



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: PHY391

COURSE TITLE: PHYSICS LABORATORY II

CREDIT UNIT: 2

TIME ALLOWED: (2 HRS)

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

QUESTION 1

- a). Distinguish between active network, branch, mesh and node or junction. **(6 marks)**
- b). Explain briefly how electrical resistance of materials varies with temperature. **(4 marks)**
- c). List any five (5) apparatus for construction and characterisation of power supplies & filters **(4 marks)**
- c(i). Distinguish between common mode rejection ratio (CMRR) and common mode voltage range **(4 marks)**
- c(ii). Explain briefly, the term “negative feedback”. **(4 marks)**
- d (i). With the aid of diagram, explain a voltage follower circuit. **(3 marks)**

QUESTION 2

- a) In the experiment of spectral analysis using a prism spectrometer, list five (5) apparatus needed for the experiment. **(5 marks)**
- b) What do you understand by dispersion of light? **(5 marks)**
- c) Define refractive index and give mathematical expression of relationship between wavelength and refractive index. **(5 marks)**

QUESTION 3

- a) What is a polychromatic light? **(3 marks)**
- b) Why do the fringes in Young's experiment have equal width? **(6 marks)**
- c) List four (4) methods that can be used to determine the focal length of a convex lens. **(6 marks)**

QUESTION 4

- a) A 3.0 cm tall object is placed along the principal axis of a thin converging lens of 30.0 cm focal length. If the object distance is 40.0 cm. Determine the image distance and height. **(6 marks)**
- b) Distinguish between metals, semiconductors and insulators in terms of energy gap **(9 marks)**

QUESTION 5

- a) What is latent heat? **(3 marks)**
- b) 2 kg of ice at -20°C is mixed with 5 kg of water at 20°C in an insulating vessel having a negligible heat capacity. Calculate the final mass of water in the vessel. It is given that the specific heats of water and ice are $1\text{kcalkg}^{-1}\text{ }^{\circ}\text{C}^{-1}$ and $0.5\text{kcalkg}^{-1}\text{ }^{\circ}\text{C}^{-1}$ respectively and the latent heat of fusion of ice is 80 kcal/kg. **(6 marks)**
- c) Explain three different methods of heat transfer. **(6 marks)**