National Qualifications 2014

X713/75/02

Chemistry
Section 1—Questions

MONDAY, 12 MAY

9:00 AM—11:00 AM

Necessary data will be found in the Chemistry Data Booklet for National 5.

Instructions for the completion of Section 1 are given on Page two of your question and answer booklet X713/75/01.

Record your answers on the answer grid on Page three of your question and answer booklet

Before leaving the examination room you must give your question and answer booklet to the Invigilator; if you do not, you may lose all the marks for this paper.

SECTION 1

1. In a reaction, 60 cm^3 of hydrogen gas was collected in 20 s.

What is the average rate of reaction, in $cm^3\,s^{-1}$, over this time?

A $\frac{60}{20}$

B $\frac{20}{60}$

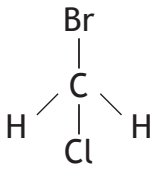
C $\frac{1}{60}$

D $\frac{1}{20}$

2. Molecules in which four different atoms are attached to a carbon atom are said to be chiral.

Which of the following molecules is chiral?

A



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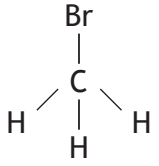

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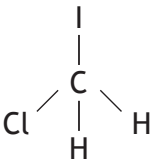

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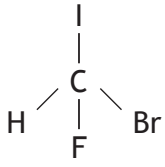


3. What is the charge on the zinc ion in the compound zinc phosphate $Zn_3(PO_4)_2$?

A 2+

B 3+

C 2−

D 3−

4. $Fe_2O_3 + x\,CO \longrightarrow y\,Fe + 3CO_2$

This equation will be balanced when

A $x = 1$ and $y = 2$

B $x = 2$ and $y = 2$

C $x = 3$ and $y = 2$

D $x = 2$ and $y = 3$.

5. An acidic solution contains

A only hydrogen ions

B only hydroxide ions

C more hydrogen ions than hydroxide ions

D more hydroxide ions than hydrogen ions.

6. Which of the following oxides, when shaken with water, would give an alkaline solution?

A Calcium oxide

B Nickel oxide

C Nitrogen dioxide

D Sulfur dioxide

7. Which of the following compounds is **not** a salt?

A Calcium nitrate

B Sodium chloride

C Potassium sulfate

D Magnesium hydroxide

8. $H^+(aq) + NO_3^-(aq) + K^+(aq) + OH^-(aq) \longrightarrow K^+(aq) + NO_3^-(aq) + H_2O(\ell)$

The spectator ions present in the reaction above are

A $K^+(aq)$ and $NO_3^-(aq)$

B $K^+(aq)$ and $H^+(aq)$

C $OH^-(aq)$ and $NO_3^-(aq)$

D $H^+(aq)$ and $OH^-(aq)$.

9. The molecular formula for cyclohexane is

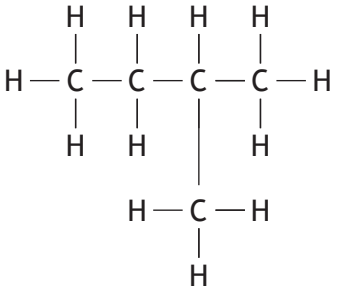
A C_6H_6

B C_6H_{10}

C C_6H_{12}

D C_6H_{14}.

10.



The systematic name for the structure shown is

A 1,1-dimethylpropane

B 2-methylbutane

C 3-methylbutane

D 2-methylpentane.

11. Petrol is a mixture of hydrocarbons.

The tendency of a hydrocarbon to ignite spontaneously is measured by its octane number.

	Hydrocarbon	*Octane number*
1	3-methylpentane	74·5
2	butane	93·6
3	pentane	61·7
4	2-methylpentane	73·4
5	hexane	24·8
6	methylcyclopentane	91·3

A student made the hypothesis that as the chain length of a hydrocarbon increases, the octane number decreases.

Which set of three hydrocarbons should have their octane numbers compared in order to test this hypothesis?

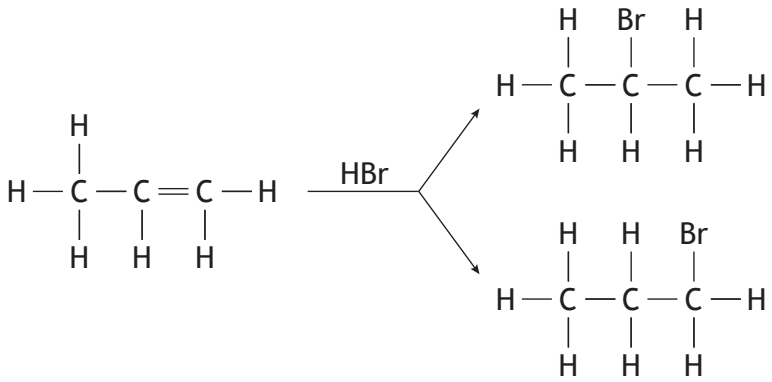
A 1, 4, 6

B 1, 2, 4

C 2, 3, 5

D 3, 4, 5

12. Propene reacts with hydrogen bromide to form two products.



Which of the following alkenes does **not** form two products on reaction with hydrogen bromide?

A But-1-ene

B But-2-ene

C Pent-1-ene

D Pent-2-ene

13. Which of the following alcohols has the highest boiling point?
You may wish to use your data booklet to help you.

A Propan-1-ol

B Propan-2-ol

C Butan-1-ol

D Butan-2-ol

14. A reaction is endothermic if

A energy is required to start the reaction

B heat is released during the reaction

C the temperature drops during the reaction

D the temperature rises during the reaction.

15. Which of the following metals will **not** react with a dilute solution of hydrochloric acid?

A Copper

B Iron

C Magnesium

D Zinc

16. Which metal can be extracted from its oxide by heat alone?

A Tin

B Zinc

C Lead

D Silver

17. The ion–electron equations for the oxidation and reduction steps in the reaction between **sulfite ions** and **iron(III) ions** are given below.

oxidation $H_2O(\ell) + SO_3^{2-}(aq) \longrightarrow SO_4^{2-}(aq) + 2H^+(aq) + 2e^-$

reduction $Fe^{3+}(aq) + e^- \longrightarrow Fe^{2+}(aq)$

The redox equation for the overall reaction is

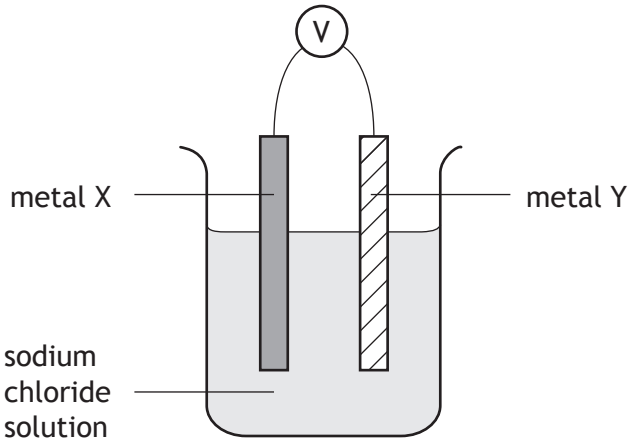
A $H_2O(\ell) + SO_3^{2-}(aq) + Fe^{3+}(aq) \longrightarrow SO_4^{2-}(aq) + 2H^+(aq) + Fe^{2+}(aq) + e^-$

B $H_2O(\ell) + SO_3^{2-}(aq) + 2Fe^{3+}(aq) \longrightarrow SO_4^{2-}(aq) + 2H^+(aq) + 2Fe^{2+}(aq)$

C $SO_4^{2-}(aq) + 2H^+(aq) + Fe^{2+}(aq) + e^- \longrightarrow H_2O(\ell) + SO_3^{2-}(aq) + Fe^{3+}(aq)$

D $SO_4^{2-}(aq) + 2H^+(aq) + 2Fe^{2+}(aq) \longrightarrow H_2O(\ell) + SO_3^{2-}(aq) + 2Fe^{3+}(aq)$.

18. The apparatus below was set up.

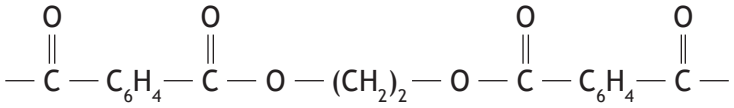


Which of the following pairs of metals would give the highest reading on the voltmeter?

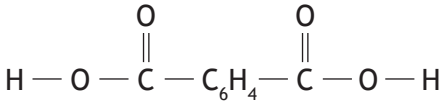
	Metal X	**Metal Y**
A	Iron	Zinc
B	Magnesium	Silver
C	Zinc	Copper
D	Zinc	Silver

[Turn over

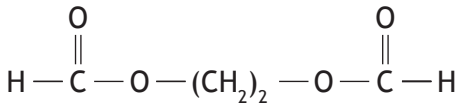
19. A section of a condensation polymer is shown below.

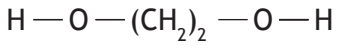


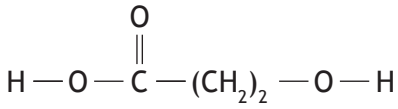
One of the monomers is

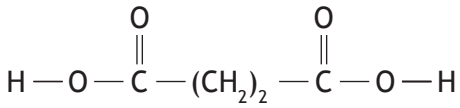


The structural formula for the other monomer is

A 

B 

C 

D 

20. $Ba^{2+}(aq) + 2NO_3^-(aq) + 2Na^+(aq) + SO_4^{2-}(aq) \longrightarrow Ba^{2+}SO_4^{2-}(s) + 2Na^+(aq) + 2NO_3^-(aq)$

The type of reaction represented by the equation above is

A addition

B displacement

C neutralisation

D precipitation.

[END OF SECTION 1. NOW ATTEMPT THE QUESTIONS IN SECTION 2 OF YOUR QUESTION AND ANSWER BOOKLET]