

CONVENT OF THE HOLY INFANT JESUS SECONDARY
Preliminary Examination in preparation for
the General Certificate of Education Ordinary Level 2025

CANDIDATE
NAME

CLASS

REGISTER
NUMBER

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SCIENCE (PHYSICS, CHEMISTRY)

5086/01

Paper 1 Multiple Choice

3 September 2025

1 hour

Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

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

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

There are **forty** questions in 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 Data Sheet is printed on page 19.

A copy of the Periodic Table is printed on page 20.

The use of an approved scientific calculator is expected, where appropriate.

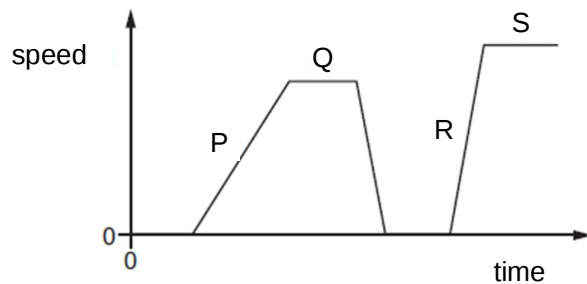
- 1 An object begins to fall close to the Earth's surface. Air resistance can be ignored. Which statement about the object's acceleration is correct?

A The acceleration is constant.
B The acceleration decreases as the body falls.
C The acceleration increases as the body falls.
D The acceleration is zero

- 2 Which quantity is equal to gravitational field strength?

A weight x mass
B gravity per unit mass
C mass per unit weight
D $\frac{\text{weight}}{\text{mass}}$

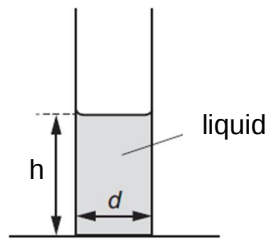
- 3 The diagram shows a speed-time graph for a bus.



Which statement about the motion of the bus is correct?

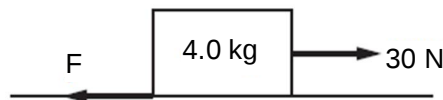
A The acceleration is greater in section P than in section R.
B The acceleration is not constant in section P or in section R.
C The bus is at rest in section Q and in section S.
D The speed is constant in section Q and in section S.

- 4 A liquid is held in a cylindrical container.
The diameter of the base of the cylinder is d .
The mass of the liquid is m and its depth is h .



Using pressure = $\frac{\text{force}}{\text{area}}$, which expression gives the pressure due to the weight of the liquid on the bottom of the cylinder?

- A $\frac{mg}{\pi d^2}$
 B $\frac{mgh}{\pi d^2}$
 C $\frac{4mg}{\pi d^2}$
 D $\frac{mg}{4\pi d^2}$
- 5 A block of mass 4.0 kg is pulled across a rough horizontal surface with a force of 30 N.

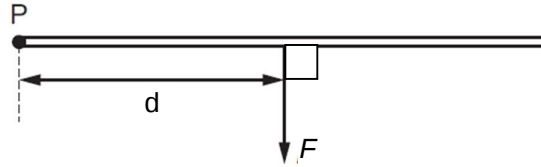


The acceleration of the block is 2.5 m/s^2 .

What is F , the force of friction between the block and the surface?

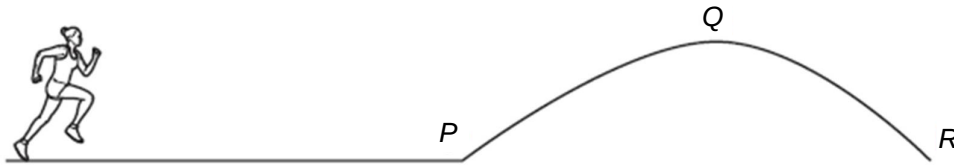
- A 10 N
 B 20 N
 C 30 N
 D 40 N

- 6 The diagram shows a force F acting at 90° to a bar at a distance d from the point P .

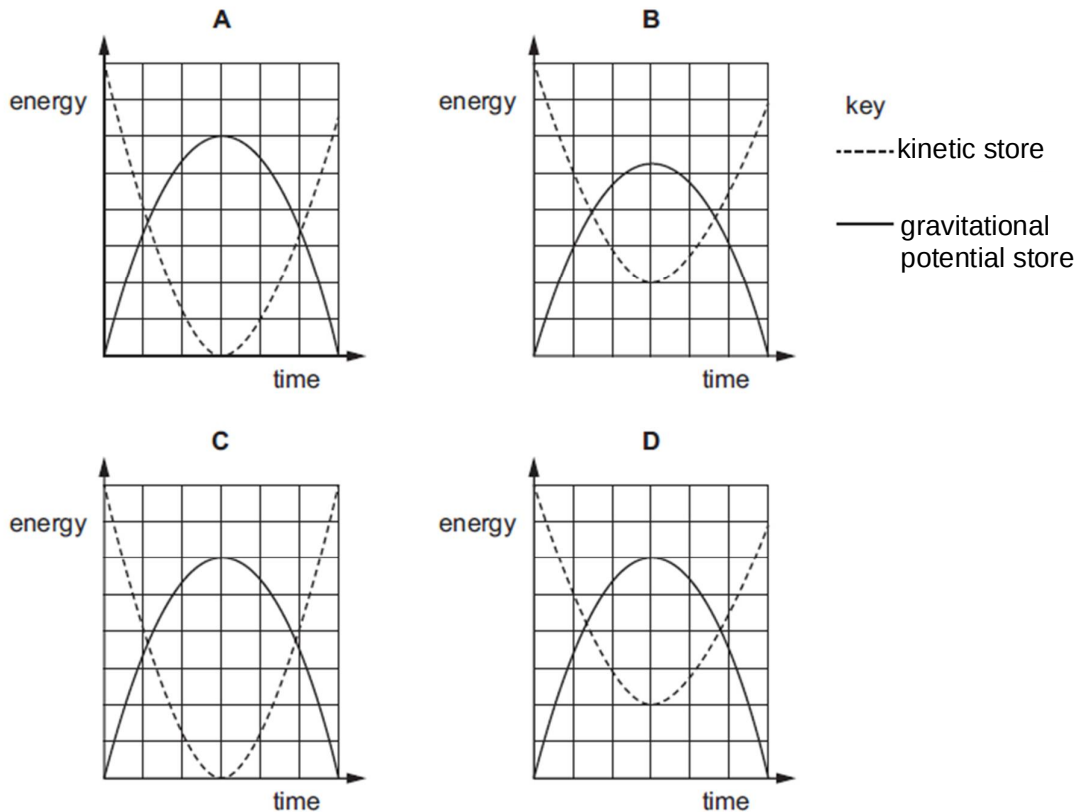


Which pair of changes causes the **greatest** increase in the moment of the force F about the point P ?

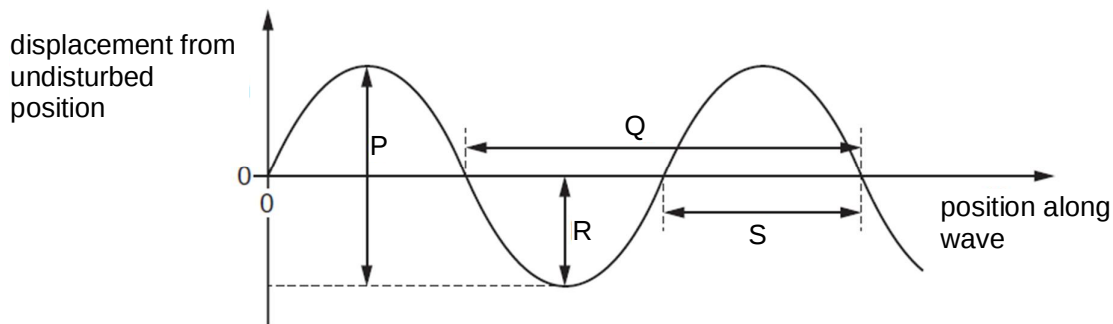
- A halving F and halving d
 B halving F and doubling d
 C doubling F and halving d
 D doubling F and doubling d
- 7 The diagram shows the path of a long jumper. Point R , where she lands, is on the same horizontal level as point P , from where she takes off. The long jumper experiences **air resistance** as she runs and jumps.



Which graph shows how the energy in the kinetic store and the energy in the gravitational potential store of the long jumper vary with time between point P and R ?



- 8** A gas expands slowly and its temperature remains constant.
What happens to the particles of the gas?
- A** They move further apart and their average speed decreases.
 - B** They move further apart and their average speed increases.
 - C** They move further apart and their average speed remains unchanged.
 - D** They stay the same distance apart and their average speed decreases.
- 9** A hot meal is supplied in a container made of shiny metal foil.
Why does the container help to keep the food hot?
- A** The container traps air which increases convection.
 - B** The foil is a poor thermal conductor.
 - C** Shiny metal foil is a good absorber of infrared radiation.
 - D** Shiny metal foil is a poor emitter of infrared radiation.
- 10** The diagram shows a wave.



Which dimensions describe the properties of the wave?

- A** P = amplitude, S = speed
- B** P = speed, Q = wavelength
- C** R = amplitude, Q = wavelength
- D** R = amplitude, S = wavelength

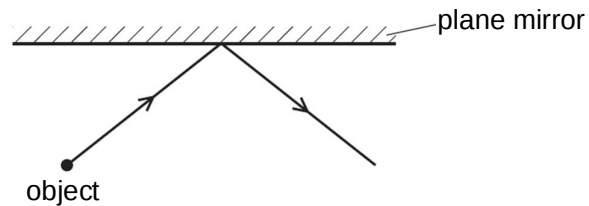
- 11** A student hits two wooden blocks together in front of a wall and calculates the speed of sound to be 340 m/s.

The time between the student hitting the blocks and hearing the echo is 0.59 s.

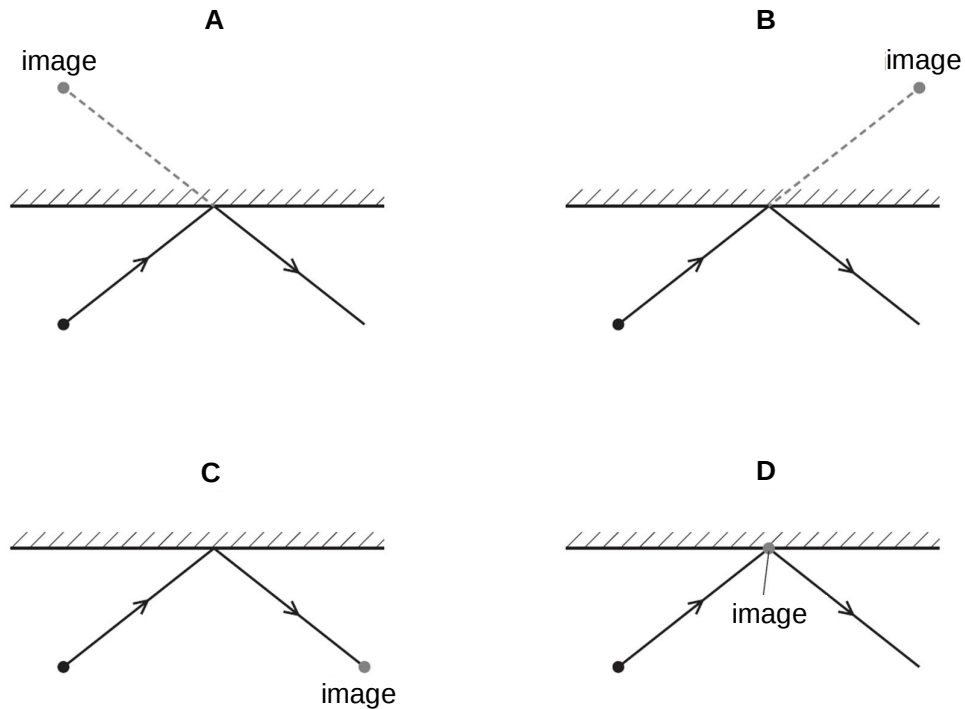


What is the distance between the student and the wall?

- A** 100 m
B 200 m
C 290 m
D 570 m
- 12** An object is placed in front of a plane mirror.
 The ray diagram shows the reflection of one ray of light from the object by the mirror.



Where does the mirror form an image of the object?

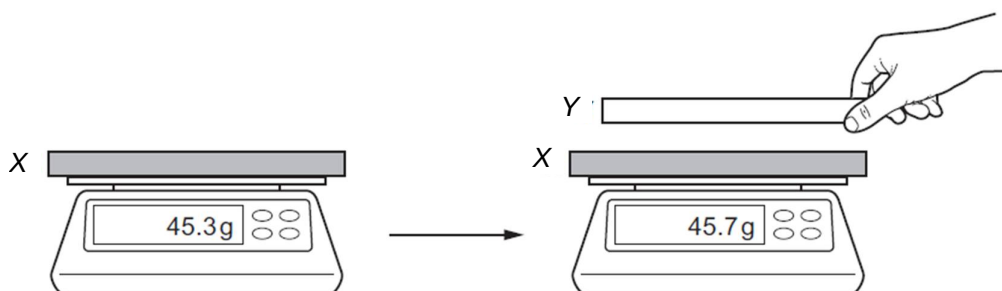


- 13** Infrared is a useful type of electromagnetic radiation. However, excessive exposure to infrared can cause harmful effects.

Which row gives a use and a harmful effect for infrared?

	use	harmful effect
A	detection of cancer	mutations
B	intruder alarms	skin burns
C	detection of fake bank notes	cell damage
D	thermal imaging	internal bleeding of body cells

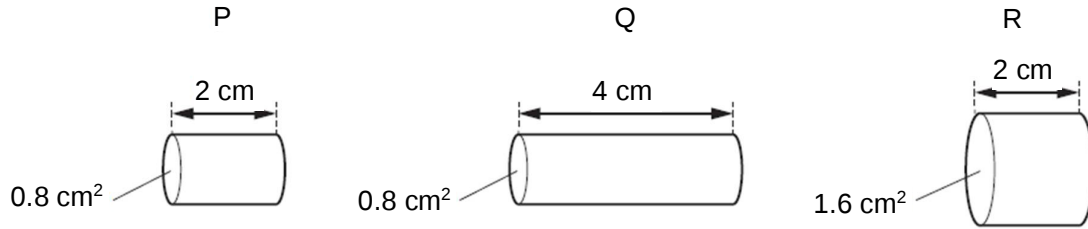
- 14** The diagram shows a charged rod X placed on a balance and another rod Y brought close to it, as shown.



Which combination of charges on the rods would cause the change in the balance reading shown?

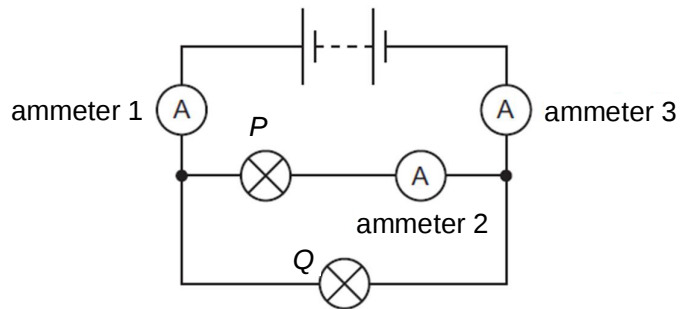
	X	Y
A	negative charge	negative charge
B	negative charge	positive charge
C	negative charge	no charge
D	positive charge	no charge

- 15 The diagram shows three wires, P, Q and R. They are all made from the same metal.



Which list gives the wires in order of resistance, from lowest to highest?

- A P → Q → R
 B Q → R → P
 C R → P → Q
 D R → Q → P
- 16 The diagram shows a circuit containing lamps P, Q and three ammeters. The resistance of lamp P is bigger than the resistance of lamp Q.



The current in ammeter 1 is 0.30 A.

Which row gives possible values for the currents in ammeters 2 and 3?

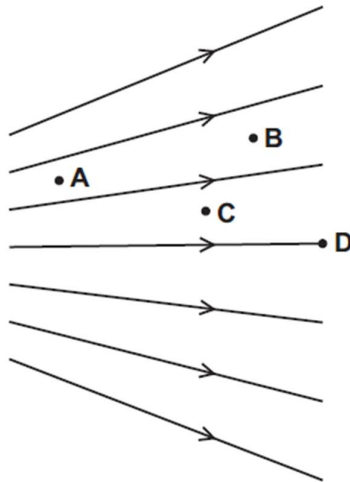
	current in ammeter 2 /A	current in ammeter 3 /A
A	0.10	0.30
B	0.15	0.30
C	0.20	0.30
D	0.30	0.00

- 17 The diagram shows the information label on an electric kettle.

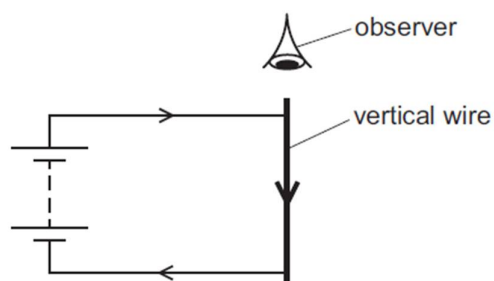
Voltage:	110 V a.c.
Power:	1.5 kW
Frequency:	50 Hz

What is the value of the current when the kettle is heating water?

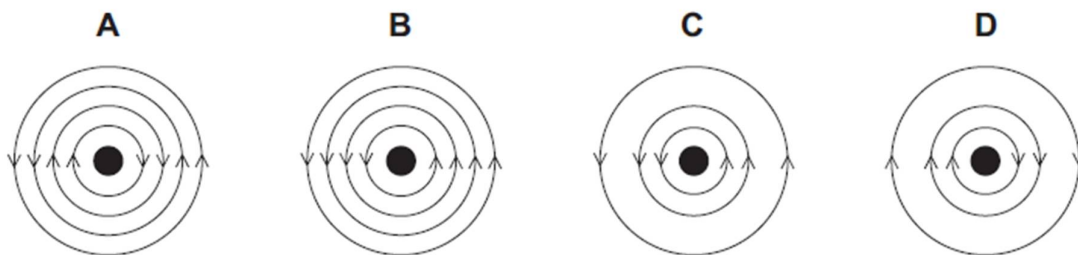
- A 0.014 A
B 2.2 A
C 3.7 A
D 14 A
- 18 A magnetic field is represented in the diagram by magnetic field lines.
At which point is the magnetic field the strongest?



- 19 A straight vertical wire carries a current in the direction shown.



What is the pattern of the magnetic field around the wire seen by an observer viewing the wire from the position shown?



- 20 A detector is placed near a radioactive material. The reading on the detector is 536 counts per second.

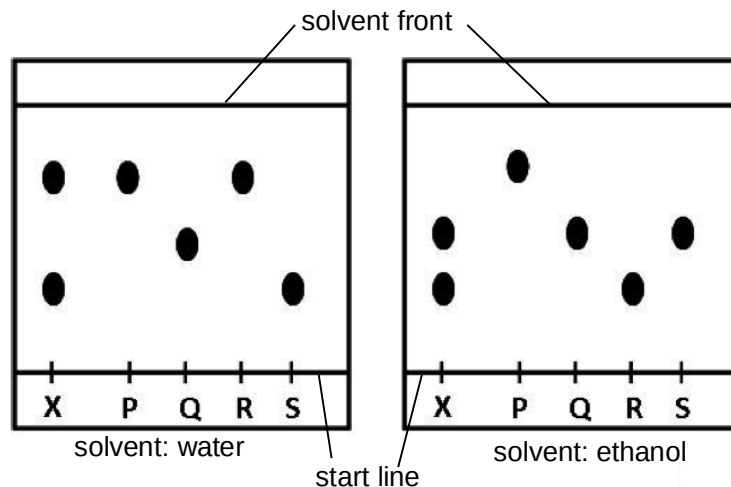
The background count rate is 44 counts per second. The half-life of the radioactive material is 34 hours.

What is the reading on the detector after 68 hours?

- A 123 counts per second
- B 134 counts per second
- C 167 counts per second
- D 178 counts per second

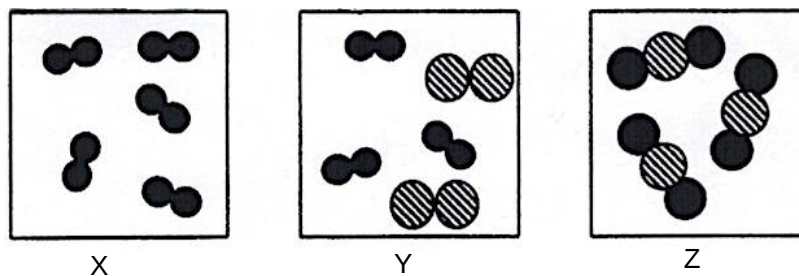
- 21** An unknown substance X and four known substances P, Q, R and S, were analysed by chromatography using two different solvents, water and ethanol.

The resulting chromatograms are shown below.



Which substances are found in X?

- A** P and R only
B R and S only
C P, R and S only
D P, Q, R and S
- 22** The diagrams show the arrangement of particles in the substances, X, Y and Z.



Which row correctly describes X, Y and Z?

	X	Y	Z
A	compound	element	mixture
B	element	compound	mixture
C	element	mixture	compound
D	mixture	compound	element

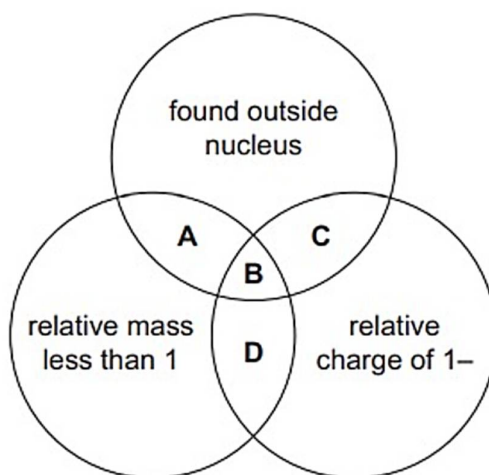
- 23** Bromine is a liquid at 20 °C.

What could be the melting point and boiling point for bromine?

	melting point / °C	boiling point / °C
A	-22	-3
B	-8	-33
C	-7	59
D	25	105

- 24** The diagram shows some properties of particles in an atom.

To which labelled part of the diagram does electron belong?



- 25** An atom forms an ion with a charge of 2+ and the electronic configuration of 2,8,8.

What is the proton number of the atom?

- A** 16
- B** 17
- C** 19
- D** 20

- 26** Element P has n protons.
Element Q has $(n - 3)$ protons and can achieve a stable electronic configuration by either sharing or accepting two electrons.

What is the compound formed when element P reacts with element Q?

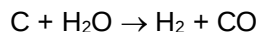
- A** a covalent compound, PQ_2
B a covalent compound, P_2Q
C an ionic compound, PQ_2
D an ionic compound, P_2Q
- 27** How many ions are there in 13.6 g of zinc chloride?

- A** 1.2×10^{23}
B 1.8×10^{23}
C 1.2×10^{24}
D 1.8×10^{24}

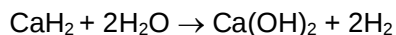
- 28** Hydrogen is produced in all reactions shown.

Which reaction produces the greatest volume of hydrogen, measured at room temperature and pressure.

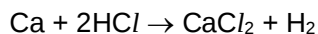
- A** 1.4 g of carbon reacts with excess steam.



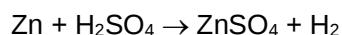
- B** 2.4g calcium hydride reacts with excess water.



- C** 4.0 g calcium reacts with excess dilute hydrochloric acid.



- D** 50.0 cm³ of 2.0 mol/dm³ of sulfuric acid reacts with excess zinc.



- 29** The table shows the observations of some reactions of an oxide, XO, where X is an unknown element.

reaction of XO with sodium hydroxide	reaction of XO with hydrochloric acid
reaction occurred	reaction occurred

What is the identity of element X?

- A** carbon
B lead
C magnesium
D sulfur
- 30** The table shows information of some pH indicators.

indicators	pH					
	2	3	4	5	6	7
methyl orange	red		yellow			
methyl red	red				yellow	
bromothymol blue	yellow					blue

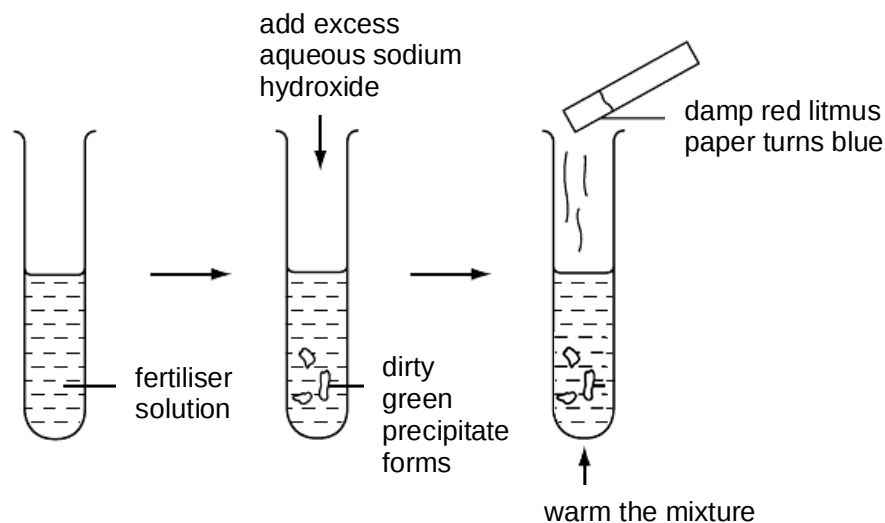
An unknown solution appears yellow when all three indicators are added to this solution.

What is the pH of the unknown solution?

- A** 4
B 5
C 6
D 7
- 31** In which reaction does the oxidation state of iron remain unchanged?

- A** $\text{C} + \text{FeO} \rightarrow \text{CO} + \text{Fe}$
B $\text{PbO} + \text{Fe} \rightarrow \text{Pb} + \text{FeO}$
C $2\text{FeCl}_2 + \text{Cl}_2 \rightarrow 2\text{FeCl}_3$
D $\text{Fe}_2\text{O}_3 + 6\text{HCl} \rightarrow 2\text{FeCl}_3 + 3\text{H}_2\text{O}$

- 32 A solution of fertiliser was tested as shown.



What are the ions present in the fertiliser solution?

- A Fe^{3+} and SO_4^{2-}
 B Fe^{2+} and NO_3^-
 C NH_4^+ and NO_3^-
 D NH_4^+ and Fe^{2+}
- 33 Period 3 of the Periodic Table contains the elements from sodium to argon.
 Which statement is correct for the trend from left to right across Period 3?
- A The elements show a decrease in electrical conductivity.
 B The elements have an increasing melting point.
 C The elements have an increasing number of electron shells.
 D The elements react more violently with water.
- 34 Which statement about the element bromine is correct?
- A It displaces chlorine from aqueous sodium chloride.
 B It has a lower melting point than fluorine.
 C It is a diatomic metal.
 D It is lighter in colour than iodine.

- 35** A student added dilute sodium hydroxide to dilute nitric acid and recorded an increase in the temperature of the mixture.

Which row describes the reaction?

	type of reaction	energy change
A	endothermic	energy given out to surroundings
B	endothermic	energy taken in from surroundings
C	exothermic	energy given out to surroundings
D	exothermic	energy taken in from surroundings

- 36** An experiment was conducted to investigate the rate of reaction when calcium carbonate is reacted with dilute hydrochloric acid. The procedure is as shown.

- Place 50.0 cm³ of dilute hydrochloric acid in a conical flask.
- Add a known volume of water to the conical flask.
- Heat the mixture in the conical flask to the required temperature.
- Add 1.0 g of calcium carbonate to the conical flask.
- Measure the time taken for the reaction to complete.

What volume of water and temperature will allow the reaction to complete in the shortest time?

	volume of water added / cm ³	temperature / °C
A	10	30
B	10	50
C	40	30
D	40	50

- 37** A sample of petroleum is separated into three fractions, X, Y, and Z, using fractional distillation.

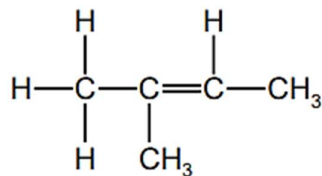
Some properties of X, Y and Z are listed.

- X is more viscous than Z.
- Y has a higher boiling point than X.

Which row correctly identifies the fraction with the longest carbon chain and highest volatility?

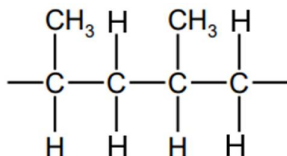
	longest carbon chain	most volatile
A	Y	X
B	Y	Z
C	Z	X
D	Z	Y

- 38 The structure of a monomer is shown.

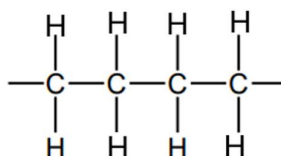


Which structure shows part of the polymer chain formed from **two** molecules of the monomer?

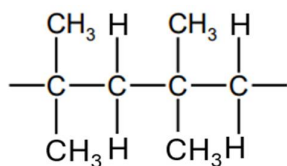
A



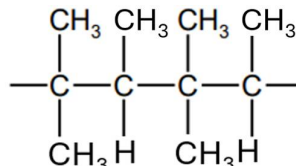
B



C



D



- 39 Which row describes the methods of recycling plastics correctly?

	physical method	chemical method
A	burning plastic to generate electricity	cracking plastics into fuel
B	burning plastic to generate electricity	compressing plastics into bricks
C	melting plastic into pellets for reuse	cracking plastics into fuel
D	melting plastic into pellets for reuse	compressing plastics into bricks

- 40 Which row identifies a natural source and an adverse effect of oxides of nitrogen?

	source	adverse effect
A	decay of plant and animal matters	acid rain
B	decay of plant and animal matters	global warming
C	lightning activities	acid rain
D	lightning activities	global warming

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