Atoms, Amount, Equations & Reactions
Multiple Choice

Question Paper 1

Level	A Level
Subject	Chemistry
Exam Board	OCR
Module	Foundations in Chemistry
Topic	Atoms, Amount, Equations & Reactions
Paper	Multiple Choice
Booklet	Question Paper 1

Time allowed: **31 minutes**

Score: **/23**

Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E
>85%	73%	60%	47%	34%	21%

Question 1

A sample of boron contains the isotopes ^{10}B and ^{11}B.
The relative atomic mass of the boron sample is 10.8.

What is the percentage of ^{11}B atoms in the sample of boron? **[1]**

A 8.0%

B 20%

C 80%

D 92%

Question 2

What is the number of hydrogen atoms in 0.125 mol of C_2H_5OH? **[1]**

A 7.525×10^{22}

B 4.515×10^{23}

C 3.7625×10^{23}

D 3.612×10^{24}

Question 3

A student titrates a standard solution of barium hydroxide, $Ba(OH)_2$, with nitric acid, HNO_3.

25.00 cm^3 of 0.0450 mol dm^{-3} $Ba(OH)_2$ are needed to neutralise 23.35 cm^3 of $HNO_3(aq)$.

What is the concentration, in mol dm^{-3}, of the nitric acid?

[1]

A 0.0241

B 0.0482

C 0.0900

D 0.0964

Question 4

Which statement about ammonium carbonate is **not** correct? **[1]**

A. It reacts with $Ba(NO_3)_2(aq)$ to form a white precipitate.

B. It effervesces with dilute nitric acid.

C. It release an alkaline gas with warm NaOH(aq).

D. It has the formula NH_4CO_3.

Question 5

Ethanol can be prepared by different reactions.

Which reaction has the lowest atom economy? **[1]**

A. $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$

B. $C_2H_4 + H_2O \rightarrow C_2H_5OH$

C. $C_2H_5Br + H_2O \rightarrow C_2H_5OH + HBr$

D. $CH_3COOC_2H_5 + H_2O \rightarrow C_2H_5OH + CH_3COOH$

Question 6

The electron configuration of element **X** is: $1s^2 2s^2 2p^6 3s^2 3p^4$

What is the formula of a compound formed when sodium reacts with element **X**? **[1]**

A Na**X**

B. Na$\mathbf{X}_2$

C. $Na_2\mathbf{X}$

D. $Na_2\mathbf{X}_3$

What is the number of oxygen atoms in 88.0 g of CO_2? **[1]**

A 3.01×10^{23}

B 1.20×10^{24}

C 2.41×10^{24}

D 4.82×10^{24}

Question 8

A compound has the composition by mass:

H, 5.00%; N, 35.00%; O, 60.00%.

Which compound has this composition? **[1]**

A. HNO_3

B. NH_4NO_3

C. HNO_2

D. NH_2OH

Question 9

Which equation does **not** represent a neutralisation reaction? **[1]**

A. $Zn + 2HCl \rightarrow ZnCl_2 + H_2$

B. $2NH_3 + H_2SO_4 \rightarrow (NH_4)_2SO_4$

C. $Na_2CO_3 + 2CH_3COOH \rightarrow 2CH_3COONa + CO_2 + H_2O$

D. $CuO + 2HNO_3 \rightarrow Cu(NO_3)_2 + H_2O$

Question 10

What is the oxidation number of Fe in K_2FeO_4? **[1]**

A +4

B +5

C +6

D +7

Question 11

Which reaction shows oxidation of sulfur?

[1]

A. $2HBr + H_2SO_4 \rightarrow SO_2 + 2H_2O + Br_2$

B. $SO_2 + 2NaOH \rightarrow Na_2SO_3 + H_2O$

C $8HI + H_2SO_4 \rightarrow 4I_2 + H_2S + 4H_2O$

D $H_2S + Cl_2 \rightarrow 2HCl + S$

1 mol of a compound reacts with 8 mol O_2 for complete combustion.

What is the formula of the compound? **[1]**

A C_4H_8

B. C_4H_9OH

C. $C_5H_{11}OH$

D C_5H_{12}

Question 13

Which atom is **not** an isotope of iodine? **[1]**

	Number of neutrons	Mass number
A	72	125
B	74	127
C	75	128
D	77	129

Question 14

What is the oxidation number of Mn in K_2MnO_4? **[1]**

A +4

B +5

C +6

D +7

Question 15

Which calcium compound contains the **greatest** percentage by mass of calcium? **[1]**

A. calcium carbonate

B. calcium nitrate

C. calcium hydroxide

D. calcium sulfate

Question 16

0.0200 mol of calcium oxide is reacted completely with 2.00 mol dm^{-3} HCl.

What is the volume, in cm^3, of 2.00 mol dm^{-3} HCl required for this reaction? **[1]**

A. 15

B. 20

C. 30

D. 60

Question 17

How many electrons are removed from 2.02×10^{-2} g of Ne(g) atoms to form $Ne^{+}(g)$ ions?

[1]

A 3.36×10^{-26}

B 1.66×10^{-27}

C 6.02×10^{20}

D 1.22×10^{22}

Question 18

Complete combustion of an organic compound forms 40 cm^3 of carbon dioxide and 40 cm^3 of water vapour, under the same conditions of temperature and pressure.

Which molecular formula could the organic compound have? **[1]**

A C_3H_8

B. C_2H_2O

C. C_2H_4O

D. C_2H_3N

Question 19

Which type of reaction has the greatest atom economy? **[1]**

A Substitution

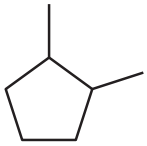
B Hydrolysis

C Elimination

D Addition

Question 20

What is the molecular formula of the compound below? **[1]**



A C_7H_{10}

B C_7H_{12}

C C_7H_{14}

D C_7H_{16}

Equal amounts of the four compounds are added to the same volume of water.

Which compound would produce the most acidic solution? **[1]**

A. CH_3CONH_2

B. CH_3COOH

C. CH_3COOCH_3

D. CH_3COCl

Question 22

0.1 mol of $HOOCCH_2COOH$ are reacted with 0.1 mol of aqueous NaOH.

How many molecules of water are formed?

[1]

A 6.02×10^{22}

B 3.01×10^{22}

C 6.02×10^{23}

D 3.01×10^{23}

Question 23

The lattice enthalpy of calcium chloride can be calculated using **three** of the enthalpy changes below.

Which enthalpy change is **not** required? **[1]**

A enthalpy change of solution of calcium chloride

B enthalpy change of hydration of Cl^- ions

C enthalpy change of formation of calcium chloride

D enthalpy change of hydration of Ca^{2+} ions