National Qualifications 2016

X713/75/02

Chemistry
Section 1 — Questions

WEDNESDAY, 18 MAY

1:00 PM – 3:00 PM

Instructions for the completion of Section 1 are given on *Page 02* of your question and answer booklet X713/75/01.

Record your answers on the answer grid on *Page 03* of your question and answer booklet.

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

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. When solid sodium chloride dissolves in water, a solution containing sodium ions and chloride ions is formed.

Which of the following equations correctly shows the state symbols for this process?

A $NaCl(s) + H_2O(\ell) \longrightarrow Na^+(\ell) + Cl^-(\ell)$

B $NaCl(s) + H_2O(aq) \longrightarrow Na^+(aq) + Cl^-(aq)$

C $NaCl(aq) + H_2O(\ell) \longrightarrow Na^+(aq) + Cl^-(aq)$

D $NaCl(s) + H_2O(\ell) \longrightarrow Na^+(aq) + Cl^-(aq)$

2. The table shows the times taken for 0·5 g of magnesium to react completely with acid under different conditions.

Acid concentration (mol l^{-1})	*Temperature* (°C)	*Reaction time* (s)
0·1	20	80
0·1	25	60
0·2	30	20
0·2	40	10

The time for 0·5 g of magnesium to react completely with 0·2 mol l^{-1} acid at 25 °C will be

A less than 10 s

B between 10 s and 20 s

C between 20 s and 60 s

D more than 80 s.

3. When an atom **X** of an element in Group 1 reacts to become $\mathbf{X}^+$

A the mass number of **X** decreases

B the atomic number of **X** increases

C the charge of the nucleus increases

D the number of occupied energy levels decreases.

4. Which of the following does **not** contain covalent bonds?

A Sulfur

B Copper

C Oxygen

D Hydrogen

5. Which of the following structures is **never** found in compounds?

A Ionic
B Monatomic
C Covalent network
D Covalent molecular

6. Which line in the table shows the properties of an ionic substance?

			Conducts electricity	
	Melting point (°C)	*Boiling point* (°C)	*Solid*	*Liquid*
A	19	80	no	no
B	655	1425	no	no
C	1450	1740	no	yes
D	1495	2927	yes	yes

7. What is the name of the compound with the formula Ag_2O?

A Silver(I) oxide
B Silver(II) oxide
C Silver(III) oxide
D Silver(IV) oxide

8. An element was burned in air. The product was added to water, producing a solution with a pH less than 7. The element could be

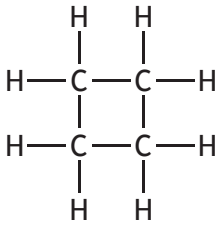
A tin
B zinc
C sulfur
D sodium.

9. When methane burns in a plentiful supply of air, the products are

A carbon and water
B carbon dioxide and water
C carbon monoxide and water
D carbon dioxide and hydrogen.

10. Which of the following compounds belongs to the same homologous series as the compound with the molecular formula C_3H_8?

A



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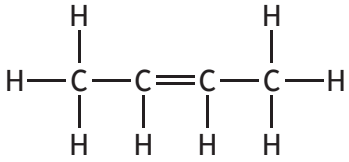

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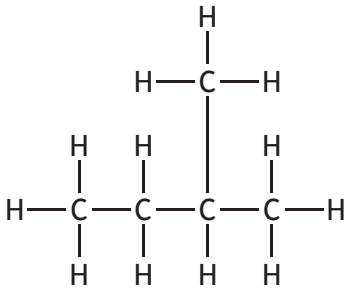

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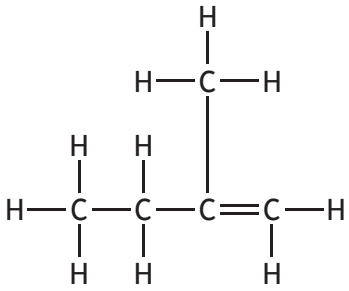
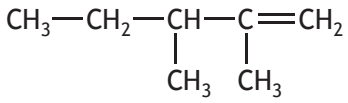


11. 

The systematic name for the structure shown is

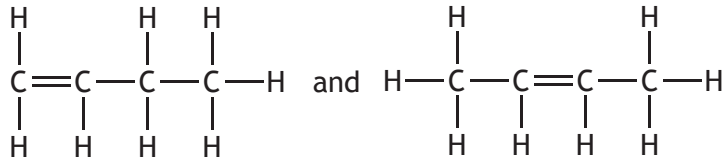
A 1,2-dimethylpent-1-ene

B 2,3-dimethylpent-1-ene

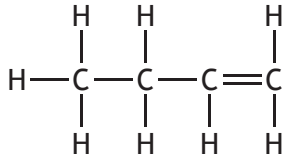
C 3,4-dimethylpent-4-ene

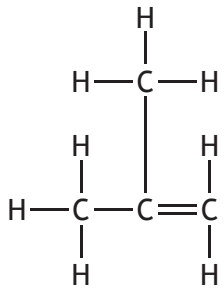
D 3,4-dimethylpent-1-ene.

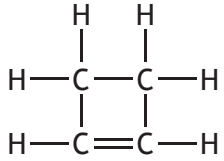
12. Two isomers of butene are

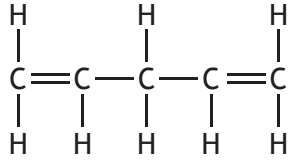


Which of the following structures represents a third isomer of butene?

A 

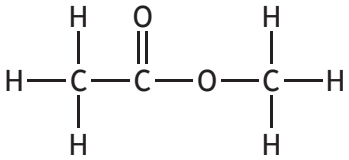
B 

C 

D 

13. Which of the following structures represents an ester?

A



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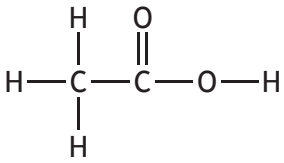

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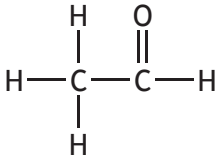

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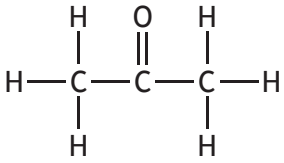


14. The lowest temperature at which a hydrocarbon ignites is called its flash point.

Hydrocarbon	*Formula*	*Boiling point* (°C)	*Flash point* (°C)
hexene	C_6H_{12}	63	−25
hexane	C_6H_{14}	69	−23
cyclohexane	C_6H_{12}	81	−20
heptane	C_7H_{16}	98	−1
octane	C_8H_{18}	126	15

Using information in the table, identify the correct statement.

A Octane will ignite at 0 °C.

B Hydrocarbons with the same molecular mass have the same flash point.

C The flash point of a hydrocarbon increases as the boiling point increases.

D In a homologous series the flash point decreases as the number of carbon atoms increases.

15. Which of the following metals can be obtained from its ore by heating with carbon monoxide?

You may wish to use the data booklet to help you.

A Magnesium

B Aluminium

C Calcium

D Nickel

16. Polyesters are always made from monomers

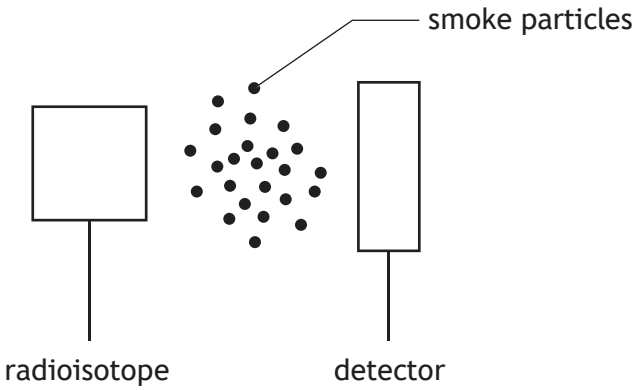
A which are the same

B which are unsaturated

C with one functional group per molecule

D with two functional groups per molecule.

17. Some smoke detectors make use of radiation which is very easily stopped by tiny smoke particles moving between the radioactive source and the detector.



The most suitable type of radioisotope for a smoke detector would be

A an alpha-emitter with a long half-life

B a gamma-emitter with a short half-life

C an alpha-emitter with a short half-life

D a gamma-emitter with a long half-life.

[Turn over for next question

18. Which particle will be formed when an atom of $^{234}_{90}Th$ emits a β-particle?

A $^{234}_{91}Pa$

B $^{230}_{88}Ra$

C $^{234}_{89}Ac$

D $^{238}_{92}U$

19. ^{14}C has a half life of 5600 years. An analysis of charcoal from a wood fire shows that its ^{14}C content is 25 % of that in living wood.

How many years have passed since the wood for the fire was cut?

A 1400

B 4200

C 11 200

D 16 800

20. A solution of potassium carbonate, made up using tap water, was found to be cloudy. This could result from the tap water containing

A lithium ions

B calcium ions

C sodium ions

D ammonium ions.

You may wish to use the data booklet to help you.

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