**Year 12 ATAR PHYSICS**

**Practical Test WAVES AND QUANTA**

**Part A: DETERMINING PLANCK’S CONSTANT**

**Marks: /20**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Teacher: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Background:**

The threshold voltage is a measurement of the energy level of the most excited electrons (the emission energy, Eg) and is related to the frequency of photons emitted**.**

**Eg = eVth = hf**

**Equipment:**

Planck’s Constant kit, 2x multimeters, 12V power supply, leads.

**Procedure:**

Set up the following circuit:

**A**



**9-12 V**

**V**

Determine the threshold voltage for each LED and complete the following table:

Operation: (2 marks)

|  |  |  |
| --- | --- | --- |
| Vth | (Read from the dial) | Frequency (f) |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Table: (2 marks)

1. When all 7 LEDs have been documented, Plot a graph of voltage applied against the frequency of the light from the LED.

(GRAPH GRID ON NEXT PAGE). (4 marks)

2. Draw a line of best fit. (1 mark)

3. Calculate the gradient showing clearly on the graph where you have taken the points.

(3 marks)

4. Use the gradient to calculate h. (4 marks)

prac exam youngs mod 10 by 10

5. List one random error and one systematic error which may occur when conducting the above experiment: (2 marks)

RANDOM: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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SYSTEMATIC: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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6. Identify a method which would help to minimise each of the above potential errors. (2 marks)

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