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**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA**

**FACULTY OF SCIENCES**

**DEPARTMENT OF PURE AND APPLIED SCIENCE**

 **OCT/NOV 2019 EXAMINATIONS**

**COURSE CODE: PHY 391**

**COURSE TITLE: PHYSICS LABORATORY II**

**CREDIT UNIT: 2**

**TIME ALLOWED: (2 HRS)**

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

**QUESTION 1**

 A student used the light box, metre rule, convex lens, screen and cardboard tube to

perform an experiment to investigate the magnification, m of the image formed on the

screen. The following observations were made:

|  |  |  |
| --- | --- | --- |
| u (cm) | v (cm) | d (cm) |
| 20.0 | 60.0 | 23.0 |
| 22.0 | 58.0 | 19.0 |
| 23.0 | 57.0 | 22.5 |
| 24.0 | 56.0 | 21.5 |
| 25.0 | 55.0 | 24.0 |

1. Evaluate m $=\frac{v}{u}$ (2.5 Marks)
2. (i) Calculate x $=$ v $–$ d (2.5 Marks)

(ii) And tabulate your readings. (2 Marks)

1. Plot a graph with m on the vertical axis and d on the horizontal axis. (6 Marks)
2. Determine the slope of the graph. (2 Marks)
3. Determine the intercept on the horizontal axis. (2 Marks)
4. Find the error in the slope. (2 Marks)
5. Given the expression; m $=\frac{1}{f}$ d $+\frac{(x -1)}{f}$

 Calculate the values of f and x from the graph. (3 Marks)

 (h) State three precautions necessary for this experiment to be carried out in the laboratory. (3 Marks)

**QUESTION 2**

(a) Discuss the uses of negative feedback in an Operational Amplifier [4 marks]

(b) Enumerate the stages of an Operational Amplifier [6 marks]

(c) Using the circuit diagram below if *R*R= 2.5 k ohm and *R*F= 10 k ohm, obtain the inverted gain in the circuit [5 marks]

**QUESTION 3**

 (a) Briefly describe how an Operational Amplifier can be used as a half-wave rectifier circuit

 (Circuit diagram required) [5 marks,]

(b) List with examples four (4) types of classifications of an Operational Amplifier [6 marks]

(c) List and explain the data sheet Specifications which give rise to Operational Amplifier [4 marks]

**QUESTION 4**

(a) Explain ways by which a polarized light can be produced [5 marks]

(b) Differentiate between Light incidents on the Polaroid and Light coming through on the

 Polaroid [5 marks]

(c) Write short notes on a polarizer and an Analyzer. [5 marks]

**QUESTION 5**

(a) Write short notes on kinetic theory and phase change [5 marks]

(b) Briefly explain any two of the following as it relate to kinetic theory:

 (i) Evaporation Causes Cooling (ii) First Order Phase Change (iii) Transition Temperature [6 marks]

(c) What are the precautions necessary to be taken in carrying out an experiment in the lab using

 naphthalene [4 marks]