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) $R_R = 5k\Omega, \quad R_F = 12k\Omega$ **(2 marks)**

   ii) $R_R = 5k\Omega, \quad R_F = 5k\Omega$ **(2 marks)**

   iii) $R_R = 5\,k\Omega, \quad R_F = 2.5k\Omega$ **(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 afocal 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 $(C_v)740J/kg.K.$ (take universal gas constant, $R = 831\ J/mol\ K$) **(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 0^0C to water at 10^0C. Specific latent
heat of fusion of ice is $3.36 \times 10^5\ Jkg^{-1}$, 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)**