



NATIONAL OPEN UNIVERSITY OF NIGERIA
PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA
FACULTY OF SCIENCES
DEPARTMENT OF PHYSICS
2025_2 EXAMINATIONS

COURSE CODE: PHY391
COURSE TITLE: PHYSICS LABORATORY II
CREDIT UNIT: 2
TIME ALLOWED: (2 HRS)
INSTRUCTION: *Answer question 1 and any other two questions*
QUESTION ONE

- (A) What is an electrical network? (3 marks)
- (B) List four (4) constituents of an Electric circuit (4 marks)
- (C) With the aid of circuit diagrams, differentiate between half and full-wave rectifiers (8 marks)
- (E) With the aid of diagram, explain a voltage follower circuit. (4 marks)
- (F)i. Why is a diverging lens called a negative lens? (2marks)
- ii. State four differences between converging lens and diverging lens (4 marks)
- (G) State how to make an unpolarised light be linearly polarized. (2marks)

QUESTION 2

- (A)i. What is an OP-amp? (3 marks)
- ii. List two inputs of an op amp. (2 marks)
- (B) What will happen if an unfiltered voltage is given to a radio set? (3 marks)
- (C) Which kind of filter is preferable at heavy loads? (2 marks)
- (D) Calculate the gain for the inverting OP Amp if the values of the resistance are given as:
- i) $R_R = 5k\Omega$, $R_F = 12k\Omega$ (2 marks)
- ii) $R_R = 5k\Omega$, $R_F = 5k\Omega$ (2 marks)
- iii) $R_R = 5k\Omega$, $R_F = 2.5k\Omega$ (2 marks)
- iv) State 2 observations from the results gotten from i, ii and iii. (4 marks)

QUESTION THREE

- (A) What is polychromatic light? (2 marks)
- (B) Why do the fringes in Young's experiment have equal width? (3 marks)
- (B) i. List four (4) methods that can be used to determine the focal length of a convex lens. (6 marks)
- ii. State three precautions to avoid error in an experiment to determine focal length (3 marks)

- (D) An object is 7 cm in front of a convex lens of focal length 9 cm. Determine; (i) the position of its image (3 marks)
- (ii) magnification of its image (2 marks)
- (iii) is the image real or virtual (1 mark)

QUESTION FOUR

- (A) State Malus's law (2 marks)
- (B) Name any five parts of a spectrometer (5 marks)
- (C) Explain briefly how the electrical resistance of materials varies with temperature. (5 marks)
- (D) List five apparatus needed to determine the angle of a prism. (5 marks)
- (E) Calculate the specific heat at constant pressure (C_p) of 1 mole of nitrogen gas of specific heat at constant pressure (C_v) $740 \text{ J/kg} \cdot \text{K}$. (take universal gas constant, $R = 831 \text{ J/mol K}$) (3 marks)

QUESTION FIVE

- (A) Difference between latent heat of fusion and heat of vaporization. (4 marks)
- (B) Briefly explain how evaporation causes cooling. (6 marks)
- (C) What quantity of heat will be necessary to change 2 kg of ice at 0°C to water at 10°C . Specific latent heat of fusion of ice is $3.36 \times 10^5 \text{ Jkg}^{-1}$, and specific heat capacity of water is 4200 JkgK^{-1} . (8 mark)
- (D) What is the polarisation for light coming out of a quarter-wave plate? (2 marks)