# Revision practice

AQA · GCSE · Physics

Original open focus revision; complete specification coverage remains unfinished.

## 1 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.

### 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.

## 2 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 $E = mc\Delta T$.

## 3 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

- 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.

## 4 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.

**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.



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## 5 Nuclear changes and radiation evidence

- half-life
- background radiation

### ■ 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.

## 6 Forces, momentum and safe stopping

- momentum
- resultant force

### ■ 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**



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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.

## 7 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 $m/s^2$



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- 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.

## 8 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.

## 9 Fields, motors and induction

- induction
- transformer



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### ■ 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.

## 10 Stars, radiation and scale

- luminosity
- flux

### ■ Question 1

At fixed luminosity, what happens to flux when distance doubles?

- It halves
- It becomes one quarter
- It doubles

Available marks: 2.

**Worked answer**

It becomes one quarter



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- For isotropic emission without absorption, flux follows an inverse-square relationship with distance. Observed brightness alone therefore cannot establish luminosity.

## ■ Question 2

A source gives flux 18 units. Find flux at three times the distance.

Available marks: 4.

**Worked answer**

2

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

The Sun is not expected to become a supernova. Redshift can support cosmological expansion; it does not mean every nearby object must move away from every observer.



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