Physics A Level 2018 examiner comment summary
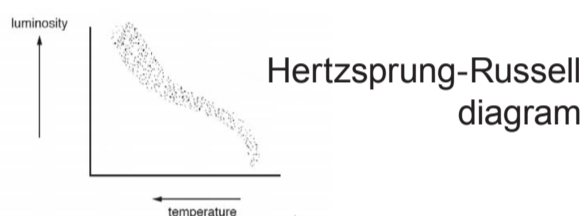
CON

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

* See additional answer page

If use of additional answer pages are necessary, it's a good idea to write a note to the marker to this effect.

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

ECF

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

mass = 125 g   2 s.f.
time = 25 ms

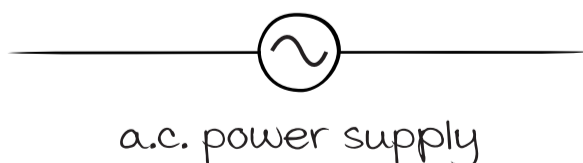The 'appropriate number of significant figures' is the lowest number of significant figures provided in the data.

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.

Reserve use of the term 'exponential' for relationships such as capacitor discharge or radioactive decay.

luminosity

Hertzsprung-Russell diagram

temperature

Remember that the temperature scale on a Hertzsprung-Russell diagram increases to the left, rather than to the right.

Energy is conserved ✗
Momentum is conserved ✗
Kinetic energy is conserved ✓

Common errors when defining an elastic collision included omitting 'kinetic' or referring to momentum only.

The relationship is given by the equation:

$$\sigma = C\, e^{-E/kT}$$

If an equation is given as part of the question, students should refer to it in their answers.

$v = u + at$
$s = \frac{1}{2}(u + v)t$
$s = ut + \frac{1}{2}at^2$
$v^2 = u^2 + 2as$

$\phi = BA\cos\theta$
$\mathcal{E} = -\frac{\Delta(N\phi)}{\Delta t}$
$\frac{n_s}{n_p} = \frac{V_s}{V_p} = \frac{I_p}{I_s}$

$A = \lambda N; \quad \frac{\Delta N}{\Delta t} = -\lambda N$
$\lambda t_{1/2} = \ln(2)$
$A = A_0 e^{-\lambda t}$
$N = N_0 e^{-\lambda t}$

Don't rely too heavily on the data booklet; revise formulae in context and know the meanings of each symbol.

0.04% ✗
0.04 × 100 = 4% ✓

When calculating a percentage, remember to multiply by 100. Check this if your answer seems very small.
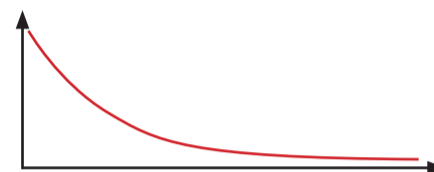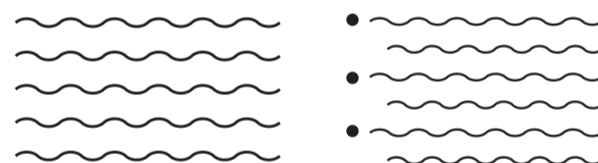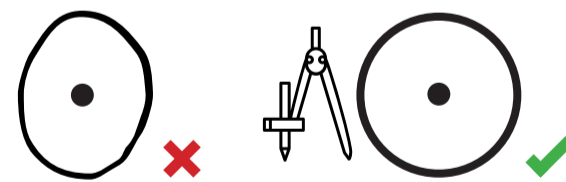
With long explanations, answers are often better written in bullet points as this gives them more structure.

p   n   e⁻   ν   μ⁻
p̄   n̄   e⁺   ν̄   μ⁺

Make sure that the correct symbols for a variety of particles and their antiparticles are known.

lg = log = log₁₀

lg, log, and log₁₀ are all equivalent expressions which may be seen in questions or on calculator buttons.

✗   ✓

Draw diagrams accurately, using drawing instruments where needed. Some orbits were far from circular!

a.c. power supply

Many students drew a cell or battery to represent an A.C. current supply. Make sure you use the correct symbol.

An oscilloscope, as a voltmeter, can measure the output voltage and period of an alternating current.

Uncertainty = ±0.1g

Values for absolute uncertainty should be quoted to 1 significant figure.
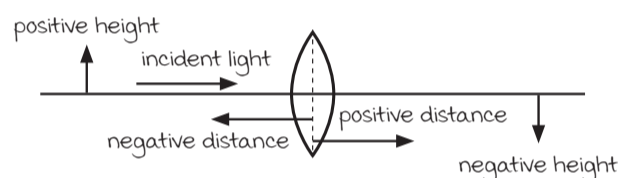
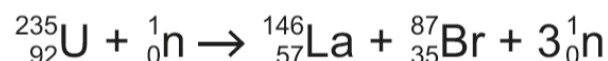# Physics A Level 2018 examiner comment summary

0.34564524 ✅
0.346 ❌

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

Your answer: A̶ B

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

How would you improve the accuracy of the results obtained?

Changes to experiments that improve accuracy are those which reduce either systematic or random errors.

Show that the length of the pendulum required for a tick of 1.0s is about 1m

In 'show that' questions, a convincing proof must be produced. Some explanatory text can be useful!

Homogenous: the same in all locations.
Isotropic: the same in all directions. Can be true even if the universe is not the same density throughout.

'Homogenous' and 'isotropic' were often mistaken for one another when discussing the universe.

when the magnet is perpendicular to the coil the change in flux linkage is a maximum ❌

A common error was to refer to 'change in flux linkage' rather than 'rate of change of flux linkage'.

positive height
incident light
positive distance
negative distance
negative height

Use of the cartesian sign convention for lenses is encouraged, but alternatives conventions are still given full credit.

$$\lambda_{max} \times T_{surface} = constant$$

To calculate the surface temperature of a star, the idea that $\lambda_{max} \times T_{surface} = constant$ should be used.

speed = 7.26 × 10⁹ ms⁻¹ ❌

Consider whether the numerical answer you arrive at is realistic. Don't just write down whatever the calculator produces!

$$^{235}_{92}U + ^{1}_{0}n \rightarrow ^{146}_{57}La + ^{87}_{35}Br + 3^{1}_{0}n$$

Many candidates' descriptions of fission were not clear enough.

When drawing graphs, lines of best fit should have a fair distribution of points above and below the line.

Lines of best fit must cover the full range of points. They don't need to extend to the axes or the origin if not appropriate.

$y_2 - y_1$ ❌
$x_2 - x_1$
$y_2 - y_1$ ✅
$x_2 - x_1$

Triangles for gradient calculation should be as large as possible – too small a triangle gives a larger error in the value.

calculations

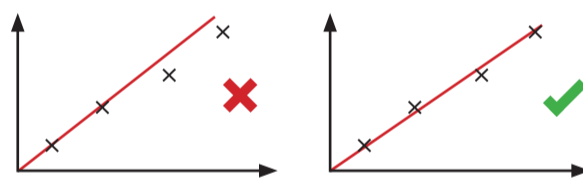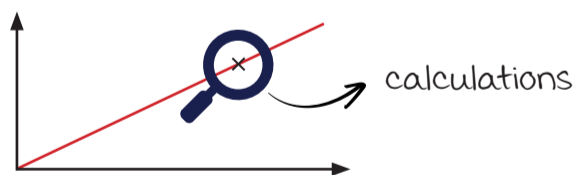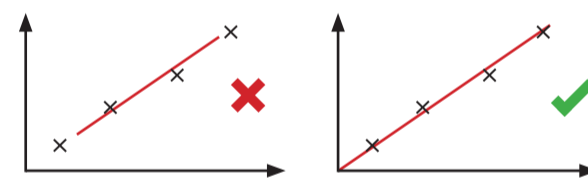Read the scales on graphs carefully and check any reading is correct before using it in subsequent calculations.

Calculate the <u>speed of rotation</u> of the drum and the <u>absolute uncertainty</u> in this value.

Underline key instructions when reading the question and refer back to them to ensure all of them have been addressed.

The full candidate exemplar materials for the 2018 Physics A Level papers can be found on Interchange.

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