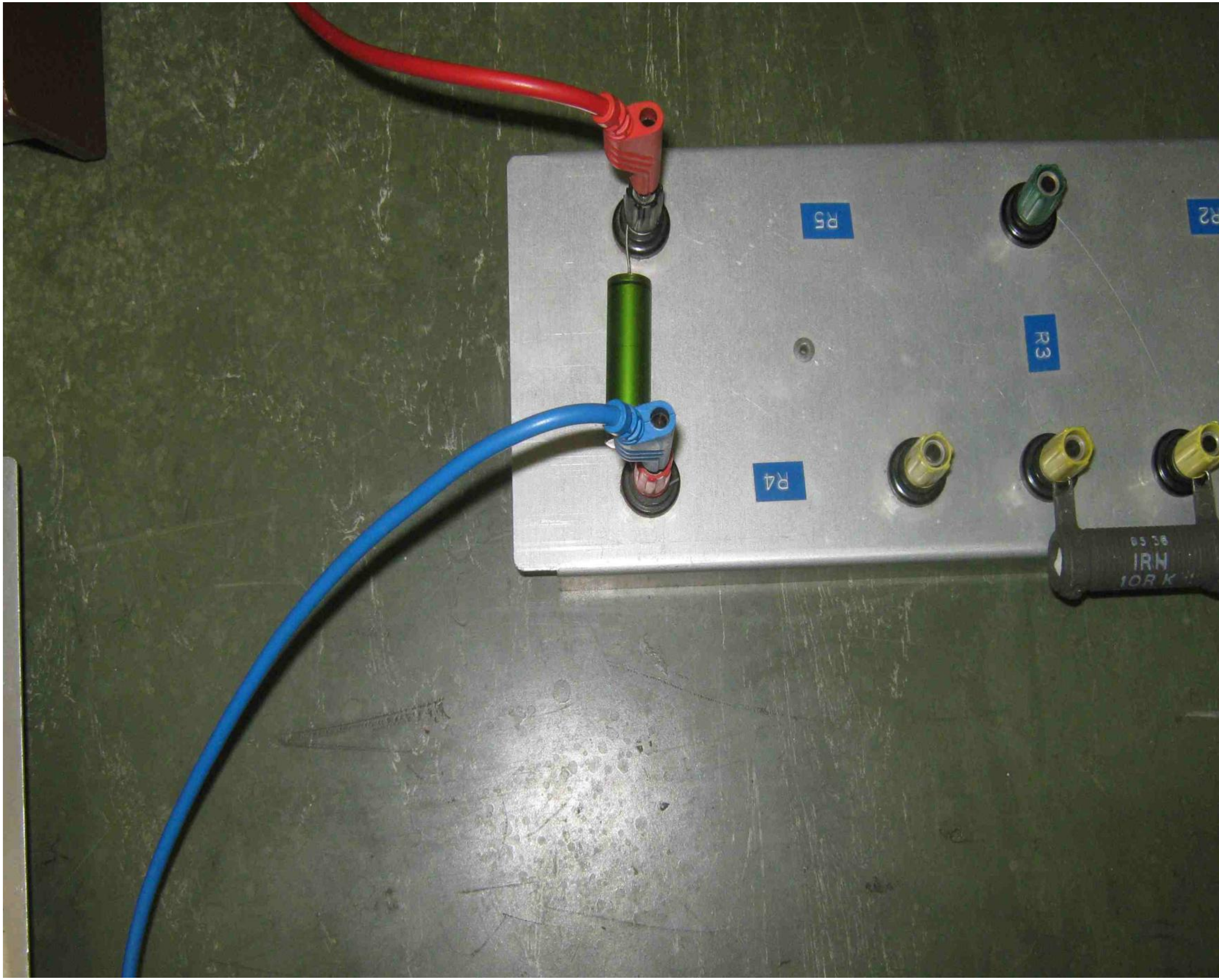


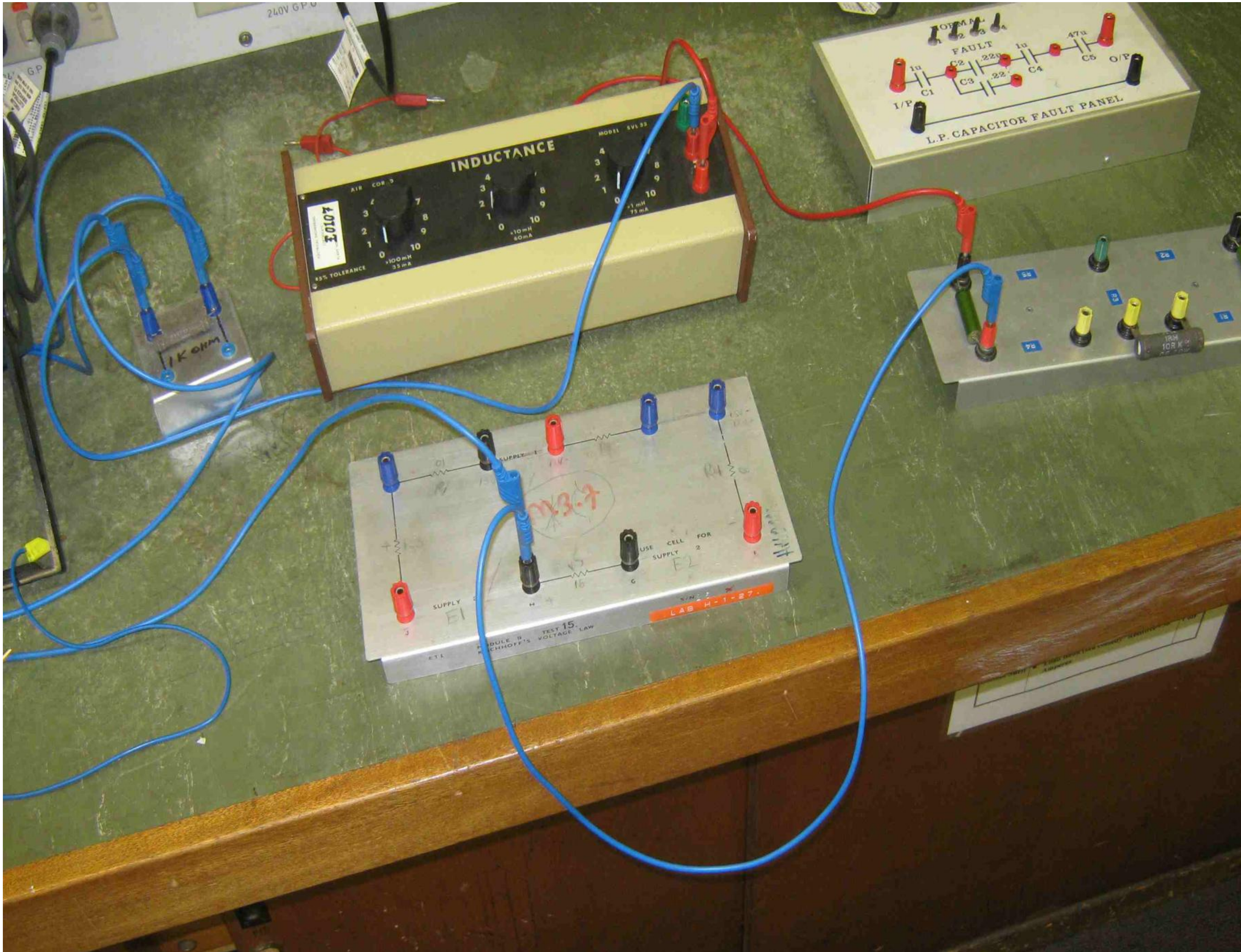

D C LOW VOLTAGE
240V PRIMARY WINDING
FUNCTION GENERATOR FG600
FEEDBACK
POWER
FREQUENCY
RANGE
.001
240V G P O
240V MAIN SWITCH
6.3V A C


MODEL : SVL 33
AIR CORED
x100 mH
35 mA
x10 mH
60mA
x1 mH
75 mA
5% TOLERANCE
ELECTRICAL ENGINEERING
CERTIFICATE
PLANT NO



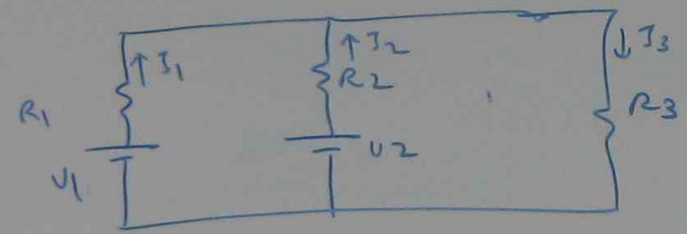
POWER
ON-OFF
1K OHM
AIR CORED
ELECTRICAL ENGINEERING
CERTIFICATE
PLANT NO
0 1 2 3 4 5
±5% TOLERANCE
x100mH
35mA
A


R5
R2
R3
R4
IRH
10R K

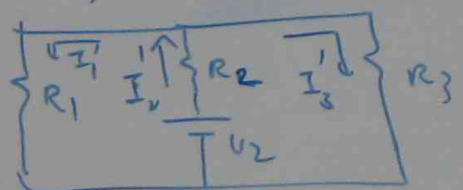

240V GPO
INDUCTANCE
MODEL SVL 33
L.P. CAPACITOR FAULT PANEL
FAULT
1K OHM
SUPPLY
USE CELL FOR SUPPLY 2
LAB H-1-27.
MODULE 9 TEST 15.
KIRCHHOFF'S VOLTAGE LAW

SUPER POSITION THEOREM

THE CURRENTS FLOWS IN A CIRCUIT CAN BE DETERMINED BY KILLING THE SOURCES ALTERNATIVELY AND VECTORIALLY ADDING THE CURRENTS.



KILL V1, FIND I_1, I_2, I_3

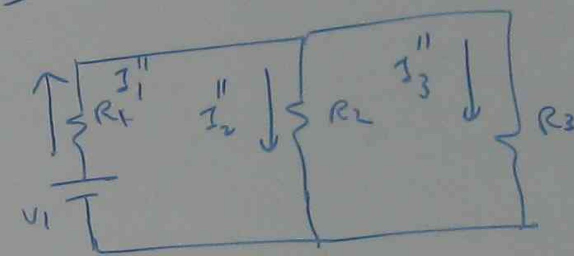


$$I_2' = \frac{V_2}{\frac{R_1 \times R_3}{R_1 + R_3} + R_2} \uparrow$$

$$I_1' = I_2' \times \frac{R_3}{R_1 + R_3} \downarrow$$

$$I_3' = I_2' \times \frac{R_1}{R_1 + R_3} \downarrow$$

KILL V2 FIND I_1, I_2, I_3



$$I_1'' = \frac{V_1}{R_1 + \frac{R_2 \times R_3}{R_2 + R_3}} \uparrow$$

$$I_2'' = I_1'' \times \frac{R_3}{R_2 + R_3} \downarrow$$

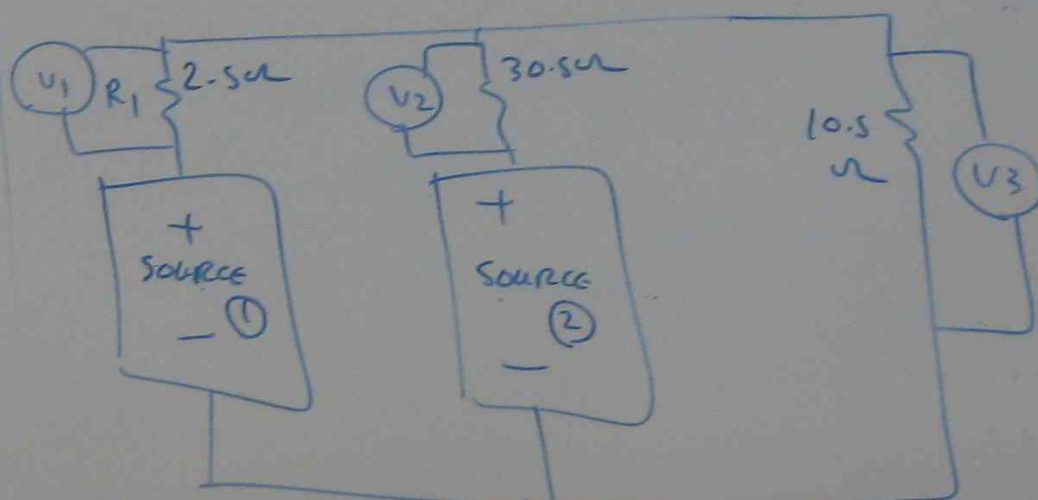
$$I_3'' = I_1'' \times \frac{R_2}{R_2 + R_3} \downarrow$$

$$I_1 = I_1' + I_1'' = I_2' \times \frac{R_3}{R_1+R_3} \downarrow - \frac{V_1}{R_1 + \frac{R_2 R_3}{R_2+R_3}} \uparrow$$

$$I_2 = I_2' + I_2'' = \frac{V_2}{\frac{R_1 \times R_3}{R_1+R_3} + R_2} \uparrow - I_1'' \times \frac{R_3}{R_2+R_3} \downarrow$$

$$I_3 = I_3' + I_3'' = I_2' \times \frac{R_1}{R_1+R_3} \downarrow + I_1'' \frac{R_2}{R_2+R_3} \downarrow$$

PRACTICAL (i) CONNECT THE GIVEN CIRCUIT



SWITCH ON SOURCE ①, TAKE V1, V2, V3

V_1	$I_1' = \frac{V_1}{R_1}$	V_2	$I_2' = \frac{V_2}{R_2}$	V_3	$I_3' = \frac{V_3}{R_3}$

SWITCH OFF SOURCE ①, SWITCH ON SOURCE ②, TAKE V1, V2, V3

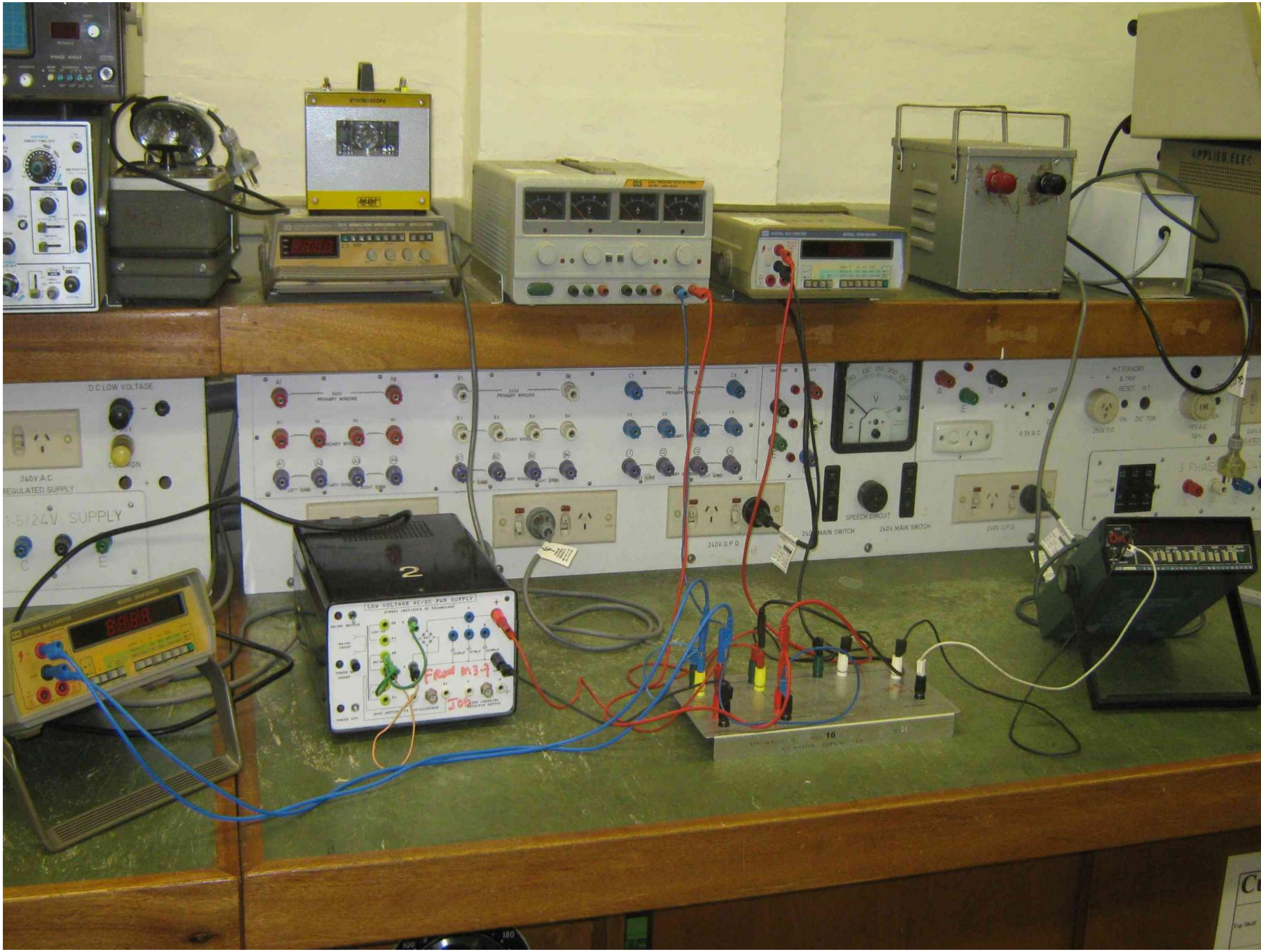
V_1	$I_1'' = \frac{V_1}{R_1}$	V_2	$I_2'' = \frac{V_2}{R_2}$	V_3	$I_3'' = \frac{V_3}{R_3}$

THEN ADD I_1' & I_1'', I_2' & I_2'', I_3' & I_3''

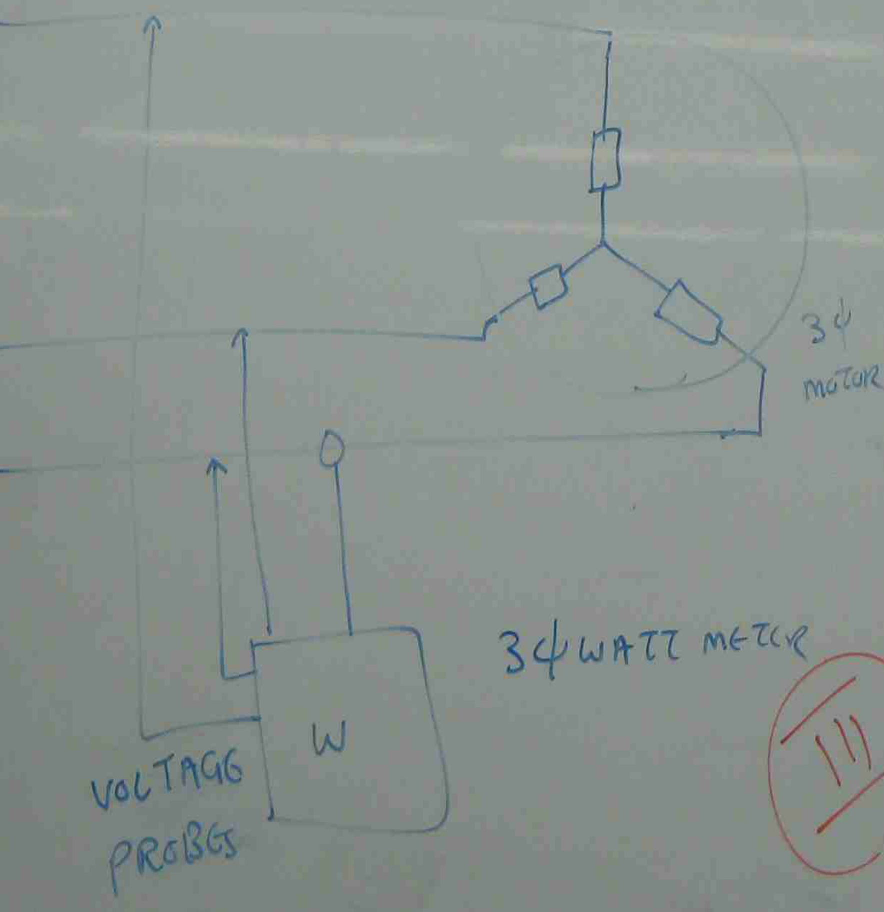
$I_1 = I_1' + I_1'' =$ | $I_2 = I_2' + I_2'' =$ | $I_3 = I_3' + I_3'' =$

SWITCH ON BOTH SOURCE ① & ② TAKE V1, V2, V3

V_1	$I_1 = \frac{V_1}{R_1}$	V_2	$I_2 = \frac{V_2}{R_2}$	V_3	$I_3 = \frac{V_3}{R_3}$

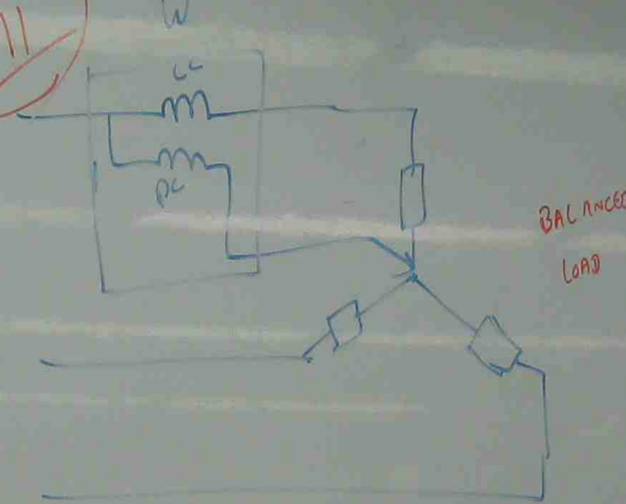

D.C LOW VOLTAGE
COMMON
240V.A.C
REGULATED SUPPLY
SUPPLY
2
LOW VOLTAGE AC/DC PWR SUPPLY
FROM M3-7
JOB
SPEECH CIRCUIT
240V MAIN SWITCH
240V MAIN SWITCH
240V G.P.O
240V G.P.O
3 PHASE
H.T STANDBY
16

3ϕ POWER MEASUREMENT



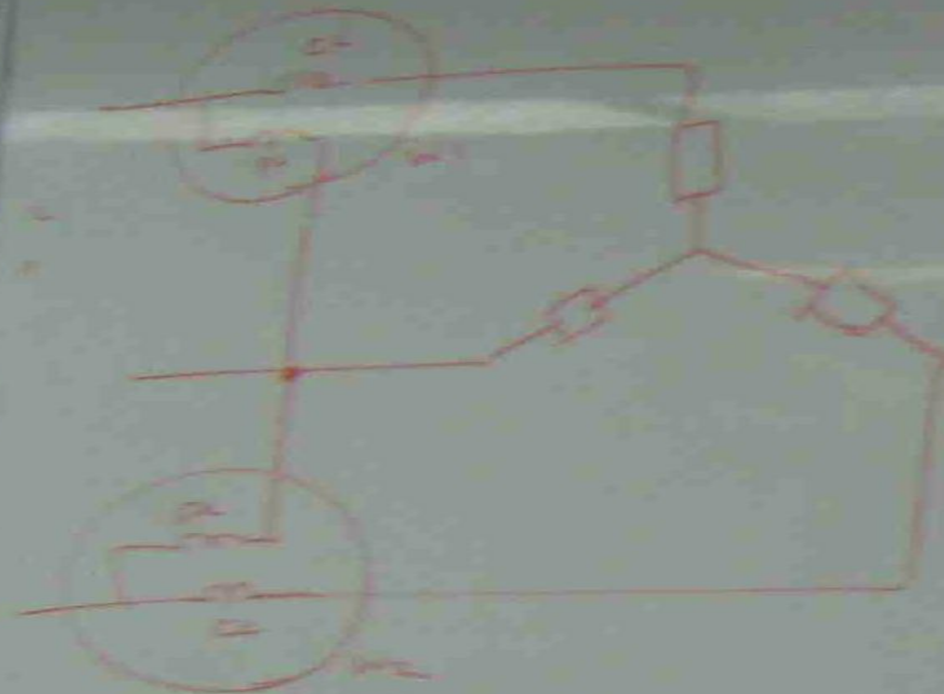
3ϕ WATT METER

II



3ϕ POWER = 3 x WATT METER READING FOR 1ϕ

III TWO WATTS METER METHOD FOR 3ϕ UNBALANCED LOAD

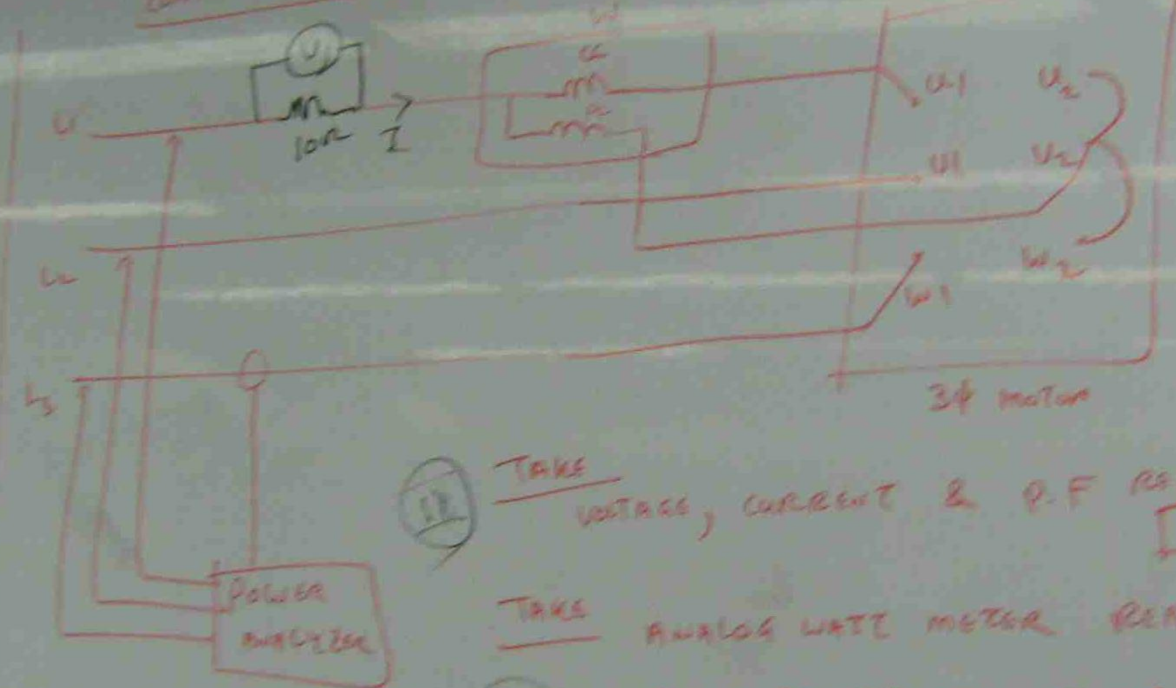


Total power = $W_1 + W_2$

I

3ϕ watt $= 3 \times \frac{415}{\sqrt{3}} \times I$

CONNECT THE CIRCUIT



(II) TAKE VOLTAGE, CURRENT & P.F READING OF POWER ANALYZER

$W = V \times I \times PF$

TAKE ANALOG WATT METER READING, CONSIDER SCALE FACTOR

(III) EX IF 150V I = 5A SETTING

5A

50V → SCALE FACTOR

ACTUAL WATT = READING X SCALE FACTOR

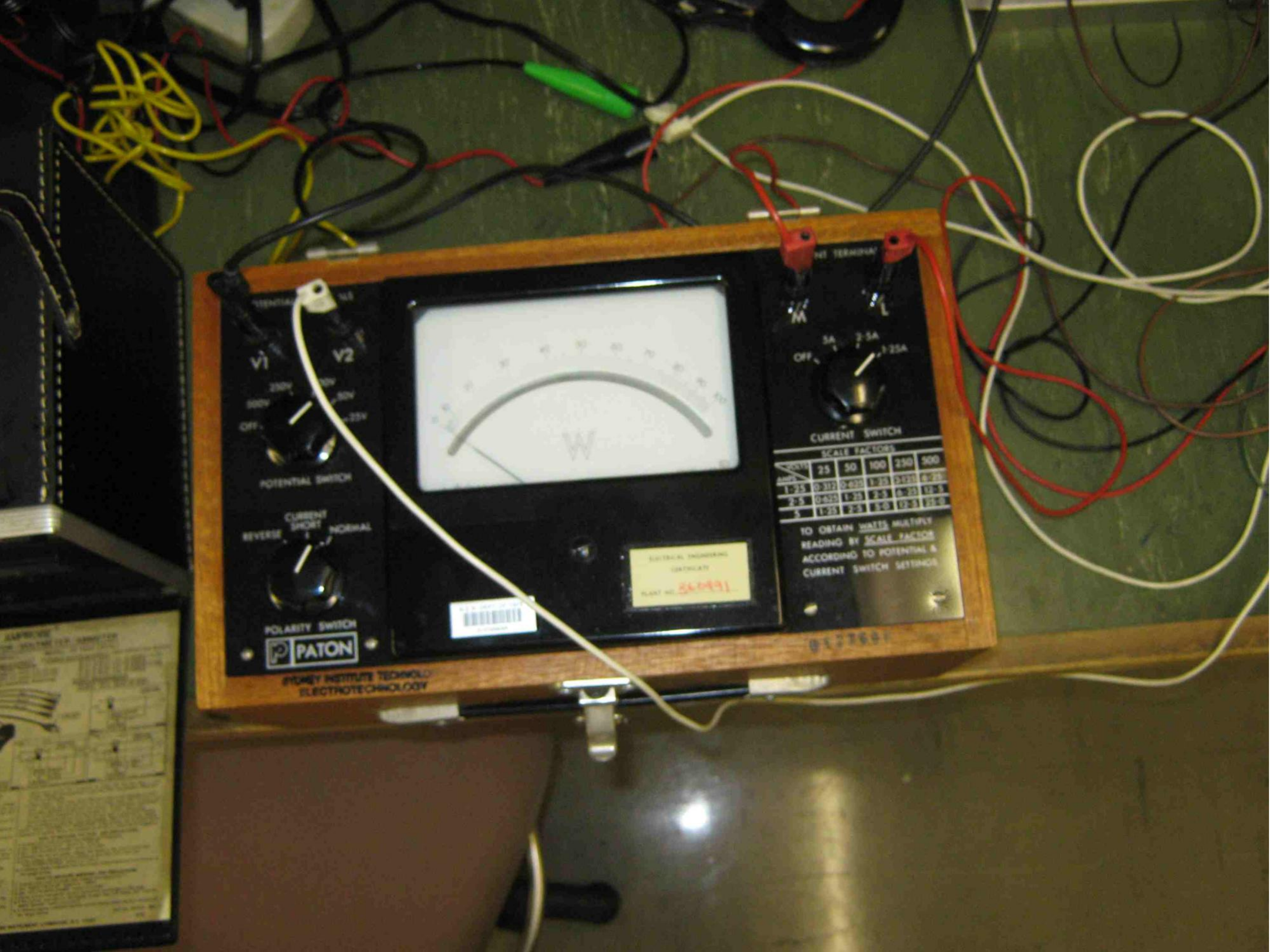
3φ MOTOR WATT = 3 X ACTUAL WATT

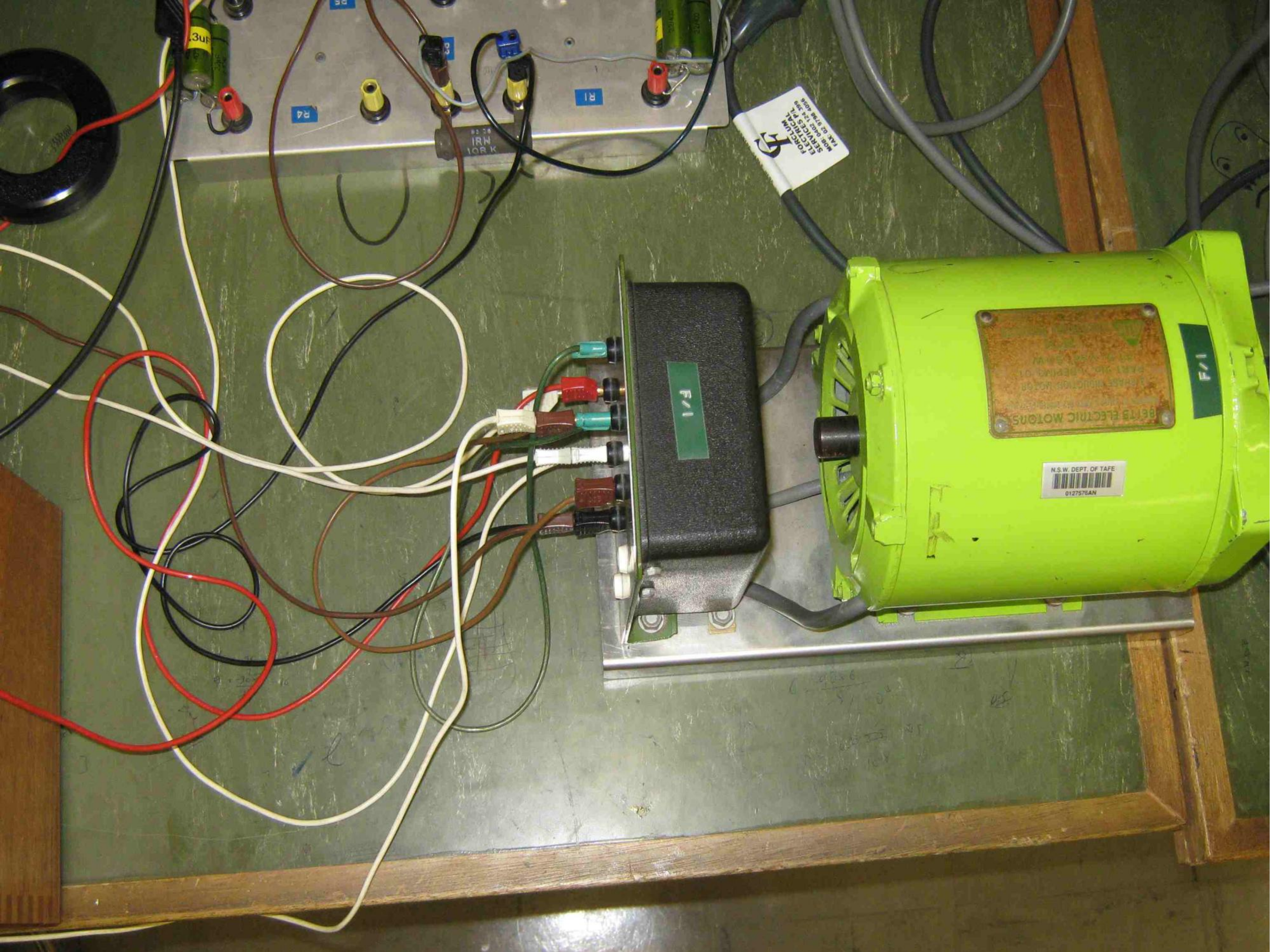
(I) $I = \frac{V_1}{10\Omega}$ Amp

3φ POWER = 3 VI

× I (APPROXIMATE)


Customer Service
Centre
TAFE
AMPROBE
MODEL PF1050
000
1.0 PF

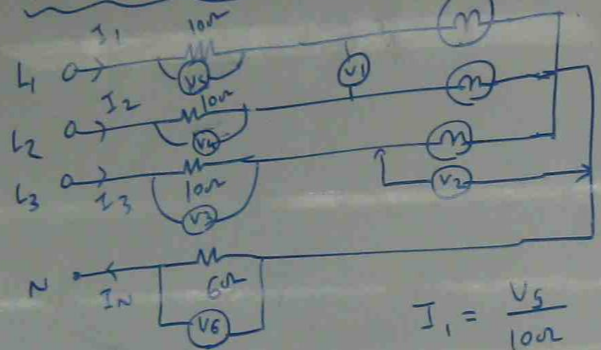

V1
V2
250V
500V
OFF
50V
25V
POTENTIAL SWITCH
REVERSE
CURRENT SHORT
NORMAL
POLARITY SWITCH
PATON
W
M
L
OFF
5A
2·5A
1·25A
CURRENT SWITCH
SCALE FACTORS
25
50
100
250
500
TO OBTAIN WATTS MULTIPLY
READING BY SCALE FACTOR
ACCORDING TO POTENTIAL &
CURRENT SWITCH SETTINGS
ELECTROTECHNOLOGY


R4
R1
F/1
F/1
N.S.W. DEPT. OF TAFE
0127576AN


DANGER 300 VOLTS.
32 VOLTS ONLY
DECADE INDUCTOR
BENCH A
C/A SERIES A.C. CIRCUITS
AMPROBE
MODEL: PF1050
VOLT/AMP/POWER FACTOR
LEADING P.F. INDICATOR
CLOCK

POWER SYSTEM ANALYSIS 3ϕ BALANCED λ & Δ CONNECTION (LAB - 2)

CONNECT THE GIVEN CIRCUIT



TAKE V_1, V_2, V_3, V_4, V_5, V_6

V_1 = LINE VOLTAGE

V_2 = PHASE VOLTAGE

V_5, V_6, V_7 = SERIES RESISTOR VOLTAGE

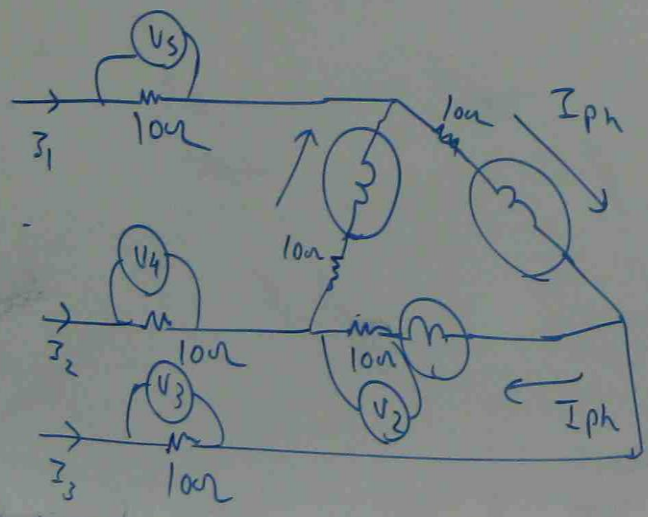
$I_1 = \frac{V_5}{10Ω}$ $I_2 = \frac{V_4}{10Ω}$, $I_3 = \frac{V_3}{10Ω}$ (I_1, I_2, I_3 = LINE CURRENT)

$I_N = \frac{V_6}{6Ω}$

COMPARE I_1, I_2, I_3, LINE TO PHASE VOLTAGE RATIO $= \frac{V_1}{V_2}$ =

COMMENT ON I_N

CHANGE THE CONNECTION TO Δ

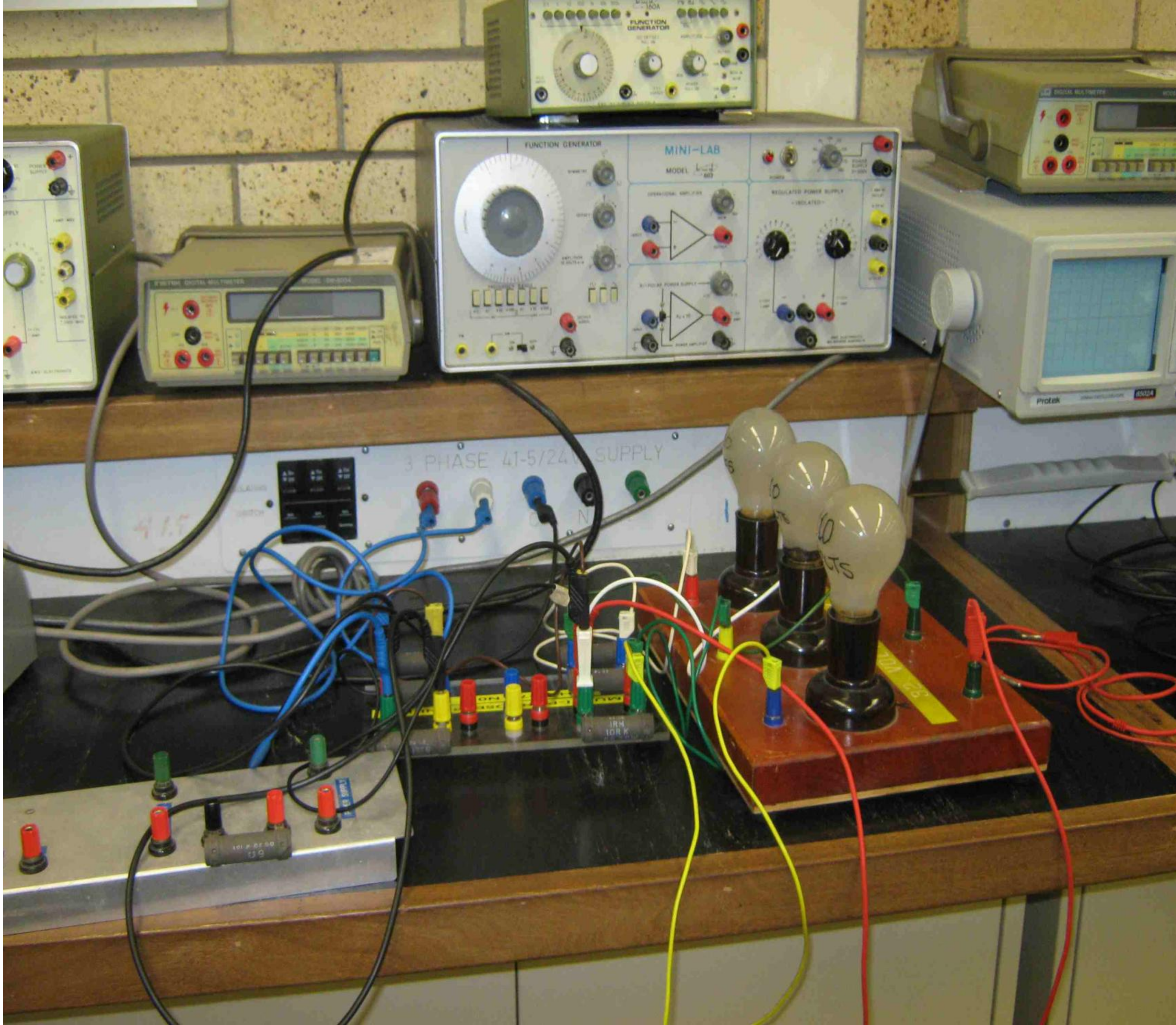


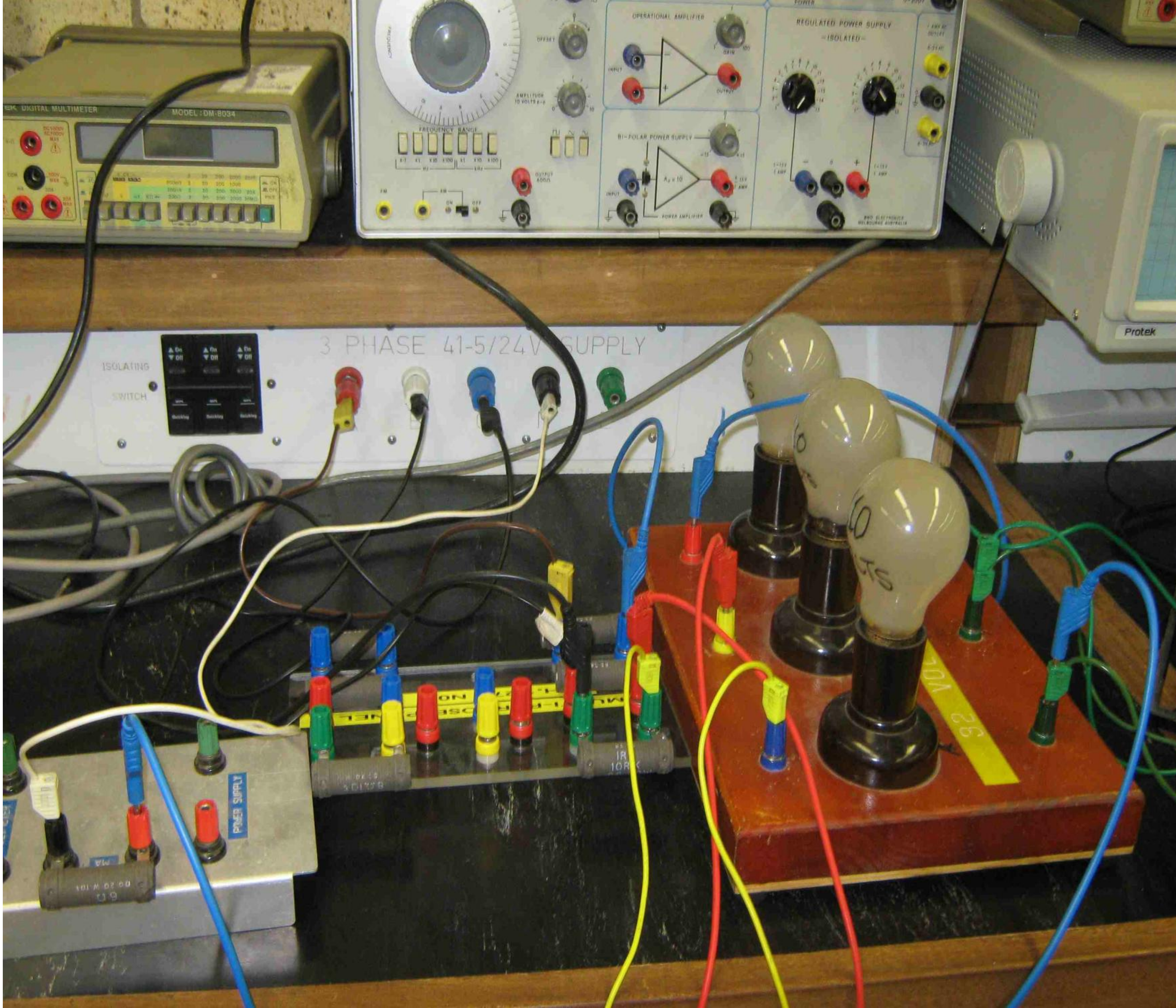
$I_1 = \frac{V_5}{10Ω}$ $I_2 = \frac{V_4}{10Ω}$ $I_3 = \frac{V_3}{10Ω}$

$I_{ph} = \frac{V_2}{10Ω}$.

CALCULATE $\frac{I_1}{I_{ph}}$, $\frac{I_2}{I_{ph}}$, $\frac{I_3}{I_{ph}}$

PROVIDE COMMENT.

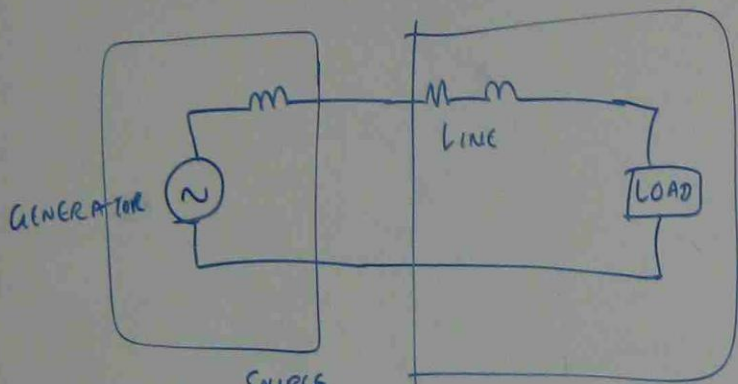

FUNCTION GENERATOR
MINI-LAB
FUNCTION GENERATOR
REGULATED POWER SUPPLY
DIGITAL MULTIMETER
Protek


DIGITAL MULTIMETER
MODEL : DM-8034
OPERATIONAL AMPLIFIER
REGULATED POWER SUPPLY
ISOLATED
BI-POLAR POWER SUPPLY
POWER AMPLIFIER
FREQUENCY RANGE
Protek
ISOLATING
SWITCH
POWER SUPPLY

MAXIMUM POWER TRANSFER THEORM

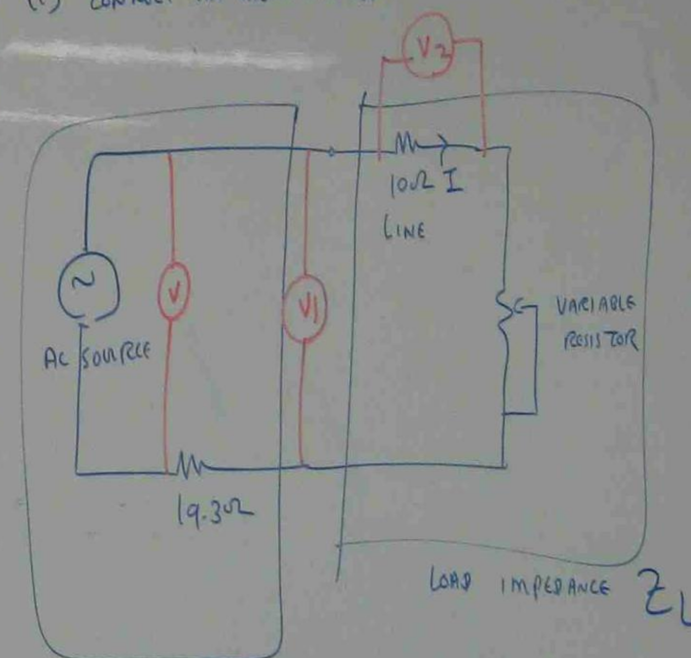
THEORM

MAXIMUM POWER IS TRANSFERRED FROM THE SOURCE WHEN SOURCE IMPEDANCE IS EQUAL TO LINE + LOAD IMPEDANCE



SOURCE IMPEDANCE = LOAD IMPEDANCE ⟶ MAXIMUM POWER IS TRANSFERRED.

(1) CONNECT THE GIVEN CIRCUIT



SOURCE IMPEDANCE

$Z_S = 19.3\Omega$

SWITCH, ADJUST THE VARIABLE RESISTOR

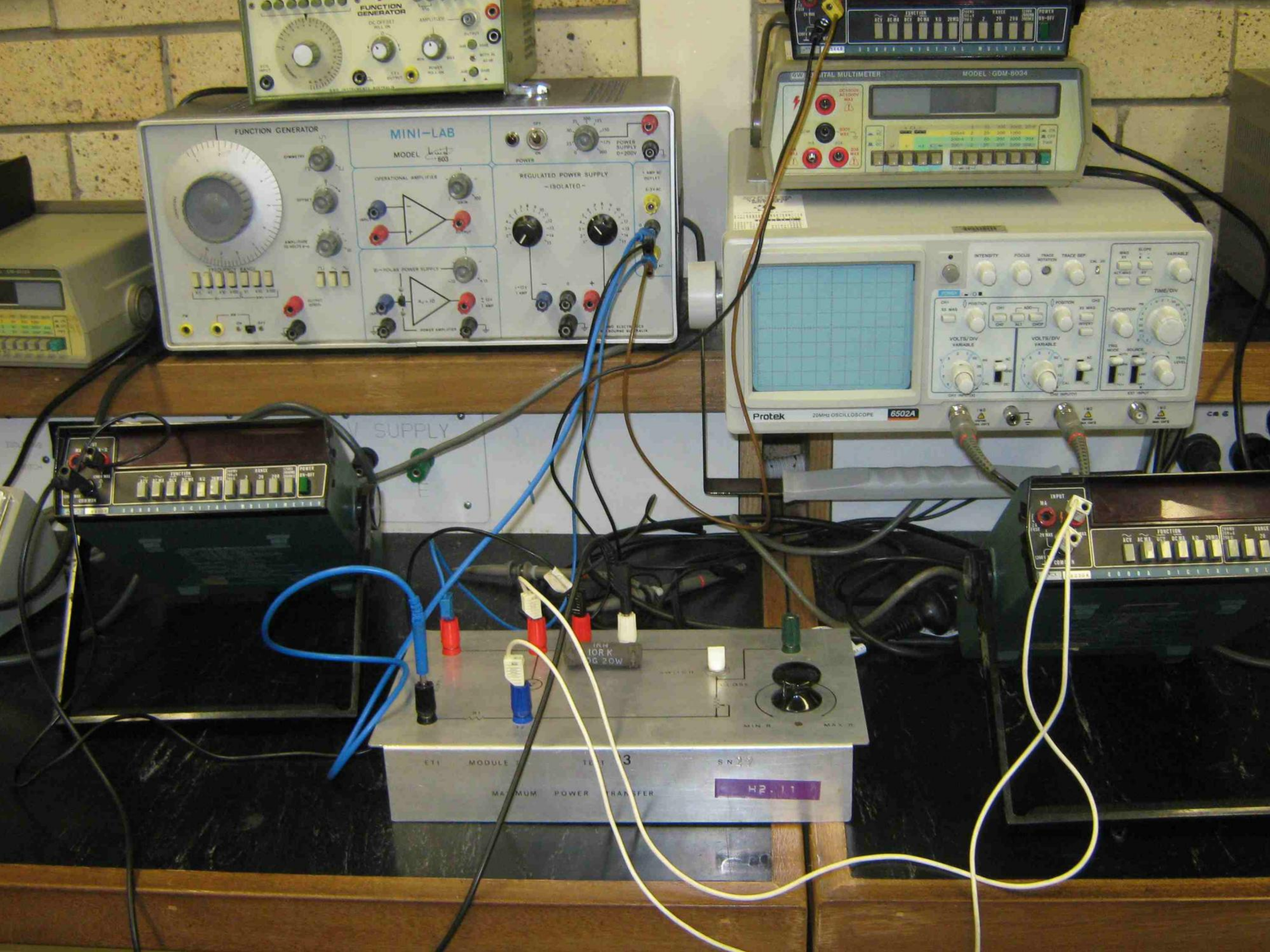
NOTE V, V_1, V_2

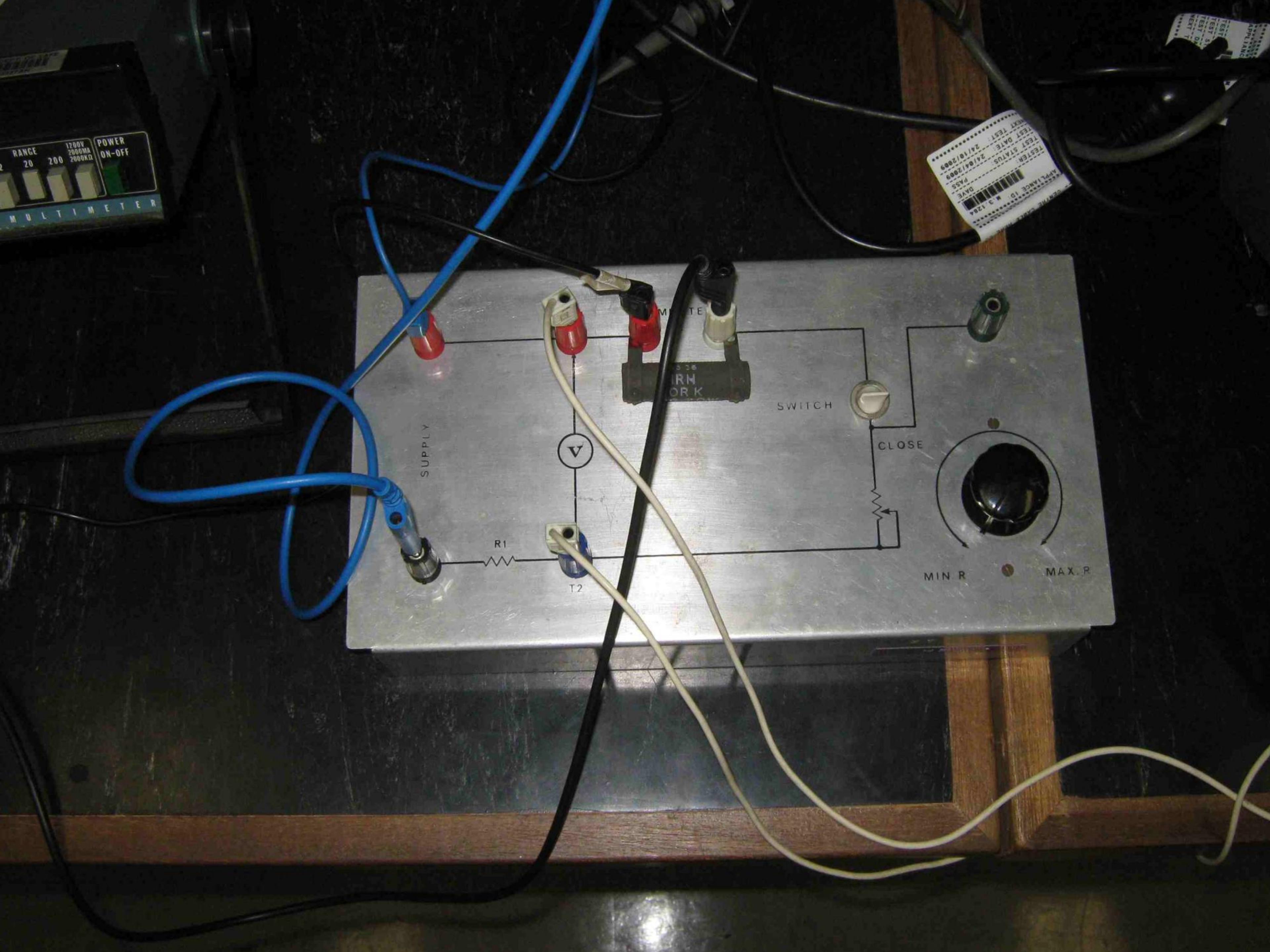
FILL IN TABLE

V Source	V1	V2	$I = \frac{V2}{10\Omega}$	POWER = $V1 \times I$
6.2	2.4			–
	3.6			–
	4.2			
	4.7			
	5.5			
	6			
	6.2			

- WHEN POWER REACHES THE MAXIMUM POINT, MEASURE, LINE + LOAD IMPEDANCE (Z_L) AND THEN COMPARE WITH SOURCE RESISTANCE

Z_L & Z_S COMPARISON


FUNCTION GENERATOR
FUNCTION GENERATOR
MINI-LAB
MODEL
603
OPERATIONAL AMPLIFIER
REGULATED POWER SUPPLY
-ISOLATED-
POWER
MODEL : GDM-8034
INTENSITY
FOCUS
TIME/DIV
VOLTS/DIV
Protek
20MHz OSCILLOSCOPE
6502A
SUPPLY
FUNCTION
RANGE
INPUT
10R K
20W
MIN R
MAX R
MODULE
TEST 3
POWER
TRANSFER
H2.11



RANGE
20
200
POWER
ON-OFF
MULTIMETER
SUPPLY
V
R1
T2
SWITCH
CLOSE
MIN R
MAX R