N5

National Qualifications

Chemistry

Section 1

THURSDAY, 1 MAY

Instructions to Candidates

Candidates should enter their surname, forename(s), date of birth, Scottish candidate number and the name and level of the subject at the top of their first answer sheet.

Total marks — 25 marks

Attempt ALL questions

The answer to each question is either A, B, C or D. There is only one correct answer to each question. Decide what your answer is, then write the question number and the letter eg 1. D, 2. A.

Sample Question

1. To show that the ink in a ball-pen consists of a mixture of dyes, the method of separation would be

A. fractional distillation

B. chromatography

C. fractional crystallisation

D. filtration.

The correct answer is B — chromatography. You write Question 1. B

[Braille page 2] If you decide to change your answer, cancel your first answer by brailling it out and write the answer you want.

An ow in the margin indicates a new question.

Questions marked with an asterisk differ in some respect from those in the printed paper.

You must clearly identify the question number you are attempting on your answer sheet.

Marks are shown in square brackets at the end of each question or part question.

Tactile diagrams are produced in a separately bound booklet.

[Braille page 3] SECTION 1 — 25 marks

Attempt ALL questions

ow 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

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

[In the table below, line option is followed by: Protons; Electrons.]

A: 56; 56.

B: 56; 26.

C: 26; 26.

D: 26; 56.

ow 3. Which of the following molecules contains three atoms?

A. Phosphorus trichloride

B. Magnesium chloride

C. Sodium fluoride

D. Carbon dioxide

[Braille page 4]

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

A. Covalent molecular

B. Ionic lattice

C. Metallic lattice

D. Covalent network

ow 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

ow 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

[Braille page 5]

ow 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.

ow 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. $\frac{149}{42} \times 100$

ow 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−

[Braille page 6]

ow 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

ow 11. Refer to the diagram for Question 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}

ow 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

[Braille page 7]

ow 13. Refer to the diagram for Question 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.

ow 14. Refer to the 4 diagrams for Question 14. The shortened structural formula for a compound is shown.

$CH_3CHC(OH)C(CH_3)_3$

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

ow 15. Refer to the diagram for Question 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

[Braille page 8]

ow 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

ow 17. Which of the following is NOT involved in metallic bonding?

A. Positive ions

B. Negative ions

C. Delocalised electrons

D. Electrostatic attraction

ow 18. Refer to the diagram for Question 18. It shows a piece of silver and a piece of another metal in a beaker containing electrolyte. The two pieces of metal are joined outside the beaker, with a wire to a voltmeter. Four different metals were connected to silver in a cell.

The results obtained were recorded in the table.

[In the table below, metal is followed by: Voltage (V).]

Iron: 0.9.

Zinc: 1.1.

Magnesium: 2.7.

Metal X: 1.5.

[Braille page 9] 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

ow 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. $Ba^{2+}(aq)+SO_4{}^{2-}(aq) \rightarrow Ba^{2+}SO_4{}^{2-}(s)$

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

A. Water

B. Oxygen

C. Ammonia

D. Platinum

[Braille page 10]

ow 21. In nuclear equations a proton is represented as

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

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

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

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

ow 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

ow 23. Refer to the diagram for Question 23. A student was reading the volume of liquid in a piece of apparatus.

The correct volume, in cm3, that the student should record is

A. 8.8

B. 9.1

C. 9.2

D. 10.8

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.

[Braille page 11] [In the table below, Titration is followed by: 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.

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

A. 10.8

B. 10.5

C. 10.3

D. 10.2

ow 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]