

2019 Summer Highlights

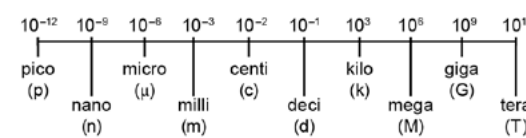
$$g = 9.81 \text{ m s}^{-2}$$

$$e = 1.60 \times 10^{-19} \text{ C}$$

The value of many physical constants is given in the data booklet.

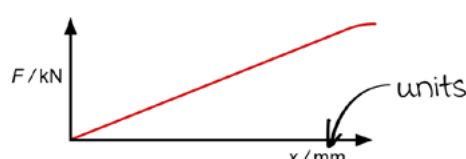
$$hf = \phi + KE_{\text{max}}$$

Do not just use symbols from the data booklet – know the correct terms and their context (e.g. ϕ is work function).

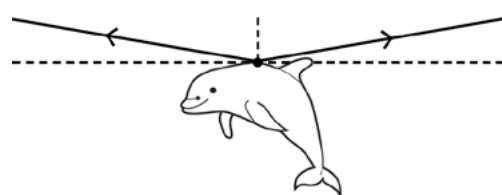


Learn the correct values for SI prefixes, e.g. nanometres (nm).

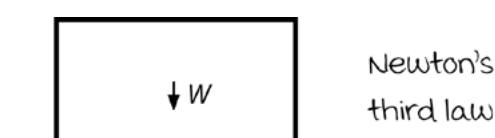
Calculate the speed of rotation of the drum and the absolute uncertainty in this value.



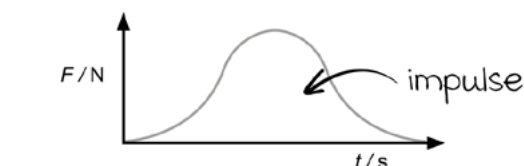
For the six mark level of response questions, underline the key terms and answer the question in full.



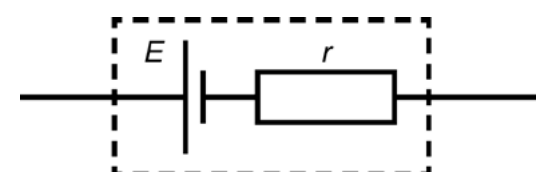
An object is in equilibrium if the resultant force acting on it is zero **and** the sum of moments acting on it is zero.



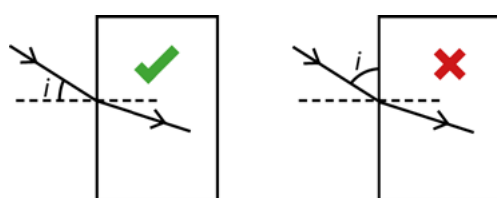
The weight of an object is equal and opposite to the gravitational force exerted on the Earth by the object.



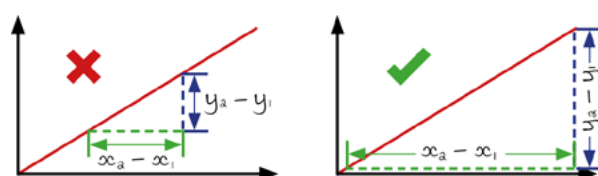
Area under a force–time graph is impulse. Impulse imparted on an object equals the object's change in momentum.



Cells have an internal resistance. Remember to include this in your calculations.



The angle of incidence and the angle of refraction are measured between the normal line and the ray.



When calculating the gradient of a line of best fit, use a large triangle and use co-ordinates from the line in the equation.

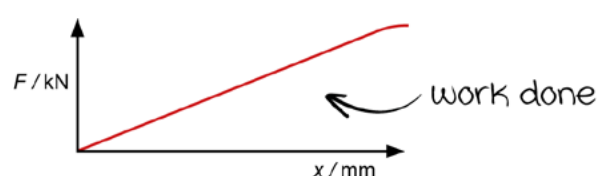
$$y = ab \quad y = \frac{a}{b} \rightarrow \text{add \% uncertainties}$$

$$y = a^2 \rightarrow \text{double \% uncertainty}$$

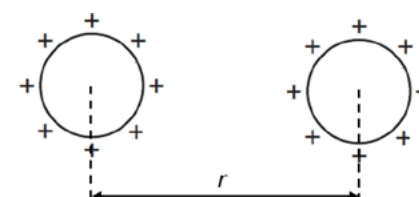
Learn the rules for combining percentage uncertainties.



The simple harmonic motion relationship $x = A \cos(\omega t)$ requires that the value of ωt is expressed in radians.



The area under a force–extension graph is the work done by the force against tension to produce the extension.



The distance between the centres of charged spheres is used to find the electric force between them.

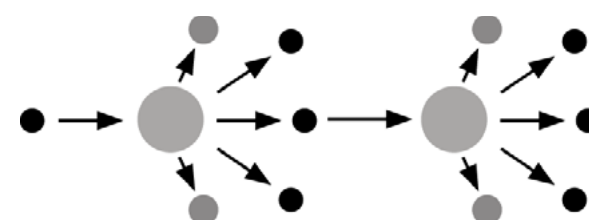
$$f \propto \frac{1}{\lambda} \quad \text{green checkmark} \quad f = \frac{1}{\lambda} \quad \text{red X}$$

Use the correct symbol " $\propto$ " when discussing relationships involving proportionality.

Kirchhoff's 1st law
 total current entering a junction equals the total current leaving it.

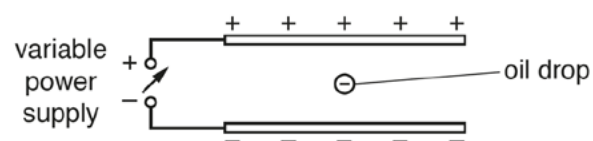
Kirchhoff's 2nd law
 sum of emfs around loop in circuit = sum of pds around the loop.

Kirchhoff's 1st law is an application of charge conservation; his 2nd law is an application of energy conservation.

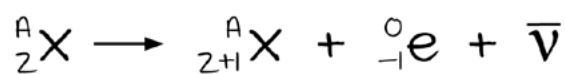


In nuclear reactor descriptions, neutrons were omitted and roles of moderators and control rods were confused.

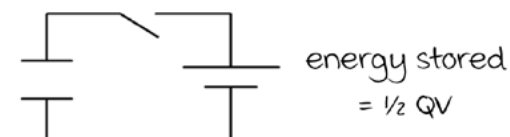
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A charged object between two charged plates is stationary if the electric force (upwards) is equal to its weight.



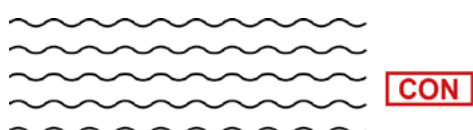
Candidates need to practice balancing nuclear equations involving beta decay.



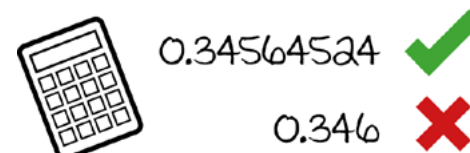
The energy stored on a capacitor is equal to $\frac{1}{2}QV$

Your answer: ~~A~~ B

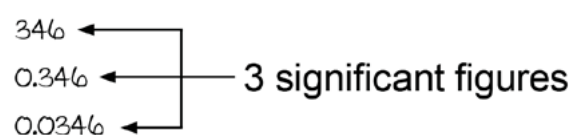
If changing the answer for an MCQ, completely cross out the wrong letter and write the correct one anew.



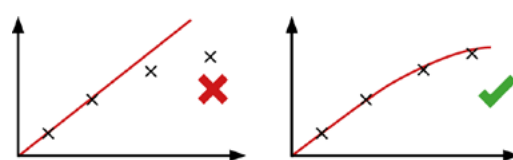
Longer answers don't always lead to more marks. If correct responses are contradicted, marks can be lost.



It's always more accurate to round once, for the final answer, and work with unrounded values on the calculator.



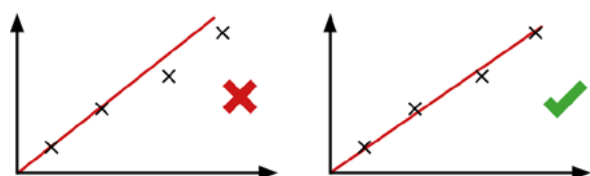
Make sure you give answers to the number of significant figures asked for after performing calculations.



Lines of best fit can be straight or curved. They don't have to extend to the axes or origin if not appropriate.

Answer: ~~.....1008.....~~ -504.....

Cross out answers if you need to change them. Trying to correct an answer by writing over it can make it unclear.



Lines of best fit should cover all points and have a fair distribution of points above and below the line.

- a. ~~~~~ X
b. ~~~~~ ✓
c. ~~~~~ X

For MCQs, if you don't know the answer try eliminating options by annotating. Don't leave MCQ answers blank!

$$\frac{3.19 \times 10^{-3}}{370 \times 10^{-10}} = 86200$$

ECF ✓

Show clear working for calculations. Error carried forward may mean a response still gains marks if a mistake is made.



Remember that precision is the closeness of agreement between different results. It is not the same as accuracy.



Accuracy is a measure of how close a result is to the true value.

Answer:65000.....
Answer: 6.5×10^4

You need to be able to convert results between decimal form and standard form (e.g. $a \times 10^n$).

The full candidate exemplar materials for the 2019 Physics A Level papers can be found on Interchange.

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