



Cambridge O Level

COMBINED SCIENCE

5129/11

Paper 1 Multiple Choice

October/November 2023

1 hour

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- There are **forty** questions on this paper. Answer **all** questions.
- For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in soft pencil on the multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **16** pages.

1 Which pair of cell structures is found only in plant cells?

- A cell membrane and nucleus
- B cellulose cell wall and mitochondria
- C chloroplasts and sap vacuole
- D mitochondria and cytoplasm

2 The enzyme amylase breaks down starch into maltose.

Which row correctly describes amylase?

	made of protein	acts as a catalyst	speeds up chemical reactions in living cells
A	X	X	✓
B	✓	✓	X
C	X	✓	✓
D	✓	✓	✓

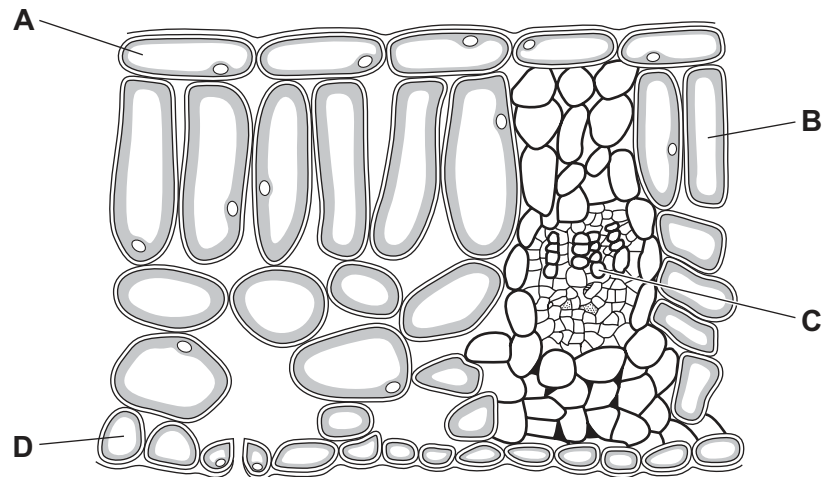
key

✓ = correct

X = not correct

3 The diagram shows a transverse section of part of a leaf.

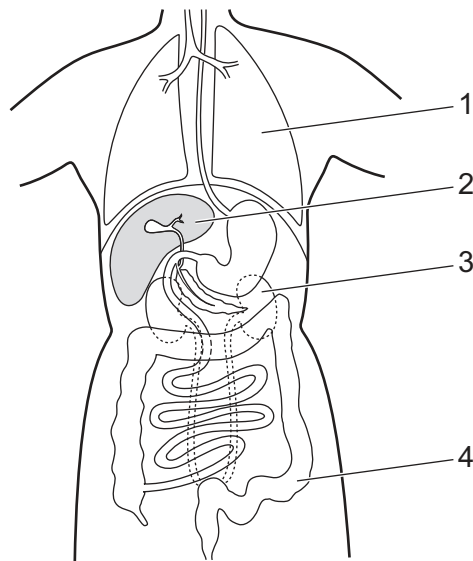
Which tissue contains the most chloroplasts?



4 Which row correctly describes functions of the stomach, ileum and liver?

	stomach	ileum	liver
A	absorption	digestion	ingestion
B	digestion	absorption	storage
C	egestion	absorption	digestion
D	digestion	egestion	storage

5 The diagram shows a body outline with some of the organs labelled 1, 2, 3 and 4.



Which row correctly shows where urea and carbon dioxide are excreted from the body?

	urea	carbon dioxide
A	2	1
B	2	4
C	3	1
D	3	4

6 What are the substances needed for anaerobic respiration and which substances are produced by anaerobic respiration?

	substances needed for anaerobic respiration	substances produced by anaerobic respiration
A	glucose and oxygen	carbon dioxide and water
B	glucose and oxygen	water only
C	glucose only	carbon dioxide and lactic acid
D	glucose only	lactic acid only

7 Which statements explain why ventricles have a thicker wall of muscle compared to the atria?

- 1 The atria pump blood over a short distance.
- 2 The atria pump blood through atrioventricular valves.
- 3 The ventricles pump blood around the body and to the lungs.
- 4 The ventricles pump blood through semilunar valves.

A 1 and 3 **B** 2 and 3 **C** 2 and 4 **D** 3 and 4

8 Long-term exposure to air pollution damages alveoli, causing a lung disease called emphysema.

Which statement about a person suffering from emphysema is correct?

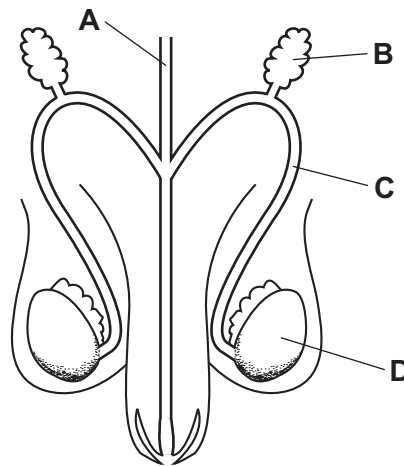
- A** The concentration of carbon dioxide in the blood is higher than normal.
- B** The concentration of carbon dioxide in the blood is lower than normal.
- C** The concentration of oxygen in the blood is higher than normal.
- D** The concentration of oxygen in the blood is normal.

9 Which statement is correct for a reflex arc?

- A** The electrical impulse in the motor neurone is travelling away from the sensory neurone.
- B** The electrical impulse in the relay neurone is travelling towards the motor neurone.
- C** The electrical impulse in the sensory neurone is travelling away from the motor neurone.
- D** The electrical impulse in the sensory neurone is travelling towards the receptor.

10 The diagram shows the male reproductive system.

Which label identifies the prostate gland?

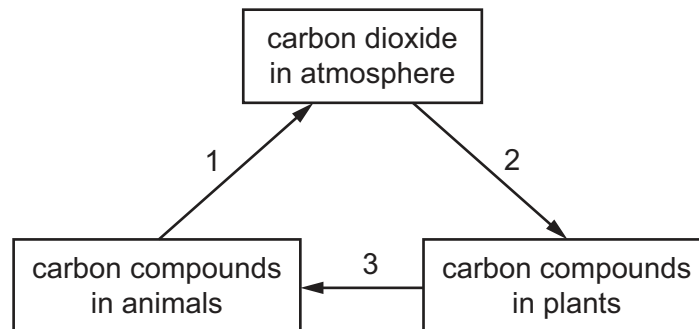


11 Inserting the human insulin gene into bacterial DNA allows the mass production of insulin.

Which row explains why bacteria are used for this process?

	bacteria have a rapid rate of reproduction	no ethical concerns are linked to using bacteria	
A	✓	✓	key ✓ = correct ✗ = not correct
B	✓	✗	
C	✗	✓	
D	✗	✗	

12 The diagram represents a simplified carbon cycle.



Which row identifies processes 1, 2, and 3?

	1	2	3
A	respiration	photosynthesis	feeding
B	feeding	photosynthesis	respiration
C	photosynthesis	respiration	feeding
D	respiration	feeding	photosynthesis

13 What is the source of energy for a food chain?

- A** photosynthesis
- B** plants
- C** respiration
- D** the Sun

- 14** The pressure on a sample of oxygen in a container at constant temperature is increased.

Which statement about the sample of oxygen is correct?

- A** The molecules move faster.
- B** The molecules bond together.
- C** Each molecule collides with the container walls with more kinetic energy.
- D** The spaces between the molecules get smaller.

- 15** Which statements about a chromatography experiment are correct?

- 1 Draw an ink base line on the chromatography paper near the bottom.
- 2 Put a spot of the solution on to the base line.
- 3 Dip the chromatography paper into a suitable solvent so that the solvent just covers the base line.
- 4 Allow the solvent to rise up through the paper until it reaches near the top.

- A** 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

- 16** An ion of an element contains two electrons, three protons and four neutrons.

In which group of the Periodic Table is this element placed?

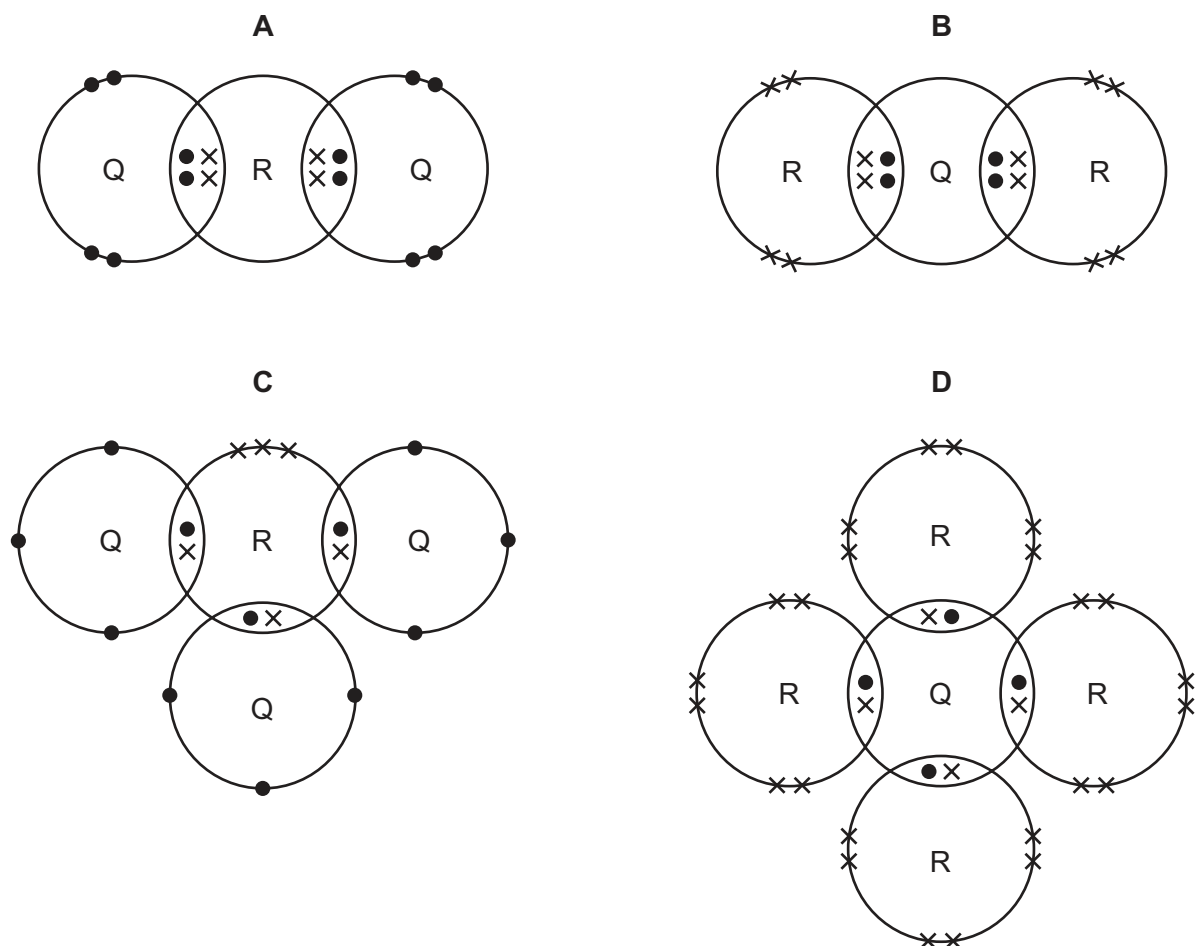
- A** Group I
- B** Group II
- C** Group III
- D** Group VII

17 Element Q and element R combine to form a covalent compound.

Atoms of element Q have four outer electrons.

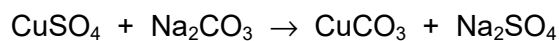
Atoms of element R have six outer electrons.

Which dot-and-cross diagram for the compound of Q and R is correct?



18 Aqueous copper sulfate reacts with aqueous sodium carbonate.

The equation is shown.



Which mass of copper carbonate is formed when a solution containing 16 g of copper sulfate is reacted with excess aqueous sodium carbonate?

- A** 12.4 g **B** 14.2 g **C** 26.6 g **D** 124 g

19 Which statements about physical and chemical changes are correct?

- 1 After a chemical change, the products have the same formulae as the reactants.
- 2 Physical changes are easily reversed.
- 3 During a physical change, new substances are made.

A 1 and 2 **B** 1 and 3 **C** 2 only **D** 3 only

20 Which statements about a redox reaction are correct?

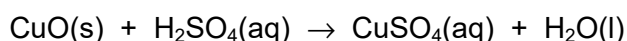
- 1 Both oxidation and reduction take place simultaneously.
- 2 The substance being reduced gains oxygen.
- 3 Oxidation involves the loss of oxygen.

A 1 and 2 **B** 1 only **C** 2 and 3 **D** 3 only

21 Which statement about all acids is correct?

- A** They contain both hydrogen and oxygen.
- B** They give ammonia with an ammonium salt.
- C** They have a pH value below 7.
- D** They react with all metals to form hydrogen.

22 The equation for the preparation of copper sulfate from copper oxide is shown.



How is solid copper sulfate obtained?

- A** adding an excess of copper oxide to dilute sulfuric acid, filtering and evaporating the filtrate to the point of crystallisation
- B** adding an excess of dilute sulfuric acid to copper oxide, filtering and evaporating the filtrate to the point of crystallisation
- C** adding dilute sulfuric acid to copper oxide and filtering off the precipitate formed
- D** dissolving copper oxide in water to make copper oxide solution and reacting with dilute sulfuric acid

- 23** An element X from Period 2 in the Periodic Table is heated in air.

It forms an oxide that dissolves in water.

Universal indicator added to the solution turns blue.

Which row describes element X?

	metal or non-metal	position in the period
A	metal	on the left side
B	metal	on the right side
C	non-metal	on the left side
D	non-metal	on the right side

- 24** Four different metals are reacted separately with cold water, steam and dilute hydrochloric acid.

The results are shown.

metal	reaction with cold water	reaction with steam	reaction with dilute hydrochloric acid
W	no reaction	reacts slowly	reacts vigorously
X	no reaction	no reaction	reacts slowly
Y	reacts slowly	reacts vigorously	reacts explosively
Z	reacts slowly	reacts slowly	reacts vigorously

What is the order of reactivity of the four metals?

	least reactive $\longrightarrow$ most reactive			
A	X	W	Z	Y
B	X	Z	W	Y
C	Y	W	Z	X
D	Y	Z	W	X

- 25** How does filtration and chlorination make river water safer to drink?

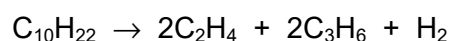
	filtration	chlorination
A	removes dissolved impurities	destroys harmful bacteria
B	removes dissolved impurities	improves the taste of the water
C	removes solid impurities	destroys harmful bacteria
D	removes solid impurities	improves the taste of the water

- 26 Bitumen is obtained from petroleum by fractional distillation.

What is a use of bitumen?

- A fuel for aircraft
- B fuel for cars
- C lubricants
- D making roads

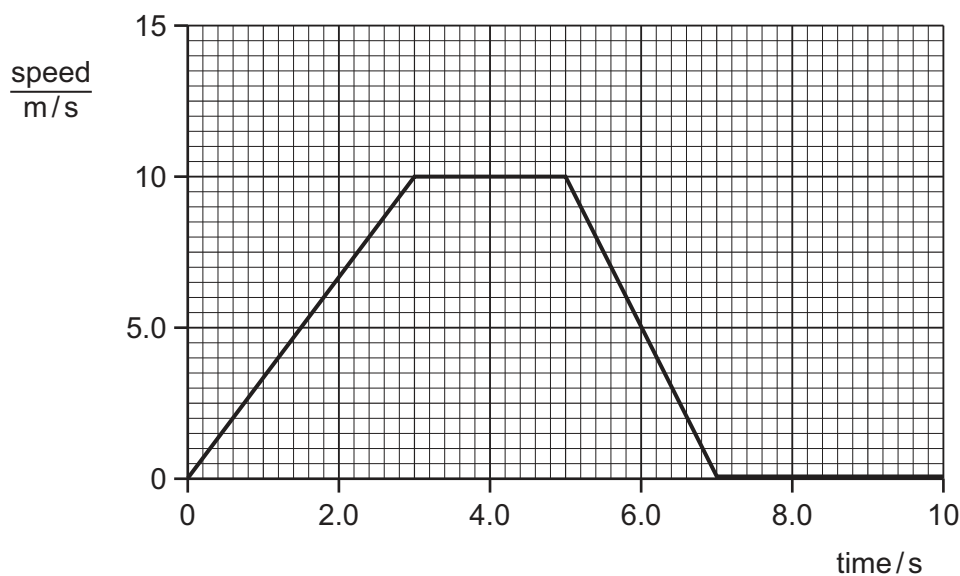
- 27 An equation for the manufacture of ethene from decane, $C_{10}H_{22}$, is shown.



What is this process called?

- A combustion
- B cracking
- C fractional distillation
- D polymerisation

- 28 The graph shows the speed of a car for the first 10 seconds of a journey.



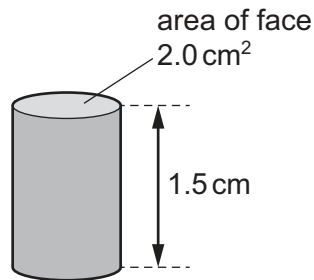
Which statement about the acceleration of the car between 3.0 s and 5.0 s is correct?

- A The acceleration decreases.
- B The acceleration increases.
- C The acceleration is zero.
- D The acceleration is 10 m/s.

29 What is a definition of gravitational field strength?

- A the gravitational acceleration of an object in free fall divided by its mass
- B the gravitational acceleration of an object in free fall divided by its weight
- C the gravitational force on an object divided by its mass
- D the gravitational force on an object divided by its weight

30 The diagram shows a cylinder with a length of 1.5 cm and a cross-sectional area of 2.0 cm².



The mass of the cylinder is 6.0 g.

What is the density of the material used to make the cylinder?

- A 0.50 g/cm³ B 2.0 g/cm³ C 3.0 g/cm³ D 4.0 g/cm³

31 A model car has a mass of 0.40 kg.

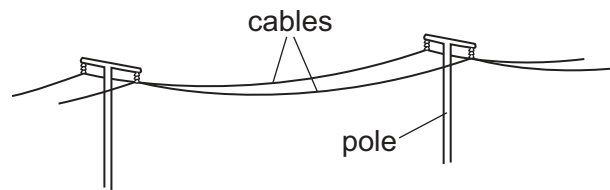
Which resultant force gives the car an acceleration of 2.0 m/s²?

- A 0.20 N B 0.80 N C 2.0 N D 8.0 N

32 Which energy source is used in a nuclear power station?

- A coal
- B hydrogen
- C natural gas
- D uranium

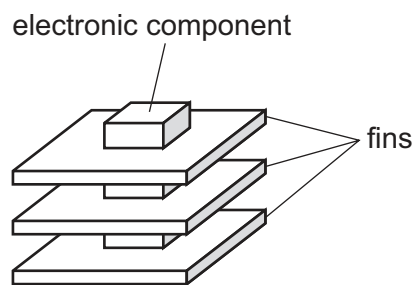
- 33 The diagram shows electricity cables hanging between two poles.



When first put up, the cables are allowed to hang loosely between the poles.

Which statement explains this?

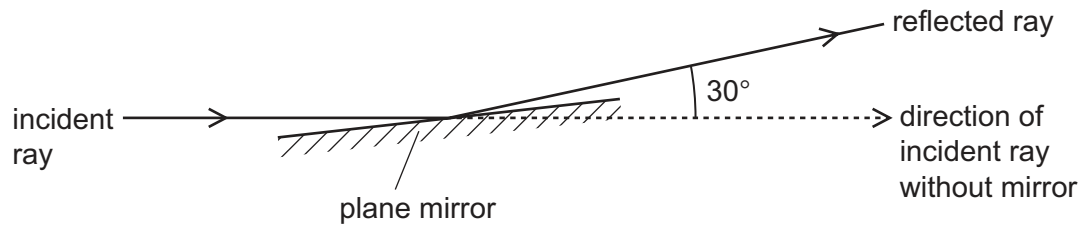
- A The cables contract in cold weather.
 - B The cables contract in hot weather.
 - C The cables expand in cold weather.
 - D The cables expand in hot weather.
- 34 The diagram shows an electronic component that has fins attached to transfer thermal energy to the surroundings.



Which combination of material and surface colour for the fins transfers the thermal energy most quickly?

- A copper painted black
- B copper painted white
- C glass painted black
- D glass painted white

- 35 A ray of light changes direction as it is reflected by a mirror.

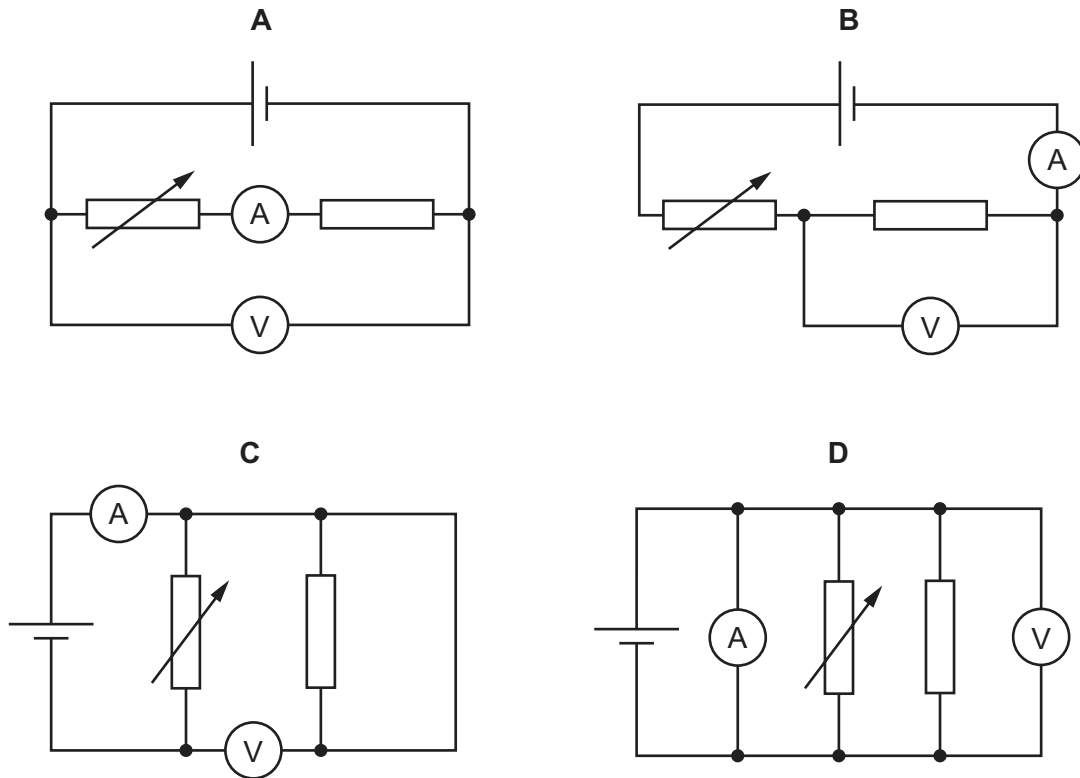


The ray changes direction by 30° .

Which statement is correct?

- A The angle of incidence is 15° and the angle of reflection is 15° .
 - B The angle of incidence is 30° and the angle of reflection is 30° .
 - C The angle of incidence is 60° and the angle of reflection is 60° .
 - D The angle of incidence is 75° and the angle of reflection is 75° .
- 36 Which electrical quantity is measured in coulombs?
- A charge
 - B current
 - C voltage
 - D resistance

37 Which circuit may be used to measure the resistance of a fixed resistor?



38 An electrical device of power 4500 W transfers energy for a time of 10 hours.

How much energy is transferred?

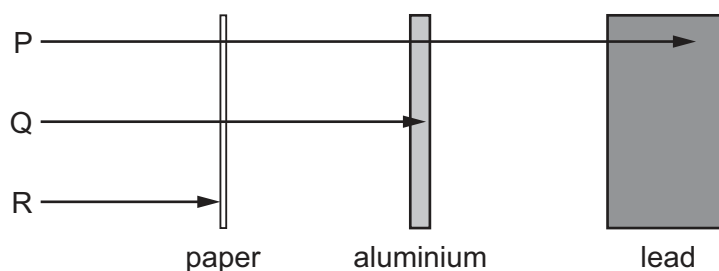
- A** 0.45 kWh **B** 45 kWh **C** 450 kWh **D** 45 000 kWh

39 A nucleus has a nucleon number A and a proton number Z .

Which equation gives the number of neutrons N in the nucleus?

- A** $N = \frac{A}{Z}$ **B** $N = \frac{Z}{A}$ **C** $N = A + Z$ **D** $N = A - Z$

40 The diagram shows the penetrative powers of three types of radiation P, Q and R.



Which row correctly identifies each radiation?

	P	Q	R
A	beta	alpha	gamma
B	beta	gamma	alpha
C	gamma	alpha	beta
D	gamma	beta	alpha

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The Periodic Table of Elements

Group																			
I	II											III	IV	V	VI	VII	VIII		
												1 H hydrogen 1							2 He helium 4