NATIONAL OPEN UNIVERSITY OF NIGERIA
PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA
FACULTY OF SCIENCES

DEPARTMENT OF PURE AND APPLIED SCIENCE

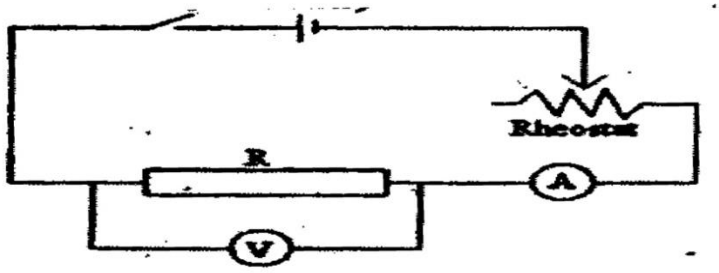
2021_2 EXAMINATIONS

COURSE CODE: **PHY 492**
COURSE TITLE: **LABORATORY PHYSICS III**
CREDIT UNIT: **3**
TIME ALLOWED: **(2½ HRS)**

INSTRUCTION: ***Answer question 1 and any other four questions***

QUESTION 1

In an experiment to verity Ohm's law and to compare the effect of combining resistors in and resistor, you are supplied with two (2) resistance while the third one X, has unknown value.



For R in the diagram above, use

i. X_1 only
ii. X_2 only
iii. X_1 and X_2 in series
iv. X_1 and X_2 in parallel

The readings were tabulated as shown below

X_1 only		**X_2 only**		**X_1& X_2 series**		**X_1 and X_2 in parallel**	
V (v)	I (A)	V (v)	I (A)	V (v)	I (A)	V (v)	I (A)
0.1	0.045	0.15	0.05	0.2	0.04	0.20	0.17
0.3	0.15	0.25	0.10	0.25	0.05	0.4	0.33

0.4	0.18	0.5	0.17	0.5	0.1	0.65	0.40
0.45	0.2	0.7	0.25	0.65	0.13	0.7	0.6
0.7	0.35	0.9	0.32	0.9	0.2	0.95	0.8

A. On the same graph sheet, plot a graph of V against I for each set of data. (**11 Marks)**
B. Calculate the slope for (i) to (iv) and hence determine the values of X, (**6 Marks)**
C. State Ohm's law and try to relate it to your results and deductions above (**3 Marks)**
D. Mention two precautions you took while performing the experiments. (**2 Marks)**

QUESTION 2

A student made the following observations during the investigation of properties of a electrical circuit.

V (v)	48	48	48	48	48	48	48	48	48	48
C (μF)	2	4	6	8	10	12	14	16	18	20
I (rms) A	5.0	9.0	18.0	24.0	32.0	22.0	18.0	12.0	8.0	7.0

(a) Determine $Z = \frac{V}{I}$ and tabulate your readings. **(5 marks)**

(b) (i) Plot a graph with Z on the vertical axis and C on the horizontal axis. **(3 marks)**

(ii) On the same axis plot a graph of I versus C **(2 marks)**

(c) Determine the value of C when I is maximum. **(2 marks)**

Recall that at maximum current, $X_L = X_C$

$2\pi fl = \frac{1}{2\pi fc}$

QUESTION 3

A. Mention any two reasons for carrying out P – N junction diode characteristics experiment (Two objectives of P – N junction diode characteristics experiment). **(3 marks)**

B. Discus the procedure to be taken in P – N junction diode **(5 marks)**

C. How depletion region is formed in the PN junction **(4 marks)**

QUESTION 4

A. How does the Zener breakdown voltage vary with temperature? **(3 marks)**

B. Explain the following terms: (i) Semiconductor (ii) Doping (iii) N-type Semiconductor

(3 marks each)

QUESTION 5

A. Draw the experimental set-up of the experiment for Investigation of the properties of a series resonance circuit. 9 marks

B. List any three (3) apparatus used in the experiment for Investigation of the properties of a series resonance circuit. 3 marks

QUESTION6

A.List any six apparatus used in the experiment to measure the thickness of paper or tinfoil by means of interference fringes. 6 marks

B. Draw the experimental set-up of the experiment to measure the thickness of paper or tinfoil by means of interference fringes. 6 marks