

# A Level Physics

8<sup>th</sup> Feb 2021 – Planck's Constant Practical

Suitable for ALL exam boards



This session will look at a practical to measure the values of Planck's constant using different coloured LEDs.

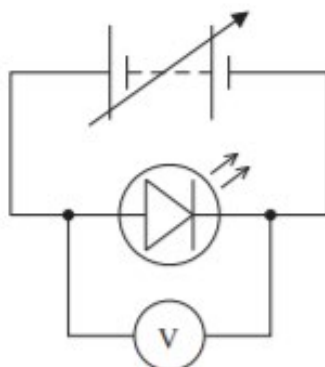
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Question taken from:

**Edexcel IAL Physics - June 2015 - Paper 6 (WPH06) - Question 3**



- 3 A student used light emitting diodes (LEDs) to determine a value for Planck's constant. He set up the circuit shown.



He increased the potential difference  $V$  from zero and recorded the value at which the LED just began to emit light. He repeated this for LEDs that emitted light of different, known frequencies  $f$ .

His results are shown in the table.

$f/\text{Hz} \times 10^{14}$	$V/\text{V}$
6.38	2.23
5.28	1.69
5.10	1.57
4.69	1.40

- (a) Criticise these results.

(1)

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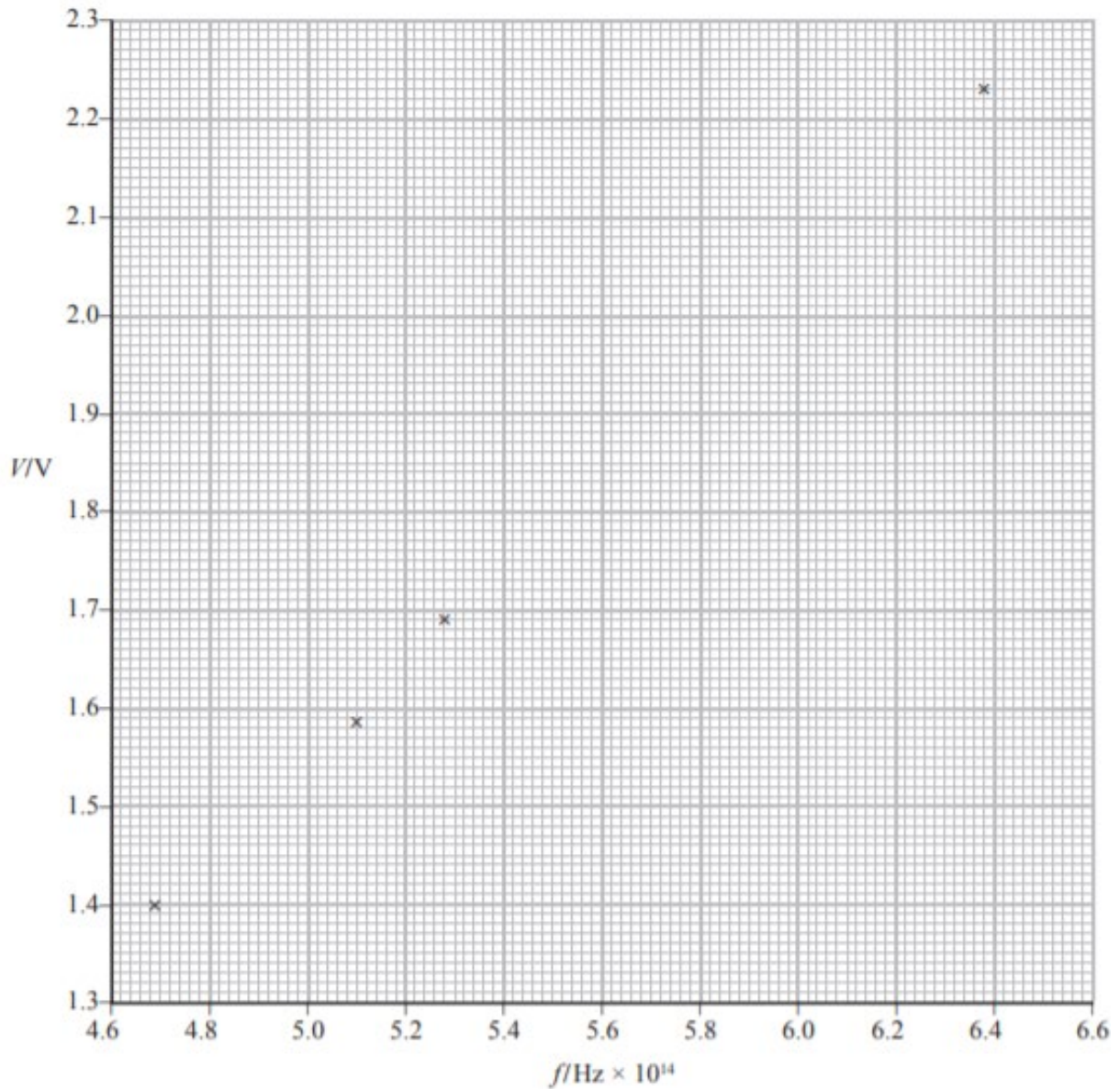
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(b)  $V$  and  $f$  are related by

$$eV = hf - b$$

where  $e$  is the electron charge,  $h$  is Planck's constant and  $b$  is also a constant.

The student plotted a graph of  $V$  against  $f$ .



(i) Draw a straight line of best fit on the graph. (1)

(ii) Use the gradient of your line to determine a value for Planck's constant. (4)

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Planck's constant = \_\_\_\_\_

(iii) Determine the percentage difference between your value and the accepted value of Planck's constant. (1)

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**(Total for Question 3 = 7 marks)**

