



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

DEPARTMENT OF PURE AND APPLIED SCIENCE
SEPTEMBER 2020_1 EXAMINATION

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

a) A NOUN Physics student performed experiment on light and got the following results:

U (cm)	V (cm)
16.50	51.00
20.00	34.00
28.00	23.00
45.00	17.50
60.0	15.50

- i) Prepare a composite table containing $U + V$ and UV for each reading above. **(5 marks)**
- ii) Plot a graph of $U + V$ against UV **(6 marks)**
- iii) Determine the slope S of the graph. **(2 marks)**
- iv) Deduce $\frac{1}{S}$ **(1 mark)**
- b) Given that the lens equation; $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$ and magnification (m) is $m = \frac{u}{f} - 1$.
- i) What type of graph is the plot of m against u ? **(3 marks)**
- ii) What is the slope of the graph of m against u ? **(3 marks)**
- iii) If s is the slope, what is $\frac{1}{S}$? **(2 marks)**

QUESTION 2

- a) Mention three (3) apparatus required in determining the radius of curvature of a lens by mirror method. **(3marks)**
- b) If x is the distance of the object from the lens, r is the radius of curvature of the lens and f is the focal length of the mirror, state the equation that relates x , r and f . **(3 marks)**

- c) State 3 first steps required in the experiment to determine refractive index of a glass and liquid by real and apparent depth method by using travelling microscope **(6 marks)**

QUESTION 3

a) Mention two (2) types of amplifiers **(2 marks)**

(b) State the equation for Gains in terms of Voltage and Resistance **(2 marks)**

(b) Given that resonance frequency f_r is given by $f_r = \frac{1}{2\pi\sqrt{LC}}$

i) Define the parameter L and C **(2 marks)**

ii) How can you use the above equation to investigate the properties of a series resonance circuit ? **(4 marks)**

iii) What is the reason why minimum value of V_{LC} is non-zero? **(2 marks)**

QUESTION 4

a) What is meant by the statement the refractive index of glass is 1.5? **(4 marks)**

b) The bottom of a pool 4m deep appears to displaced by 1m when view from above. Calculate the refractive index in pool. **(6 Marks)**

c) State two (2) precautions taken to obtain accurate result is the determination of refractive index. **(2 marks)**

QUESTION 5

a. What is the function of operational Amplifier (OP-AMP)? **(3marks)**

b. Mention three (3) properties of OP-AMP **(3 marks)**

c. Draw a simple diagram of OP-AMP **(4 marks)**

d. What makes a measurement to be precise? **(2 marks)**

QUESTION6

(a) What is: i) forward bias diode? **(3 marks)**

ii) reverse bias diode ? **(3 marks)**

b) State three (3) precautions that should be taken in the experiment of drawing the I-V characteristics of P-n junction in forward and reverse bias. **(3 marks)**

c) State three (3) sources of errors. **(3 marks)**