

IGCSE Physics 0625 Paper 3 Practice Paper

(Core)

Total: 80 marks · 1 hour 15 minutes · 6 questions · 33 parts

Question 1 · Forces and motion [14]

- (a) A car travels 150 m at constant speed in 12 s. Calculate its average speed. Show your working. [3]
- (b) Convert 12.5 m/s into km/h. Show your working. [3]
- (c) A student runs 100 m in 20 s, then walks a further 100 m in 60 s. Calculate the average speed for the whole journey. [3]
- (d) A distance-time graph shows a car moving from 0 m to 20 m between 0 s and 4 s, then staying at 20 m from 4 s to 10 s. Calculate the speed in the first 4 s and describe the motion between 4 s and 10 s. [3]
- (e) State one change in the motion of a car when the resultant force on it acts in the opposite direction to its motion. [2]

Question 2 · Density and pressure [13]

- (a) A piece of metal has a mass of 240 g and a volume of 30 cm³. Calculate the density of the metal. [2]
- (b) Convert 8.0 g/cm³ into kg/m³. Show your working. [3]
- (c) The metal block is a cuboid measuring 5 cm x 3 cm x 2 cm. It rests on a table on its smallest face (3 cm x 2 cm). Take $g = 10 \text{ N/kg}$. Calculate the pressure the block exerts on the table in N/cm² and in Pa. [3]
- (d) The same block is now placed on its largest face (5 cm x 3 cm). State how the pressure changes and explain your answer. [3]
- (e) Calculate the pressure in water at a depth of 1.5 m. Density of water = 1000 kg/m³, $g = 10 \text{ N/kg}$. [2]

Question 3 · Thermal physics and specific heat capacity [14]

- (a) Define specific heat capacity. [2]
- (b) A heater raises the temperature of 2 kg of water from 20 °C to 60 °C. The specific heat capacity of water is 4200 J/(kg °C). Calculate the energy gained by the water. [3]
- (c) The heater has a power of 700 W. Calculate the time needed to heat the 2 kg of water from 20 °C to 60 °C, giving your answer in seconds and in minutes. [3]
- (d) In practice the water takes longer than the calculated time to heat up. Explain why. [2]
- (e) Use the motion of particles to explain why a solid expands when it is heated. [2]
- (f) At the same room temperature a metal block feels colder than a wooden block. Explain why. [2]

Question 4 · Waves and light [14]

- (a) The speed of sound in air is 340 m/s. A sound has a frequency of 500 Hz. Calculate its wavelength. Show your working. [3]
- (b) Calculate the time taken for sound to travel 680 m in air. Speed of sound = 340 m/s. [2]
- (c) A student claps and hears the echo from a distant wall 0.8 s later. The speed of sound is 340 m/s. Calculate the distance between the student and the wall. [3]
- (d) Light passes from air into glass at an angle. State what happens to the speed of the light and to the direction of the ray. [2]
- (e) State what is meant by frequency and give its unit. [2]
- (f) State what determines the pitch and the loudness of a sound. [2]

Question 5 · Electric circuits and electrical energy [13]

- (a) Two resistors of 6 ohm and 2 ohm are connected in series to a 12 V battery. Calculate the total resistance of the circuit. [2]
- (b) Calculate the current in the series circuit described in (a). [2]
- (c) Calculate the voltage across the 6 ohm resistor and across the 2 ohm resistor, and check that the two voltages add up to the battery voltage. [3]
- (d) A second circuit connects two identical 6 ohm resistors in parallel to a 12 V battery. Calculate the total resistance of the parallel combination. [2]
- (e) Explain why the total resistance of a parallel combination is smaller than either single resistor. [2]

(f) A 2 kW heater is used for 3 hours. Electricity costs \$1.2 per kWh. Calculate the energy used in kWh and the cost. [2]

Question 6 · Radioactivity [12]

(a) An atomic nucleus emits an alpha particle. State how its mass number and its proton (atomic) number change. [2]

(b) A radioactive isotope has a half-life of 8 days and an initial activity of 640 Bq. Calculate the activity after 24 days. [3]

(c) Another sample has a half-life of 6 days. Its activity falls from 800 Bq to 100 Bq. Calculate the time taken. [3]

(d) Explain why alpha particles are more ionising than gamma rays but less penetrating. [2]

(e) State one safety precaution when handling a radioactive source and explain why it is needed. [2]