PROGRAM SEPENUH MASA *UTMSPACE*
UNIVERSITI TEKNOLOGI MALAYSIA INTERNATIONAL CAMPUS
EXPERIMENT 1

TITLE : **USING ANALOGUE METER AND ERROR CALCULATING**

PURPOSE : Introduce the application of volt meter, ampere meter and multi meter. To see the loading effect in volt meter, range effect in measurement and insertion effect in ampere meter.

LIST OF EQUIPMENT

dc power supply (0-30V)
dc volt meter (0.3-30V)
dc ampere meter (10-1000mA)
Multi meter
Varies of resistor

Procedure [Co1, Po2] 50%

1.0 Effect of load in volt meter

1.1 Given four (4) different value of resistor, determine the resistance value through:
- i colour code
- ii measurement using analogue multi meter

Complete the Table 1

1.2 Conect the circuit in figure 1.0. Where R_a = 27KΩ (or approximate) and R_b equals to 5.1KΩ (or approximate). By using two volt meter with different sensitivity
- i record the sensitivity (S) for each volt meter
- ii calculate the internal resistance for each meter and complete table 2

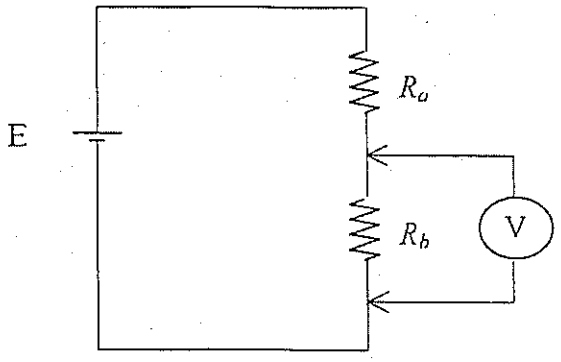

Figure 1.0

1.3 Increase the power supply to 25V. .Measure voltage across resistor R_b using meter A with range 10V. Repeat step 1.3 using meter B with same range.

1.4 Calculate voltage across R_b using voltage divider theorem.

1.5 Calculate load error for each volt meter.

1.6 Complete the result in Table 2

2.0 Error reading on multi range volt meter. [C01, P03] 25%

2.1 Refer to circuit diagram figure 1.0 with **power supply 15V**. Choose volt meter with less sensitivity. Measure voltage across R_b using range state in table 3.

2.2 Complete table 3 and determine the error percentage for every range in Table 3

2.3 Determine the suitable range for above measuring.

3.0 Meter ampere insertion effect. [C01, P03] 25%

3.1 Connect circuit in figure 2.0. Make sure power supply are set at **20V.** Choose 470Ω for resistor R. Write down the ampere reading in table 4.

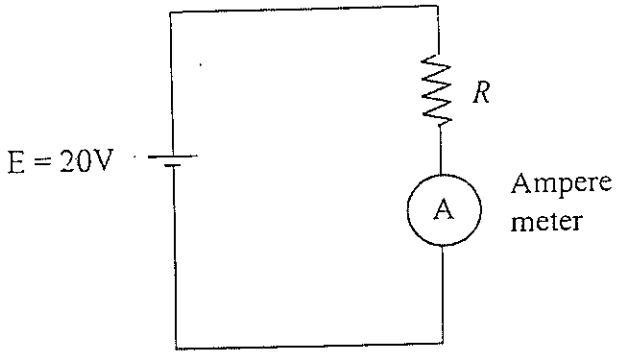

Figure 2.0

3.2 Calculate the current across resistor R using Ohm theorem.

3.3 Repeat step 3.1 and 3.2 for R equal to 1KΩ (or approximate).

3.4 Compare the calculating value with measuring value. Observe the effect of meter ampere connection for both resistors. Calculate the insertion error of ampere meter.

3.5 Write down all the result in Table 4.

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EXPERIMENT 1
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1.0 Loading effect of volt meter

No.	Colour code value	Measurement Value
1		
2		
3		
4		

TABLE 1 CO3, PO2 - 10m

Sensitivity (s) for each voltmeter are :

Meter *A* : S_A = _____ / V Meter *B* : S_B = _____ / V

Voltage calculation for R_B : _____ volt CO2, PO2 - 10m

	Sensitivity	Voltmeter Internal Resistance	Meter volt reading	Percentage of error for voltmeter
Meter A				
Meter B				

TABLE 2 CO3, PO2 - 10m

Conclusion :

CO1, PO1 - 10m

2.0 Error reading of multirange meter

Voltage calculation for R_b = _____ volt CO3 PO2 - 2m

	Meter volt reading	Percentage of error
Range 3V		
Range 10V		
Range 30V		

CO3 PO2 - 10m

TABLE 3

Choose the best range : _____ CO2 PO2 - 3m

Conclusion :

CO1 , PO1 - 10m

3.0 Insertion effect of ampere meter

Resistance R	Ampere Meter Reading	Calculation for Current	Percentage of Insertion error
470 Ω			
1 KΩ			

TABLE 4 CO3 , PO2 - 15m

Conclusion :

CO1 , PO1 - 10m