National Qualifications 2025

X813/75/02

Chemistry
Section 1 — Questions

THURSDAY, 1 MAY
1:00 PM – 3:30 PM

Instructions for the completion of Section 1 are given on *page 02* of your question and answer booklet X813/75/01.

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

You may refer to 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.

X8137502

SECTION 1 — 25 marks

Attempt ALL questions

1. Oganesson is a newly discovered element with a predicted electron arrangement of 2,8,18,32,32,18,8

In which group of the periodic table should oganesson be placed?

A 0

B 1

C 2

D 7

2. Which line in the table shows the correct number of protons and electrons for the atom, $^{56}_{26}Fe$?

	Protons	**Electrons**
A	56	56
B	56	26
C	26	26
D	26	56

3. Which of the following molecules contains three atoms?

A Phosphorus trichloride

B Magnesium chloride

C Sodium fluoride

D Carbon dioxide

4. Which bonding and structure is never found in elements?

A Covalent molecular

B Ionic lattice

C Metallic lattice

D Covalent network

5. Which of the following compounds would conduct electricity at 600 °C?

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

A Silicon dioxide

B Lithium bromide

C Ammonia

D Barium chloride

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

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

A Calcium oxide

B Nitrogen dioxide

C Sulfur dioxide

D Nickel oxide

7. A student made some statements about the effect of adding water to a solution of hydrochloric acid.

Identify the correct statement.

A The rate of reaction with magnesium will increase.

B The concentration of H^+ ions will increase.

C The acid will be neutralised.

D The pH will increase.

8. Ammonium phosphate, $(NH_4)_3PO_4$, has a gram formula mass of 149.

The percentage by mass of nitrogen in ammonium phosphate is equal to

A $\frac{14}{149} \times 100$

B $\frac{42}{149} \times 100$

C $\frac{149}{14} \times 100$

D $\frac{149}{42} \times 100$

[Turn over

9. What is the charge on the manganese ion in manganese dichromate, $MnCr_2O_7$?
You may wish to use the data booklet to help you.

A 2+
B 1+
C 2−
D 1−

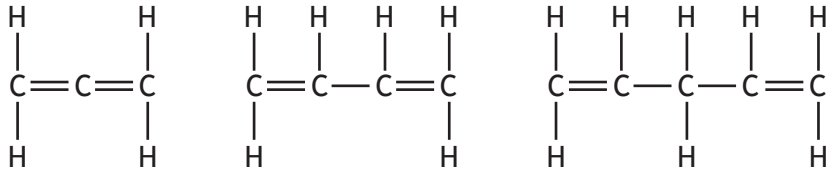
10. Compound **X**:

- is saturated
- is insoluble in water
- has two hydrogen atoms for every carbon atom.

Which of the following could be compound **X**?

A Propane
B Propan-1-ol
C Cyclopropane
D Propene

11. The structures of three members of a homologous series called the dienes are shown.



The general formula for the dienes is

A C_nH_{n+1}
B C_nH_{n+2}
C C_nH_{2n}
D C_nH_{2n-2}

12. Which of the following formula masses belongs to a hydrocarbon that does **not** belong to the same homologous series as the others?

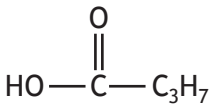
A 16

B 44

C 58

D 70

13. The structural formula for a compound is shown.



The name of this compound is

A propanoic acid

B propan-1-ol

C butanoic acid

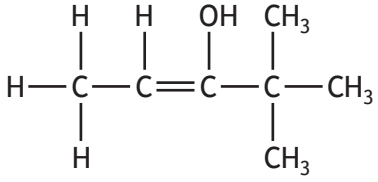
D butan-1-ol.

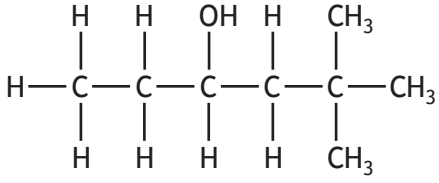
[Turn over

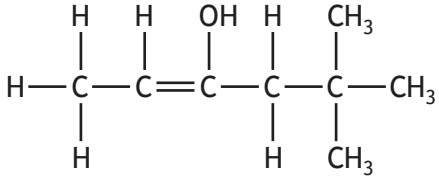
14. The shortened structural formula for a compound is shown.

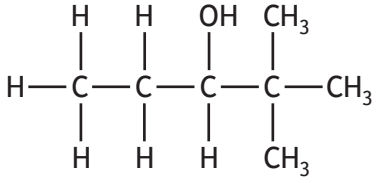
$CH_3CHC(OH)C(CH_3)_3$

Which of the following is another way of representing this structure?

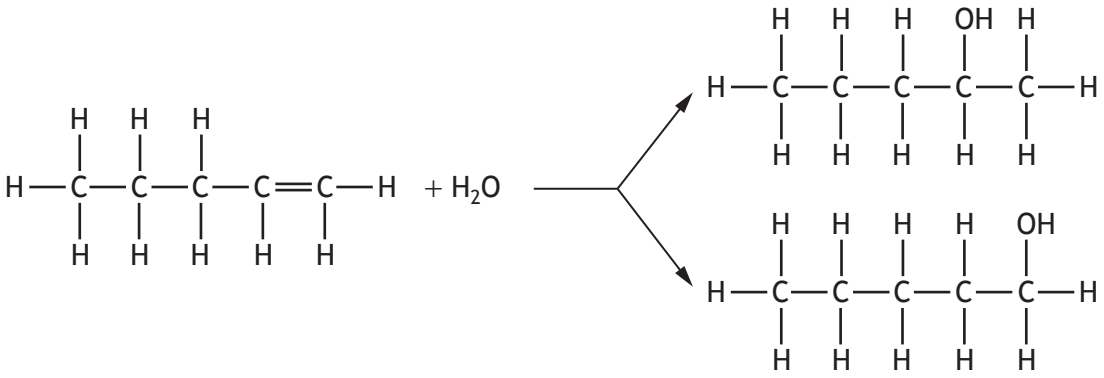
A 

B 

C 

D 

15. Pent-1-ene reacts with water to form two products.



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

A But-1-ene

B But-2-ene

C Hex-1-ene

D Hex-2-ene

16. When 5 g of a fuel was burned, 150 kJ of energy was released.

Calculate the energy, in kJ, that would be released if 60 g of the fuel was burned.

A 30

B 150

C 1800

D 9000

17. Which of the following is **not** involved in metallic bonding?

A Positive ions

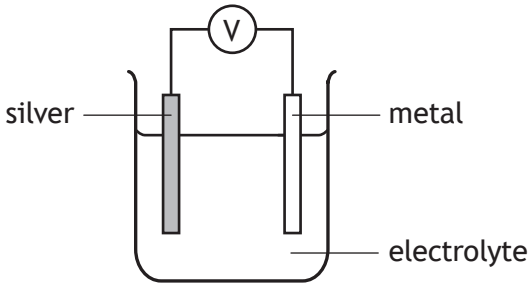
B Negative ions

C Delocalised electrons

D Electrostatic attraction

[Turn over

18. Four different metals were connected to silver in a cell.



The results obtained were recorded in the table.

Metal	Voltage (V)
Iron	0.9
Zinc	1.1
Magnesium	2.7
Metal **X**	1.5

Which of the following could be metal **X**?
You may wish to use the data booklet to help you.

A Aluminium
B Sodium
C Nickel
D Copper

19. Which of the following is **not** a redox reaction?

A $Zn(s) + 2H^+(aq) \rightarrow Zn^{2+}(aq) + H_2(g)$
B $Cu(s) + Cl_2(g) \rightarrow Cu^{2+}(Cl^-)_2(s)$
C $Br_2(aq) + 2Fe^{2+}(aq) \rightarrow 2Fe^{3+}(aq) + 2Br^-(aq)$
D $Ba^{2+}(aq) + SO_4^{2-}(aq) \rightarrow Ba^{2+}SO_4^{2-}(s)$

20. Which of the following would be recovered unchanged in the Ostwald process?

A Water
B Oxygen
C Ammonia
D Platinum

21. In nuclear equations a proton is represented as

A $^{1}_{1}p$

B $^{1}_{0}p$

C $^{0}_{1}p$

D $^{0}_{0}p$

22. Which of the following compounds can be prepared by precipitation?
You may wish to use the data booklet to help you.

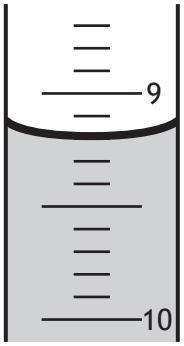
A Lithium sulfate

B Sodium sulfate

C Barium sulfate

D Magnesium sulfate

23. A student was reading the volume of liquid in a piece of apparatus.



The correct volume, in cm^3, that the student should record is

A 8.8

B 9.1

C 9.2

D 10.8

[Turn over

Questions **24** and **25** refer to the experiment below.

A titration was performed using hydrochloric acid and a 10 cm^3 solution of sodium hydroxide. The results are shown in the table.

Titration	Initial reading (cm^3)	Final reading (cm^3)	Titre (cm^3)
1	0.0	11.0	11.0
2	11.0	21.1	10.1
3	22.0	32.6	10.6
4	33.0	43.3	10.3

24. The average of the concordant titre values, in cm^3, is

A 10.8
B 10.5
C 10.3
D 10.2

25. Which piece of apparatus is the most appropriate to measure and transfer the 10 cm^3 of sodium hydroxide solution?

A Burette
B Pipette
C Conical flask
D Measuring cylinder

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

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