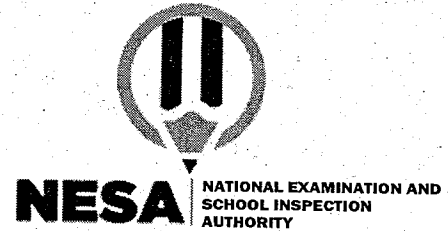


Physics III

031

28/07/2021 08:30 AM – 10:00 AM



ADVANCED LEVEL NATIONAL EXAMINATIONS, 2020-2021

SUBJECT: PHYSICS III PRACTICAL EXAM

COMBINATIONS:

- PHYSICS -CHEMISTRY- MATHEMATICS (**PCM**)
- PHYSICS -CHEMISTRY- BIOLOGY (**PCB**)
- MATHEMATICS- PHYSICS-GEOGRAPHY (**MPG**)
- MATHEMATICS-PHYSICS- COMPUTER SCIENCE (**MPC**)

DURATION: 1 HOUR 30 MINUTES

INSTRUCTIONS:

1. Write your names and index number on the answer booklet as written on your registration form and **DO NOT** write your names and index number on additional answer sheets if provided.
2. Do not open this question paper until you are told to do so.
3. This paper consists of **one** compulsory question. (**40 marks**)
4. You may use non-programmable calculator and mathematical set where appropriate.
5. All answers should be written in the answer booklet provided.
6. Use a **blue** or **black** pen and pencil for drawings.

ATTEMPT ALL SUB-QUESTIONS OF THIS QUESTION (40 marks)

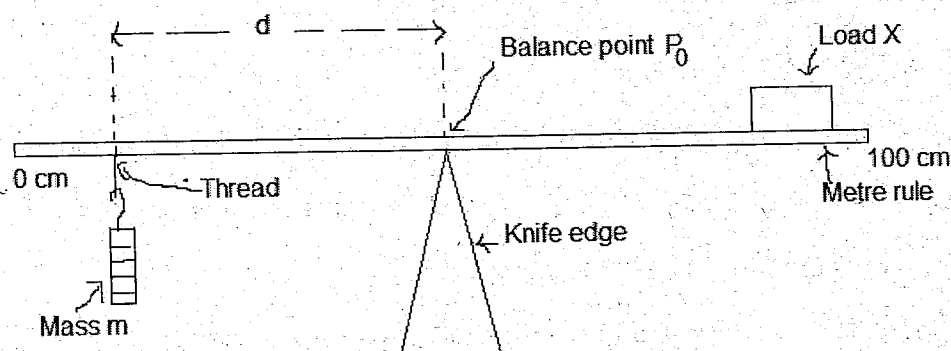
In this experiment, you are required to determine the mass of a load labelled x using a balancing method.

Apparatus required:

- 1 wooden metre rule
- 1 set of slotted masses of 200 g each set (it comprises 9 slotted masses of 20 g each and a 20 g mass hanger)
- 1 sharp wooden knife edge
- 1 load labelled x
- 1 piece of thread 30 cm long

Procedures

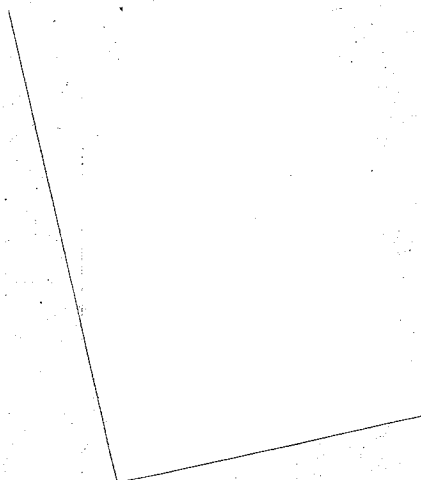
- a) Balance the metre rule on the knife edge.
- b) Read and record the balance point P_0 in cm to one decimal place.
(1mark)
- c) Place the load labelled x on the metre rule so that its centre is exactly over 90.0 cm mark. It is not moved during the experiment
- d) Put a mass $m = 80.0$ g on the metre rule. Its position is adjusted so that the metre rule is being balanced with the balance point P_0 . This point is exactly over the wooden knife edge (pivot) as shown below on the diagram drawn not to scale. Measure and record the distance d



- e) Repeat the procedure d) for values of $m = 100.0, 120.0, 140.0, 160.0$ and 180.0 g

Questions

- 1) Record your results in a suitable table including values of **m** to one decimal place, **d** to one decimal place and $\frac{1}{d}$ to two decimal places
This means that for each value of d in cm, you calculate $\frac{1}{d}$. **(15 marks)**
- 2) Plot a graph of m(y- axis) against $\frac{1}{d}$ (x-axis). **(8 marks)**
- 3) Determine the gradient/slope G of the best fit straight line.
Show clearly how you obtain the necessary information. **(4 marks)**
- 4) Find the mass M of the load x using the equation $M = \frac{G}{k}$
where k= 40.0 cm. **(2 marks)**
- 5) Do you think that the result obtained is accurate?
Justify your answer. **(2 marks)**
- 6) a) Formulate another method different from the method used in this experiment that you would use to determine the mass of the load x. **(2 marks)**
b) Which one is the best? Explain. **(2 marks)**
- 7) Observe your graph and explain how it indicates that the readings are or not subjected to
 - a) A systematic error. **(2 marks)**
 - b) A random error. **(2 marks)**



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