Revision practice

OxfordAQA · International GCSE · Physics

Original open focus revision; complete specification coverage remains unfinished.

1 Motion graphs and acceleration

- velocity
- acceleration

■ Question 1

What does area under a velocity-time graph represent?

- Displacement
- Acceleration
- Mass

Available marks: 2.

Worked answer

Displacement

- The gradient of a displacement-time graph is velocity. The area under a velocity-time graph gives displacement. A constant-acceleration formula is valid only when its assumption is justified.

■ Question 2

Velocity changes from 3 to 15 metres per second in 6 s. Find acceleration.

Available marks: 4.

Worked answer

2 $\mathrm{m/s^2}$

- Appropriate relation; consistent substitution; correct result; meaningful unit and interpretation.

Negative velocity indicates direction under the chosen sign convention; it does not necessarily mean slowing down.

2 Forces, momentum and safe stopping

- momentum
- resultant force

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Question 1

For fixed momentum change, which reduces average stopping force?

- Longer stopping time
- Shorter stopping time
- Ignoring external force

Available marks: 2.

Worked answer

Longer stopping time

- Impulse equals momentum change. Increasing stopping time for the same momentum change reduces average force. Identify external forces before applying momentum conservation.

Question 2

A 2 kg trolley travels at 3 metres per second. Find its momentum.

Available marks: 4.

Worked answer

6 kg · m/s

- Appropriate relation; consistent substitution; correct result; meaningful unit and interpretation.

Balanced forces do not require the object to be at rest. Mass and weight have different units and meanings.

3 Energy stores, work and efficiency

- power
- efficiency

Question 1

What happens to kinetic energy when speed doubles at fixed mass?

- It doubles
- It quadruples
- It stays constant

Available marks: 2.

Worked answer

It quadruples

- Define the system and useful output before calculating efficiency. Doubling speed quadruples kinetic energy at constant mass. Power describes transfer per time, not total energy.

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■ Question 2

A device receives 250 J and gives 150 J useful output. Find efficiency as a percentage.

Available marks: 4.

Worked answer

60 %

- Appropriate relation; consistent substitution; correct result; meaningful unit and interpretation.

Efficiency cannot exceed 100% for a properly defined energy balance. Energy dissipated by heating is still conserved.

4 Waves, measurement and refraction

- wavelength
- frequency

■ Question 1

When a wave enters a slower medium, what stays constant?

- Frequency
- Wavelength
- Speed

Available marks: 2.

Worked answer

Frequency

- At a boundary, frequency stays fixed by the source. A change of speed changes wavelength. Refraction follows from speed differences; angles are measured from the normal.

■ Question 2

Frequency is 8 Hz and wavelength is 0.25 m. Find wave speed.

Available marks: 4.

Worked answer

2 m/s

- Appropriate relation; consistent substitution; correct result; meaningful unit and interpretation.

The wave frequency does not change simply because the medium changes. A longitudinal wave has oscillations parallel to propagation.

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5 Thermal measurements and particle models

- specific heat capacity
- latent heat

■ Question 1

Why can temperature stay constant while a pure substance melts?

- No energy enters
- Energy changes particle arrangement
- The thermometer must be broken

Available marks: 2.

Worked answer

Energy changes particle arrangement

- Temperature relates to particle motion in a model; internal energy includes kinetic and potential contributions. During a change of state, energy can change particle arrangements rather than temperature.

■ Question 2

A 2 kg sample with c=500 J per kilogram per degree warms by 3 °C. Find energy gain.

Available marks: 4.

Worked answer

3000 J

- Appropriate relation; consistent substitution; correct result; meaningful unit and interpretation.

A flat section of a heating curve can show a phase change, not absence of energy transfer. Do not substitute temperature for a temperature difference in $E = mc\Delta T$.

6 Gas models and absolute temperature

- absolute temperature
- ideal gas

■ Question 1

For a fixed amount of gas at constant temperature, halving volume does what to pressure?

- Halves it
- Doubles it
- Leaves it unchanged

Available marks: 2.

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Worked answer

Doubles it

- State which quantities stay fixed. A pressure-volume relation requires consistent units and a fixed temperature. The kelvin-based temperature ratio is an extension only where the course explicitly specifies it.

■ Question 2

At fixed temperature, pressure is 120 kPa at volume 50 cubic centimetres. Find pressure at volume 30 cubic centimetres.

Available marks: 4.

Worked answer

200 kPa

- Appropriate relation; consistent substitution; correct result; meaningful unit and interpretation.

An ideal gas is a model with conditions of validity. Celsius zero is not zero molecular motion, and internal energy is not determined by pressure alone.

7 Current, potential difference and resistance

- current
- potential difference

■ Question 1

How is a voltmeter connected to measure voltage across a resistor?

- In parallel with the resistor
- In series only
- Across the ammeter only

Available marks: 2.

Worked answer

In parallel with the resistor

- Current is the same through components in series. Potential differences add around the series path. In parallel, branches share the same potential difference, while branch currents sum at a junction.

■ Question 2

A component has 12 V across it and carries 0.40 A. Find resistance.

Available marks: 4.

Worked answer

30 Ω

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- Appropriate relation; consistent substitution; correct result; meaningful unit and interpretation.

Current is not used up by a lamp. A filament heats up, so its resistance need not remain constant as voltage changes.

8 Fields, motors and induction

- induction
- transformer

■ Question 1

Which gives a continuing emf in a coil?

- A constant unchanging flux
- A changing flux linkage
- A nearby stationary magnet in every situation

Available marks: 2.

Worked answer

A changing flux linkage

- Changing field strength, coil area, orientation or relative motion can change flux linkage. Lenz law describes an induced effect opposing the change producing it, consistent with energy conservation.

■ Question 2

An ideal transformer has Np=400, Ns=100 and Vp=20 V. Find Vs.

Available marks: 4.

Worked answer

5 V

- Appropriate relation; consistent substitution; correct result; meaningful unit and interpretation.

A transformer needs changing magnetic flux; a steady DC input does not provide continuous transformer action. Magnetic field direction is not automatically the direction of force.

9 Nuclear changes and radiation evidence

- half-life
- background radiation

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■ Question 1

Which count should be used for source activity?

- Raw source-plus-background only
- Measured count minus background over equal times
- The largest repeated count only

Available marks: 2.

Worked answer

Measured count minus background over equal times

- Subtract background counts measured over the same time interval. Distinguish irradiation from contamination. Shielding, distance and reduced exposure time can reduce risk under a school-controlled procedure.

■ Question 2

An initial source count is 160 per minute. Find it after three half-lives.

Available marks: 4.

Worked answer

20 counts/min

- Appropriate relation; consistent substitution; correct result; meaningful unit and interpretation.

An irradiated object is not automatically radioactive. A half-life does not predict the exact decay time of one nucleus.

10 Stellar evolution: initial mass changes the route

- main sequence
- white dwarf

■ Question 1

Which final route is appropriate for the Sun in the school model?

- Red giant followed by white dwarf
- Every star becomes a black hole
- A supernova is required for every star

Available marks: 2.

Worked answer

Red giant followed by white dwarf

- Read a life-cycle diagram as a model of stages and conditions, not a timed film of one star. The Sun is expected to follow the lower-mass route. Fusion combines light nuclei; it differs from fission of a heavy nucleus.

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■ Question 2

6 of 30 stars in an illustrative sample are in a chosen stage. Calculate the percentage.

Available marks: 4.

Worked answer

20 %

- Appropriate relation; consistent substitution; correct result; meaningful unit and interpretation.

The Sun is not expected to become a supernova. A diagram does not establish that every massive star makes the same remnant, nor that all stages last the same time.

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