Revision practice

Pearson Edexcel · International A-Level · 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

exercises.lol exercises.com.cn

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.

exercises.lol exercises.com.cn

■ 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.

exercises.lol exercises.com.cn

5 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.

6 Photons and the photoelectric effect

- photon
- work function

■ Question 1

At fixed above-threshold frequency, increasing intensity mainly increases what?

- Photon energy
- The number of emitted electrons per time
- Work function

Available marks: 2.

Worked answer

exercises.lol exercises.com.cn

The number of emitted electrons per time

- Use photon energy = Planck constant × frequency. Maximum kinetic energy = photon energy - work function. Increasing intensity at fixed frequency increases photon arrival rate, not individual photon energy.

■ Question 2

Photon energy is 4.8 eV and work function 2.1 eV. Find maximum kinetic energy.

Available marks: 4.

Worked answer

2.7 eV

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

Electrons do not accumulate many sub-threshold photons in the elementary single-photon model. Do not confuse photon number with photon energy.

7 Uncertainty, gradients and model testing

- uncertainty
- systematic error

■ Question 1

Which is most likely a systematic error?

- A balance reads 0.20 g when empty
- Repeated values fluctuate either side of the mean
- Random differences in reaction time

Available marks: 2.

Worked answer

A balance reads 0.20 g when empty

- For a product or quotient, adding fractional uncertainties is a common maximum-uncertainty approximation. For a difference, add absolute uncertainties. A nonzero intercept can reveal an offset or an incomplete model.

■ Question 2

A 40 cm reading has an absolute uncertainty of 1 cm. Find percentage uncertainty.

Available marks: 4.

Worked answer

2.5 %

exercises.lol exercises.com.cn

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

Repeating readings reduces random uncertainty in a mean but does not automatically remove a zero error. Do not quote more decimal places than your measurement can support.

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 Gravitational fields and orbital motion

- gravitational field
- centripetal force

exercises.lol exercises.com.cn

Question 1

What direction is the net force in uniform circular motion?

- Toward the centre
- Along the velocity
- Always outward

Available marks: 2.

Worked answer

Toward the centre

- For a point mass or outside a spherical mass, field strength follows an inverse-square distance dependence. Use distance from the centre, not height above the surface alone.

Question 2

Field strength is 18 units at r. Find it at 3r for an inverse-square field.

Available marks: 4.

Worked answer

2

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

Weightlessness in an orbiting spacecraft means apparent weight is small in free fall, not that there is no gravitational field.

10 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.

exercises.lol exercises.com.cn

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 $E = mc\Delta T$.

11 Gas models and absolute temperature

- absolute temperature
- ideal gas

Question 1

Which scale belongs in a gas-law temperature ratio?

- Celsius
- Kelvin
- Either scale without conversion

Available marks: 2.

Worked answer

Kelvin

- At fixed amount and volume, pressure is proportional to kelvin temperature. At fixed temperature and amount, pressure is inversely proportional to volume. State which quantities are fixed before choosing a relationship.

Question 2

At fixed volume, pressure is 120 kPa at 300 K. Find pressure at 350 K.

Available marks: 4.

Worked answer

140 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.

exercises.lol exercises.com.cn

12 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.

13 Oscillation, resonance and phase

- resonance
- damping

■ Question 1

For ideal SHM, where is speed greatest?

- At equilibrium
- At maximum displacement
- At every point equally

Available marks: 2.

Worked answer

exercises.lol exercises.com.cn

At equilibrium

- Velocity is greatest near equilibrium for ideal SHM, while acceleration magnitude is greatest at extreme displacement. Resonance can occur near the natural frequency under periodic driving, with amplitude limited by damping.

■ Question 2

30 cycles take 45 s. Find period.

Available marks: 4.

Worked answer

1.5 s

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

Not every repeated motion is SHM. A force proportional to displacement but directed away from equilibrium does not produce SHM.

14 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

- 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

exercises.lol exercises.com.cn

- 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.

exercises.lol exercises.com.cn