

Name: _____

Date: _____



Question: 1 of 20

QID: 445

Marks: 1

Which is the equation for the reaction of calcium with water?

Please mark (✓) for the correct answer.

- A. $\text{Ca} + \text{H}_2\text{O} \rightarrow \text{CaO} + \text{H}_2$
- B. $\text{Ca} + 2\text{H}_2\text{O} \rightarrow \text{CaO} + 2\text{H}_2$
- C. $\text{Ca} + 2\text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{H}_2$
- D. $2\text{Ca} + 2\text{H}_2\text{O} \rightarrow 2\text{Ca}(\text{OH})_2 + \text{H}_2$

Question: 2 of 20

QID: 446

Marks: 1

Group 2 compounds give different colours in a flame test. The best explanation is that the cations have different

Please mark (✓) for the correct answer.

- A. gaps between electron energy levels.
- B. ionic radii.
- C. numbers of electrons.
- D. first and second ionisation energies

Question: 3 of 20

QID: 447

Marks: 1

25.0 cm³ of a solution of sodium carbonate, Na₂CO₃, contained 2.12 g of solute. What is the concentration of the solution, in mol dm⁻³?

Please mark (✓) for the correct answer.

- A. 0.02
- B. 0.40
- C. 0.80
- D. 1.02

Question: 4 of 20

QID: 448

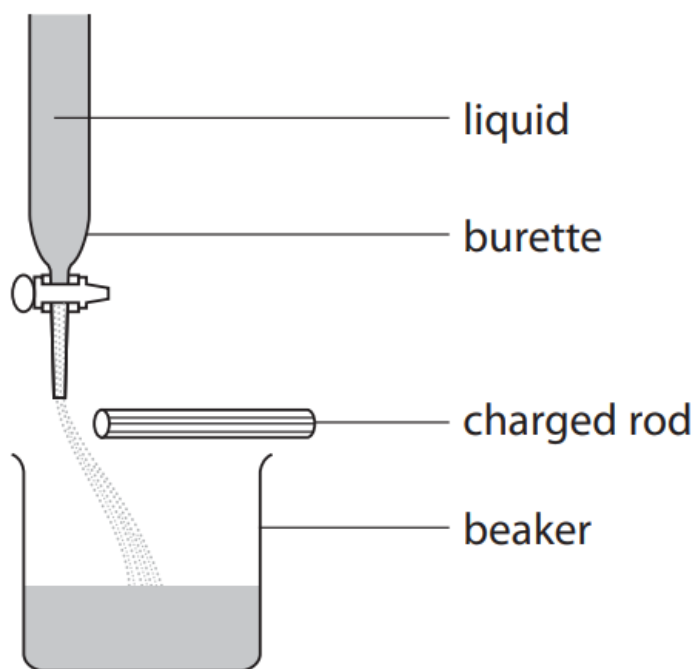
Marks: 1

Which molecule has the shortest distance between the atoms?

Please mark (✓) for the correct answer.

- A. Cl-Cl
- B. I-I
- C. O=O
- D. N≡N

Which liquid will be deflected the most by a charged rod, using the apparatus shown in the diagram?



Please mark (✓) for the correct answer.

- A. cyclohexane
- B. hexane
- C. tetrachloromethane
- D. trichloromethane

What is the trend in boiling temperatures for the hydrogen halides from HF to HI?

Please mark (✓) for the correct answer.

- A. decreases
- B. decreases then increases
- C. increases
- D. increases then decreases

W is a white compound containing a Group 2 metal ion, an anion and water of crystallisation.

(a) W gives a red colour in a flame test.

(i) Describe how you would carry out a flame test. (3 marks)

Please write your answer below.

(ii) Identify the metal ion by name or formula. (1 mark)

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Please write your answer below.

(b) W dissolves readily in distilled water to form a solution.

(i) Describe what you would see if some dilute sulfuric acid was added to this solution. **(1 mark)**

Please write your answer below.

(ii) Write an ionic equation, with state symbols, for this reaction **(2 marks)**

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Please write your answer below.

(c) When W is heated in a test tube, a colourless solution forms.

As heating continues, drops of a liquid, **X**, condense at the top of the test tube. A white solid, **Y**, remains in the test tube.

On further heating, **Y** melts and a brown gas is given off. A glowing splint held just inside the test tube relights.

When heating is finished, a white solid, **Z**, remains in the test tube.

Identify, by name or formula, the substances **X**, **Y**, **Z** and the two gases given off **(5 marks)**

Please write your answer below.

(d) A sample of W is heated until only solid Z is left.

(i) Describe how you would check that the reaction is complete. **(1 mark)**

Please write your answer below.

(ii) Calculate the formula of W given that 0.0100 mol of W, with mass 2.836 g, gave 0.0100 mol of Z, with mass 1.036g. **(3 marks)**

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Please write your answer below.

This question is about finding the identity of two organic liquids, **P** and **Q**, which have the same functional group.

P and **Q** are isomers containing carbon, hydrogen and oxygen only.

(a) When phosphorus(V) chloride is added to samples of **P** and **Q** in separate test tubes, a gas **R** is produced.

(i) Identify **R**, by name or formula. (1 mark)

Please write your answer below.

(ii) Give a possible reason why gas R forms steamy fumes when it mixes with moist air. **(1 mark)**

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Please write your answer below.

(b) A few drops of acidified potassium dichromate(VI) are added to separate samples of P and Q, and the mixtures are heated.

The colour of both mixtures changes from orange to green.

(i) Identify the functional group present in **P** and **Q**. (1 mark)

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Please write your answer below.

(ii) Give the **formula** for the ion responsible for the green colour of the mixtures. **(1 mark)**

Please write your answer below.

(c) State two observations you would make when a small piece of sodium is added to either liquid **P** or liquid **Q**. (2 marks)

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Please write your answer below.

(d) The mass spectra of P and Q both have a molecular ion peak at $m/e = 60$.

The mass spectrum of P also has a peak at $m/e = 31$, which is not present in the mass spectrum of Q.

Give the formulae of the ions responsible for these peaks. **(2 marks)**

Please write your answer below.

(e) Deduce the structural formulae of P and Q (2 marks)

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Please write your answer below.

--- END OF QUESTION PAPER ---

Answer Key

No	Question Type	QID	Correct Answer
Question - 1	Multiple Choice (Radiobutton)	445	C
Question - 2	Multiple Choice (Radiobutton)	446	A
Question - 3	Multiple Choice (Radiobutton)	447	C
Question - 4	Multiple Choice (Radiobutton)	448	D
Question - 5	Multiple Choice (Radiobutton)	449	D
Question - 6	Multiple Choice (Radiobutton)	450	B
Question - 7	Essay (Evaluted by Admin)	431	Essay Type Question
Question - 8	Essay (Evaluted by Admin)	432	Essay Type Question
Question - 9	Essay (Evaluted by Admin)	433	Essay Type Question
Question - 10	Essay (Evaluted by Admin)	434	Essay Type Question
Question - 11	Essay (Evaluted by Admin)	435	Essay Type Question
Question - 12	Essay (Evaluted by Admin)	436	Essay Type Question
Question - 13	Essay (Evaluted by Admin)	437	Essay Type Question
Question - 14	Essay (Evaluted by Admin)	438	Essay Type Question
Question - 15	Essay (Evaluted by Admin)	439	Essay Type Question
Question - 16	Essay (Evaluted by Admin)	440	Essay Type Question
Question - 17	Essay (Evaluted by Admin)	441	Essay Type Question
Question - 18	Essay (Evaluted by Admin)	442	Essay Type Question
Question - 19	Essay (Evaluted by Admin)	443	Essay Type Question
Question - 20	Essay (Evaluted by Admin)	444	Essay Type Question

-- END OF ANSWER KEY --