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**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA**

 **FACULTY OF SCIENCES**

 **DEPARTMENT OF PURE AND APPLIED SCIENCE**

 **JULY 2018 EXAMINATIONS**

**COURSE CODE: PHY 391**

**COURSE TITLE: PHYSICS LABORATORY II**

**CREDIT UNIT 2**

**TIME ALLOWED (2 HRS)**

**INSTRUCTION: *Answer question one (1) and any other three (3) questions***

**QUESTION 1**

 **Q1. (a).** State the Thevenin’s Theorem. ***4 marks***

**(b).**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S. No. | Load Resistance (R*L*) ohms | Output Voltage (V0) volts | V02 volts | Power TransferP= V02/ R*L* |
| 12345678 | 2461014182226 | 204060100140180220260 |  |  |

Complete the Table ***2marks***

Plot a graph of R*L* against V02 ***4marks***

Calculate the slope ***2marks***

What is the meaning of the slope ***2marks***

**c)** Three capacitors of capacitance C1=2μ, C=2μ and C=3μ are connected in Parallel, calculate the Effective Capacitance of the circuit. ***3 marks***

**d)** Mention two important characteristics of thermistor ***4marks***

**e)**What do you mean by energy gap in a semiconductor?***4marks***

**QUESTION 2**

2.a. With the aid of a diagram explain the Energy Band Diagram ***9 marks***

b. Define the following:

 i. Network Branch ***2 marks***

 ii. Couple ***2 marks***

c. What is the use of a Polaroid? ***2 marks***

**QUESTION 3**

3. a. Differentiate between a Converging lens and a Diverging lens. ***9 marks***

**b**. Define Resistivity of a wire. ***3 marks***

**c**. Define Common Mode Rejection Ratio (CMRR). ***3 marks***

**QUESTION 4**

Q. 4To investigate the value of a resistor in parallel connections, the following observation were made:

|  |  |  |  |
| --- | --- | --- | --- |
| S/N | R Ω | I (A) | V (v) |
| 1 | 2.0 | 0.90 | 1.10 |
| 2 | 3.0 | 0.80 | 1.20 |
| 3 | 4.0 | 0.75 | 1.30 |
| 4 | 5.0 | 0.70 | 1.40 |
| 5 | 7.0 | 0.65 | 1.50 |
| 6 | 10.0 | 0.60 | 1.60 |

Evaluate $R^{-1}$ and y $=\frac{1}{V}$ and, tabulate your readings. ***(4 marks)***

Plot a graph with y on the vertical axis and $R^{-1}$ on the horizontal axis. ***(5 marks)***

Determine the (i) slope of the graph.

 (ii) Intercept on the vertical axis. ***(3 marks)***

Calculate the error in the slope. ***(1 mark)***

Given the expression : $\frac{I}{V}=\frac{1}{R}+\frac{1}{S}$ ***(1 mark)***

Where S is the resistance of the resistor connected in parallel with R. Deduce the value of S from your graph.

State two sources of error and how to prevent them. ***(1 mark)***

**QUESTION 5**

Q.5 A student used the light box, metre rule, convex lens, screen and cardboard tube to

perform an experiment to investigate the magnification, m of the image formed on the

screen. The following observations were made:

|  |  |  |
| --- | --- | --- |
| u (cm) | v (cm) | d (cm) |
| 20.0 | 60.0 | 23.0 |
| 22.0 | 58.0 | 19.0 |
| 23.0 | 57.0 | 22.5 |
| 24.0 | 56.0 | 21.5 |
| 25.0 | 55.0 | 24.0 |

a. Evaluate (i) m $=\frac{v}{u}$ and, (ii) x $=$ v $–$ d, and tabulate your readings. ***(4 marks)***

b. Plot a graph with m on the vertical axis and d on the horizontal axis. ***(4 marks)***

c. Determine the slope of the graph. ***(2 marks)***

d. Determine the intercept on the horizontal axis. ***(1 mark)***

e. Find the error in the slope. ***(1 mark)***

f. Given the expression; m $=\frac{1}{f}$ d $+\frac{(x -1)}{f}$

 Calculate the values of f and x from the graph. ***(3 marks)***