



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

SCIENCE (PHYSICS, CHEMISTRY)

5124/01

Paper 1 Multiple Choice

October/November 2009

1 hour

Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Write your name, Centre number and index number on the Answer Sheet in the spaces provided unless this has been done for you.

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 separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 16.

This document consists of **13** printed pages and **3** blank pages.

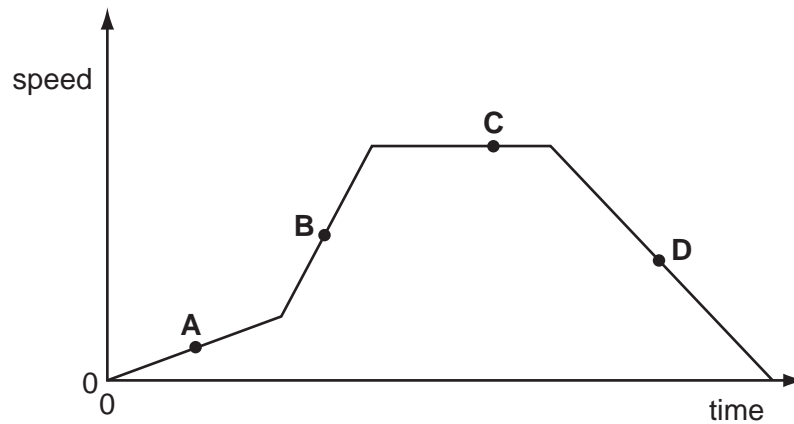


1 What gives the most accurate value for the internal diameter of a test tube?

- A a measuring tape
- B a metre rule
- C a micrometer screw gauge
- D vernier calipers

2 The speed-time graph shows the journey of a train.

At which point does the acceleration have its highest value?

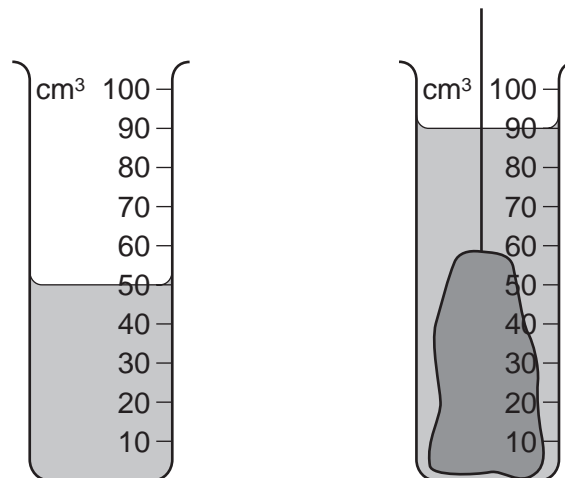


3 A horizontal force of 8 N is applied to a block of mass 2 kg, resting on a frictionless table.

What is the acceleration of the block?

- A 0.25 m/s^2
- B 4.0 m/s^2
- C 6.0 m/s^2
- D 16 m/s^2

4 An object of mass 100 g is immersed in water as shown in the diagram.



What is the density of the material from which the object is made?

- A 0.4 g/cm^3
- B 0.9 g/cm^3
- C 1.1 g/cm^3
- D 2.5 g/cm^3

- 5 If a nut and bolt are difficult to undo, it may be easier to turn the nut by using a longer spanner.

This is because the longer spanner gives

- A a larger turning moment.
- B a smaller turning moment.
- C less friction.
- D more friction.

- 6 A crane lifts a concrete block, whose weight is 60 000 N, to a height of 20 m in 30 s.

What power is achieved by the crane?

- A 100 W B 4000 W C 40 000 W D 90 000 W

- 7 The earliest Ford cars were always painted black. This was because black paint dried more quickly than lighter colours when the cars were left in the sun to dry.

Which property of black paint makes it dry more quickly?

- A It is the best absorber of heat.
- B It is the best conductor of heat.
- C It is the best insulator of heat.
- D It is the best reflector of heat.

- 8 The volume of a fixed mass of liquid can be used to measure temperature.

Why is this?

- A It can be coloured.
- B It expands when it is heated.
- C It is a poor conductor of heat.
- D It is cheap.

- 9 The frequency of a certain v.h.f. radio transmitter is 2×10^8 Hz.

The speed of the waves is 3×10^8 m/s.

What is the wavelength?

- A 0.67 m B 1.0 m C 1.5 m D 6.0 m

- 10** A ray of light travels from air into glass. The refractive index of the glass is 1.5.

Which of the following pairs could be values of the angle of incidence and the angle of refraction?

	angle of incidence	angle of refraction
A	21.5°	20.0°
B	40.0°	30.0°
C	60.0°	35.3°
D	80.0°	53.3°

- 11** A sonic 'tape measure' is used to measure the length of a room. It measures a time interval of 0.060 s between transmitting a sound pulse and receiving the echo. The speed of sound in air is 330 m/s.

How far is the reflecting wall from the 'tape measure'?

- A** 5.5 m **B** 9.9 m **C** 11 m **D** 20 m

- 12** An electrical quantity is defined as 'the energy dissipated by a source in driving unit charge round a complete circuit.'

What is this quantity called?

- A** current
B electromotive force
C potential difference
D power

- 13** A wire has a resistance of $8\ \Omega$. A second wire, made of the same material, has half the length and twice the cross-sectional area.

What is the resistance of the second wire?

- A** $1\ \Omega$ **B** $2\ \Omega$ **C** $8\ \Omega$ **D** $16\ \Omega$

- 14** A set of lights consists of 40 identical lamps connected in series to a 240 V mains supply.

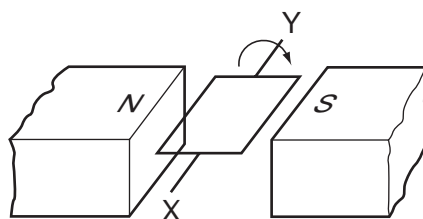
What is the potential difference across each lamp?

- A** 6 V **B** 40 V **C** 240 V **D** 9600 V

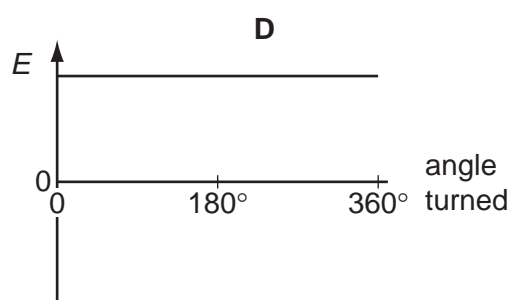
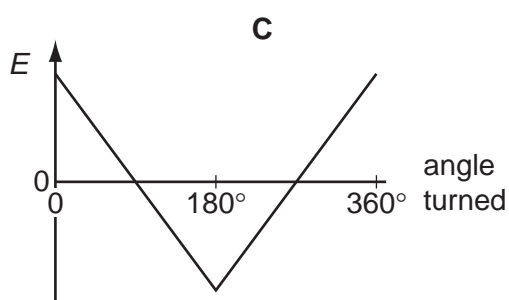
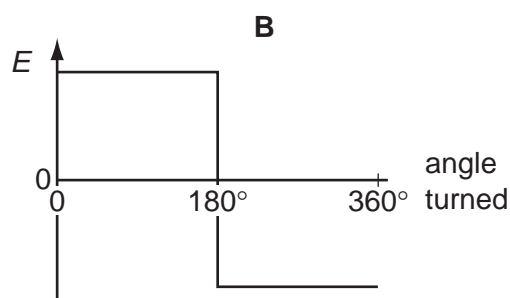
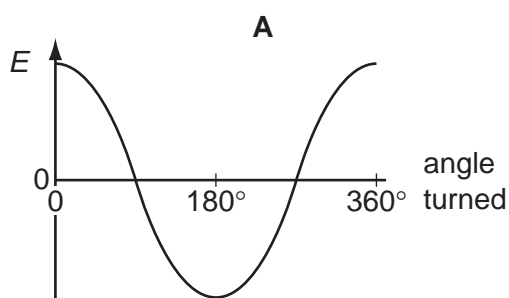
- 15** An electric kettle is plugged in and switched on. The fuse in the plug blows immediately.

Which single fault could cause this?

- A** The earth wire is not connected to the kettle.
 - B** The live wire and neutral wire connections in the plug are swapped around.
 - C** The live wire touches the metal case of the kettle.
 - D** The wires connected to the plug are too thin.
- 16** In a simple a.c. generator, a coil is rotated about a horizontal axis XY between the poles of two bar magnets.



Which graph shows the e.m.f., E , induced in the coil during one complete revolution?



- 17** Which statement about the action of a transformer is correct?

- A** An e.m.f. is induced in the secondary coil when an alternating voltage is applied to the primary coil.
- B** An e.m.f. is induced in the secondary coil when there is a steady direct current in the primary coil.
- C** The current in the secondary coil is always larger than the current in the primary coil.
- D** The voltage in the secondary coil is always larger than the voltage in the primary coil.

- 18 Two nuclides of neon are represented by the symbols below.



One nuclide contains more particles than the other.

What are these extra particles?

- A electrons
 - B ions
 - C neutrons
 - D protons
- 19 Radioactive decay occurs in some nuclei.

Which word describes these nuclei?

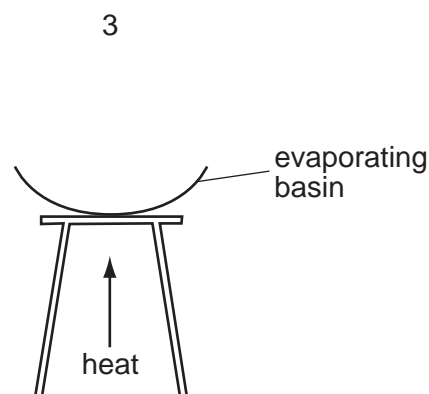
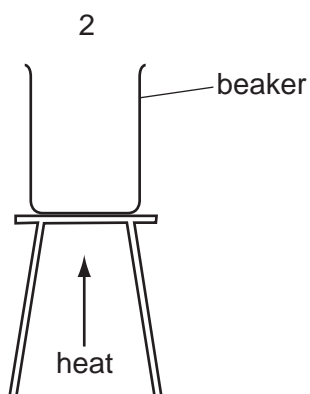
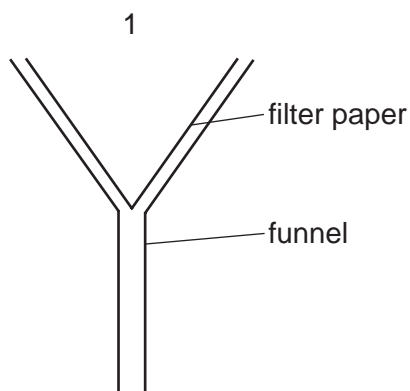
- A expanding
 - B neutral
 - C stable
 - D unstable
- 20 The half-life of a radioactive material is 24 years.

The activity of a sample falls to a fraction of its initial value after 72 years.

What is the fraction?

- A $\frac{1}{3}$
- B $\frac{1}{4}$
- C $\frac{1}{6}$
- D $\frac{1}{8}$

- 21 The diagrams show three sets of apparatus.



What apparatus would be used to obtain separate samples of sand and salt from a mixture of sand and seawater?

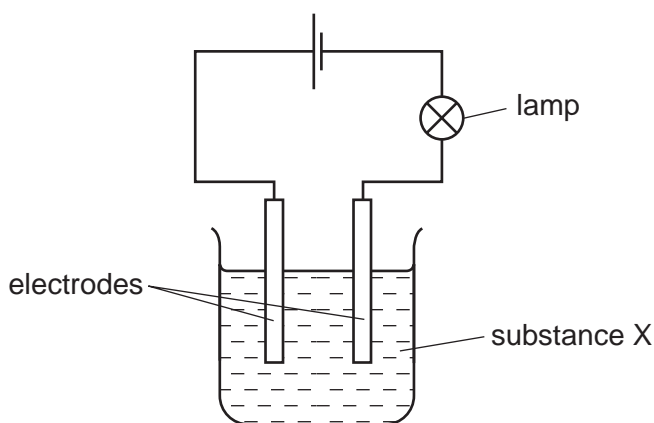
- A 1 only
- B 1 and 3
- C 2 and 3
- D 3 only

- 22 The symbol for an atom of potassium is ${}^{39}_{19}\text{K}$.

What does the number 39 represent for an atom of potassium?

- A the number of nucleons
- B the number of protons
- C its position in the Periodic Table
- D the number of electrons plus protons plus neutrons

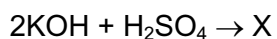
- 23 In the circuit below, the lamp lights up.



What could substance X be?

- A a solution of ethanol in water
 - B a solution of sodium chloride in water
 - C liquid ethanol
 - D solid sodium chloride
- 24 Which pair of elements form a compound by sharing electrons?
- A carbon and chlorine
 - B lithium and iodine
 - C neon and oxygen
 - D potassium and bromine

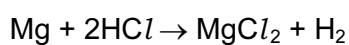
25 The following equation is incomplete.



What is represented by X?

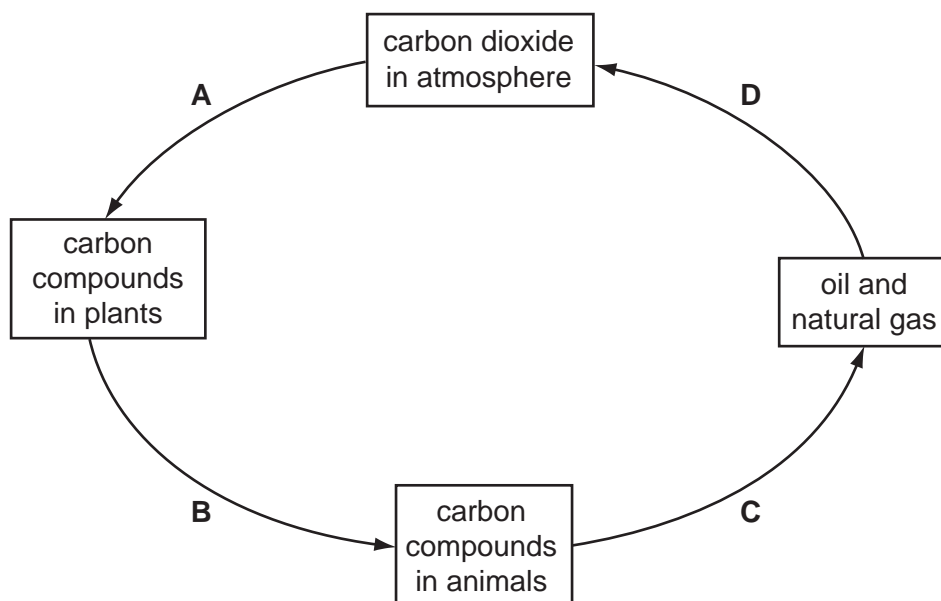
- A $\text{KSO}_4 + \text{H}_2\text{O}$
- B $\text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
- C $\text{KSO}_4 + 2\text{H}_2\text{O}$
- D $\text{K}_2\text{SO}_4 + 2\text{H}_2\text{O}$

26 For the reaction shown, which volume of 1.0 mol / dm^3 hydrochloric acid is required to react completely with 3 g of magnesium?



- A 3 cm^3
- B 6 cm^3
- C 125 cm^3
- D 250 cm^3

27 Which step in the diagram shows the process of photosynthesis?



- 28 Calcium carbonate was reacted with an excess of dilute hydrochloric acid at room temperature.

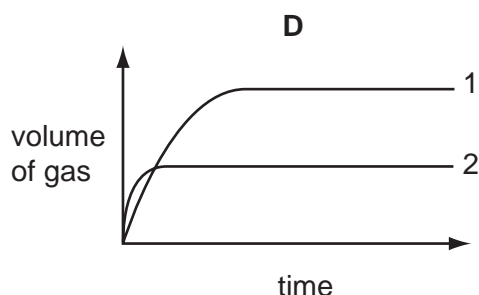
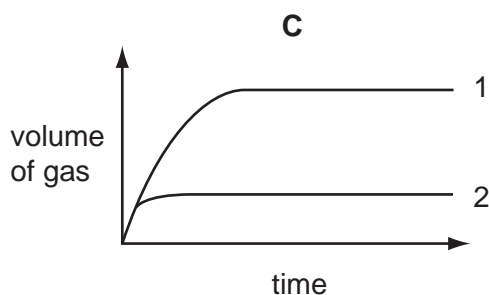
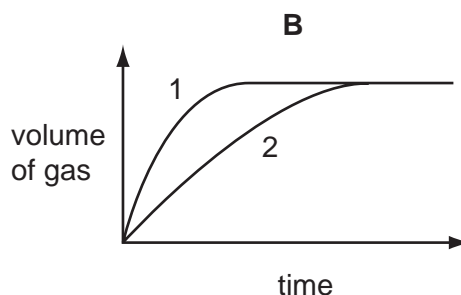
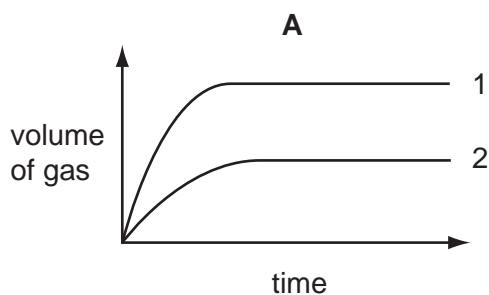


Two experiments were carried out.

Experiment 1 10 g of calcium carbonate in large lumps

Experiment 2 5 g of calcium carbonate as a fine powder

Which graph is correct?



- 29 Which reactants could be used safely to prepare potassium chloride?

- A** aqueous potassium hydroxide and dilute hydrochloric acid
- B** aqueous potassium sulfate and aqueous sodium chloride
- C** potassium and aqueous sodium chloride
- D** potassium and dilute hydrochloric acid

- 30 Caesium is in the same group of the Periodic Table as sodium and potassium.

What is a property of caesium?

- A** It does not conduct electricity.
- B** It forms an acidic oxide.
- C** It forms an ionic chloride, CsCl_2 .
- D** It reacts with water, forming hydrogen.

31 Which row in the table gives a correct use for the metal stated?

	metal	use
A	aluminium	manufacture of aircraft
B	copper	galvanising dustbins
C	mild steel	cutlery
D	zinc	cooking utensils

32 Nickel is placed between zinc and iron in the reactivity series.

Which metal reduces the oxide of nickel?

- A** copper
- B** iron
- C** lead
- D** magnesium

33 Which shows both the correct source and the correct effect of the named pollutant?

	pollutant	source	effect
A	carbon monoxide	incomplete combustion of carbon-containing materials	global warming
B	oxides of nitrogen	decaying vegetable matter	global warming
C	ozone	photochemical reactions	acid rain
D	sulfur dioxide	volcanoes	acid rain

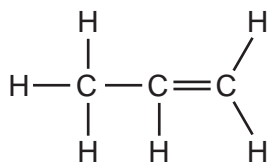
34 Which compound provides two elements essential to plant growth?

- A** potassium chloride
- B** potassium nitrate
- C** sodium phosphate
- D** sodium sulfate

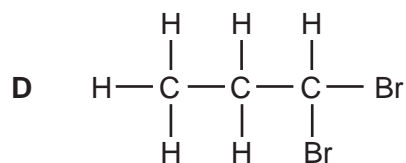
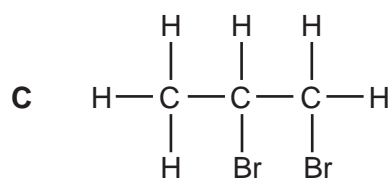
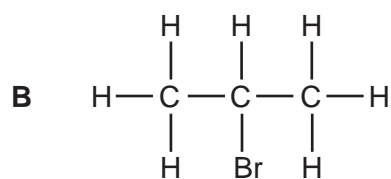
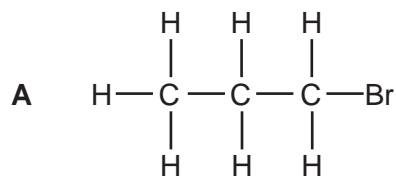
35 Methane the main constituent of

- A** diesel.
- B** naphtha.
- C** natural gas.
- D** petrol.

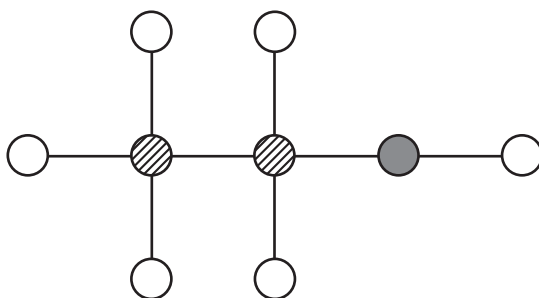
36 Propene is an unsaturated hydrocarbon. Its structure is shown.



What is produced when propene reacts with bromine?



37 The diagram represents an organic compound that contains three different elements.



What could the compound be?

- A** ethanoic acid
- B** ethanol
- C** propane
- D** propene

38 Which statement about a compound means that it **must** be an alkane?

- A It burns easily in air or in oxygen.
- B It contains carbon and hydrogen only.
- C It has the general formula C_nH_{2n+2} .
- D It is generally unreactive.

39 A compound, X, has a molecular formula $C_4H_8O_2$ and can be prepared by the reactions shown.



What is the structural formula of X?

- A $HCO_2CH_2CH_2CH_3$
- B $CH_3CO_2CH_2CH_3$
- C $CH_3CH_2CO_2CH_3$
- D $CH_3CH_2CH_2CO_2H$

40 In which pair of macromolecules are the linkages the same?

- A fats and proteins
- B nylon and fats
- C nylon and proteins
- D proteins and *Terylene*

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).

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