



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

DEPARTMENT OF PURE AND APPLIED SCIENCE

2020_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

- What is the relationship between the focal length and radius of curvature of a lens 2mks
- If the radius of curvature is 12.056cm, what is the focal length? 3mks
- Put down an equation relating object and image distances from the lens, size of the object and image and magnification 5mks
- If the object distance from the lens is 3 cm and the image distance is 5cm, object size is 7 cm, what is the image size? 3mks
- Sketch a well labelled diagram of Cathode Ray Oscilloscope that can be used to measure D.C. voltage. 4mks
- What do you understand by the term interference? 2mks
 - Derive the relationship between the thickness t and order of interference of the thin film in the wedge experiment 3mks

QUESTION 2

- Briefly explain the device amplifier 4mks
- Write down three (3) differences between the inverting and non – inverting OP – AMP amplifier 3mks
- What is the significance of the negative sign in the gain of inverting amplifier? 1mk
 - If R_2 is short circuited and R_1 is open, what is the effect in a non – inverting amplifier 1mk

- d. If V_+ is $450\mu\text{V}$ and V_- $300\mu\text{V}$ and open loop gain is 100,000. What is the output voltage? 3mks

QUESTION 3

- a. What is an npn transistor? 2mks
- b. Mention three (3) parts of a transistor 1.5mks
- c. What do you understand by the current gain in common emitter npn transistor? 2.5mks
- d. If the change in collector current is 2.7mA and change in base current is $25\mu\text{A}$.
What is the gain? 3mks
- e. How do you calculate the output resistance for a particular base current 3mks

QUESTION 4

- a. List the apparatus required to investigate the properties of series resonance circuit 3mks
- b. How are the materials listed in 4a connected serially? 1.5mks
- c. How would you measure the voltages in :
Inductor L, Capacitor C and LC? 4.5mks
- d. What do you understand by impedance? 3mks

QUESTION 5

- a. List the apparatus that are required to investigate the properties of a parallel resonance circuit 2.5mks
- b. How can one connect the apparatus mentioned in 6a to measure the properties? 2.5mks
- c. What is the difference between the graphs plotted in series resonance circuit and parallel resonance circuit? 2mks
- d. A series RLC circuit with $R = 10\Omega$, $L = 0.2\text{mH}$ and $C = 0.08\mu\text{F}$ is connected to an alternating voltage. If the amplitude of the alternating voltage source is 3.0V ,
- e. calculate:
- i) the resonance frequency f_o of the circuit. 3mks
- ii) the amplitude of the A.C. at resonance 2mks

QUESTION 6

- a. Sketch the diagram for demonstration of half wave rectification 3mks
- b. Describe how the set up in 6a explains the action of the diode 3mks
- c. Does the connection to CRO affect the A.C. wave form? If so how? 4mks
- d. What is the effect of connecting capacitors parallel to R when S is open 2mks