

CHEMISTRY (US)

0439/11

Paper 1 Multiple Choice

October/November 2014

45 Minutes

Additional Materials: Multiple Choice Answer Sheet
 Soft clean eraser
 Soft pencil (type B or HB is recommended)

* 9 4 7 9 0 9 9 5 4 6 3 *

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, glue or correction fluid.

Write your name, Center number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.

DO NOT WRITE IN ANY BARCODES.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A, B, C** and **D**.

Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

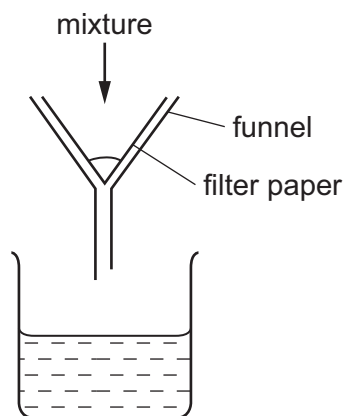
Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 16.

Electronic calculators may be used.

This document consists of **13** printed pages and **3** blank pages.

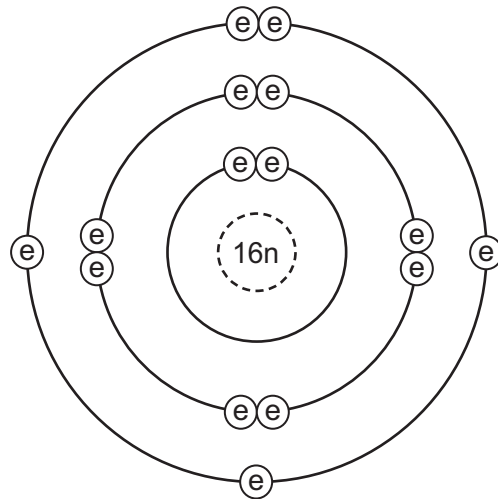
- 1 Which statement is an example of diffusion?
- A A kitchen towel soaks up some spilled milk.
 - B Ice cream melts in a warm room.
 - C Pollen from flowers is blown by the wind.
 - D The smell of cooking spreads through a house.
- 2 A mixture is separated using the apparatus shown.



What is the mixture?

- A aqueous copper chloride and copper
 - B aqueous copper chloride and sodium chloride
 - C ethane and methane
 - D ethanol and water
- 3 Ethanol is made by fermentation.
- How is ethanol obtained from the fermentation mixture?
- A chromatography
 - B crystallization
 - C electrolysis
 - D fractional distillation
- 4 What is different for isotopes of the same element?
- A nucleon number
 - B number of electron shells
 - C number of electrons in the outer shell
 - D proton number

5 Which element has the atomic structure shown?



key

(e) electron

n neutron

(dashed circle) nucleus

A Al

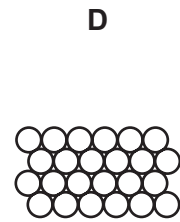
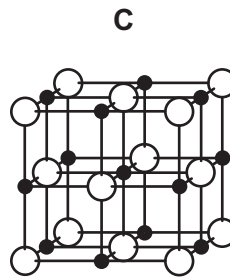
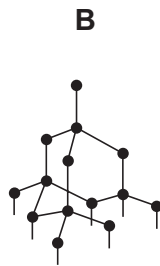
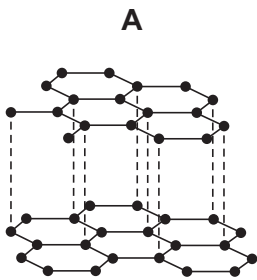
B P

C S

D Si

6 Slate has a layered structure and can easily be split into thin sheets.

Which diagram shows a structure most like that of slate?



7 Sodium chloride is an ionic solid.

Which statement is **not** correct?

A Ions are formed when atoms lose or gain electrons.

B Ions in sodium chloride are strongly held together.

C Ions with the same charge attract each other.

D Sodium chloride solution can conduct electricity.

- 8 Caesium chloride and rubidium bromide are halide compounds of Group I elements.

Caesium chloride has the formula1....., a relative formula mass2..... that of rubidium bromide and bonds that are3.....

Which words correctly complete gaps 1, 2 and 3?

	1	2	3
A	CaCl	different from	ionic
B	CaCl	the same as	covalent
C	CsCl	different from	ionic
D	CsCl	the same as	covalent

- 9 How many atoms of hydrogen are there in a molecule of ethanol, $\text{C}_2\text{H}_5\text{OH}$?

A 1 **B** 2 **C** 5 **D** 6

- 10 Iron forms an oxide with the formula Fe_2O_3 .

What is the relative formula mass of this compound?

A 76 **B** 100 **C** 136 **D** 160

- 11 Which metal could **not** be used for electroplating by using an aqueous solution?

A chromium
B copper
C silver
D sodium

- 12 Which products are formed at the electrodes when a concentrated solution of sodium chloride is electrolyzed?

	cathode (-)	anode (+)
A	hydrogen	chlorine
B	hydrogen	oxygen
C	sodium	chlorine
D	sodium	oxygen

13 Which statements about exothermic and endothermic reactions are correct?

- 1 During an exothermic reaction, heat is given out.
- 2 The temperature of an endothermic reaction goes up because heat is taken in.
- 3 Burning methane in the air is an exothermic reaction.

A 1, 2 and 3 B 1 and 2 only C 1 and 3 only D 2 and 3 only

14 A power station was designed to burn gaseous fuels only.

Which two substances could be used?

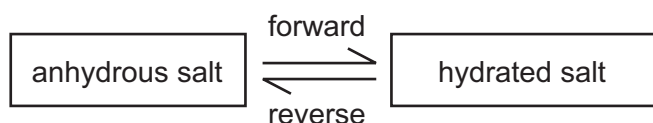
- A carbon dioxide and hydrogen
B carbon dioxide and ^{235}U
C hydrogen and methane
D methane and ^{235}U

15 The rate of a reaction depends on temperature, concentration, particle size and catalysts.

Which statement is **not** correct?

- A Catalysts can be used to increase the rate of reaction.
B Higher concentration decreases the rate of reaction.
C Higher temperature increases the rate of reaction.
D Larger particle size decreases the rate of reaction.

16 The diagram shows the change from an anhydrous salt to its hydrated form.



Which statement is correct?

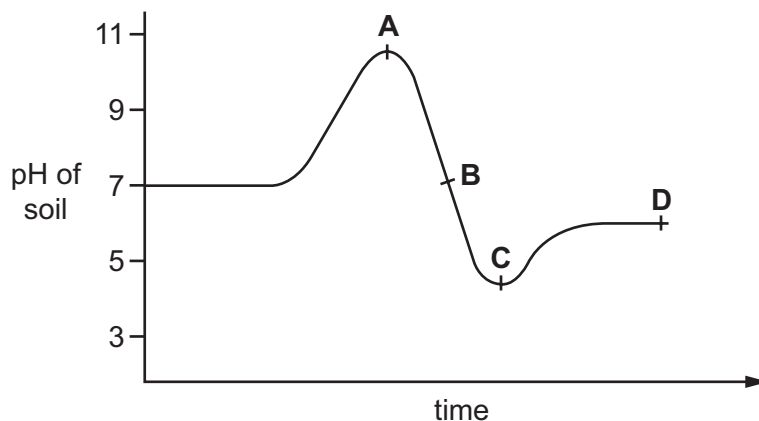
- A forward reaction requires heat and water
B forward reaction requires water only
C reverse reaction requires heat and water
D reverse reaction requires water only

21 How many different salts could be made from a supply of dilute sulfuric acid, dilute hydrochloric acid, copper, magnesium oxide and zinc carbonate?

- A 3 B 4 C 5 D 6

22 The graph shows how the pH of soil in a field changes over time.

At which point was the soil neutral?



23 Elements in Group I of the Periodic Table react with water.

Which row describes the products made in the reaction and the trend in reactivity of the elements?

	products	trend in reactivity
A	metal hydroxide and hydrogen	less reactive down the group
B	metal hydroxide and hydrogen	more reactive down the group
C	metal oxide and hydrogen	less reactive down the group
D	metal oxide and hydrogen	more reactive down the group

24 An element X has the two properties listed.

- 1 It acts as a catalyst.
- 2 It forms colorless ions.

Which of these properties suggest that X is a transition element?

	property 1	property 2
A	✓	✓
B	✓	x
C	x	✓
D	x	x

25 An inert gas X is used to fill weather balloons.

Which descriptions of X are correct?

	number of outer electrons in atoms of X	structure of gas X
A	2	single atoms
B	2	diatomic molecules
C	8	single atoms
D	8	diatomic molecules

26 The table shows the reactions of four different metals with water.

metal	reaction
W	reacts vigorously with cold water
X	no reaction with water
Y	reacts very slowly with water, more vigorously with steam
Z	reacts violently with cold water

What is the correct order of reactivity, from most reactive to least reactive?

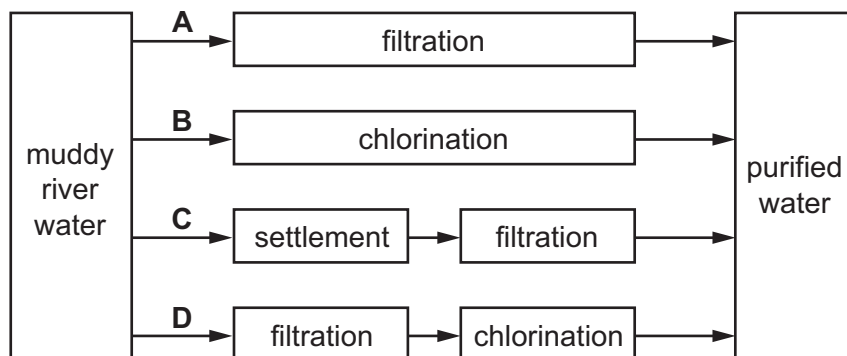
- A** $W \rightarrow X \rightarrow Y \rightarrow Z$
- B** $W \rightarrow Z \rightarrow Y \rightarrow X$
- C** $Z \rightarrow W \rightarrow X \rightarrow Y$
- D** $Z \rightarrow W \rightarrow Y \rightarrow X$

- 27 Which information about an element can be used to predict its chemical properties?
- A boiling point
 - B density
 - C melting point
 - D position in the Periodic Table
- 28 Aluminum is the most common metal in the Earth's crust.
- Which is **not** a property of aluminum?
- A low density
 - B resistance to corrosion
 - C good conductor of electricity
 - D poor conductor of heat
- 29 The oxide of element X is reduced by heating with carbon.
- Element X does not react with cold water, steam or dilute hydrochloric acid.
- What is X?
- A copper
 - B iron
 - C magnesium
 - D zinc
- 30 Which object is **least** likely to contain aluminum?
- A a bicycle frame
 - B a hammer
 - C a saucepan
 - D an aeroplane body
- 31 Which reaction involves oxidation?
- A heating hydrated copper(II) sulfate in the air
 - B polymerization of ethene
 - C rusting of iron
 - D thermal decomposition of calcium carbonate

32 Which method can be used to obtain ammonia from ammonium sulfate?

- A Heat it with an acid.
- B Heat it with an alkali.
- C Heat it with an oxidizing agent.
- D Heat it with a reducing agent.

33 Which method of purification would produce water **most** suitable for drinking?



34 Which statement about methane is **not** correct?

- A It is a liquid produced by distilling petroleum.
- B It is produced as vegetation decomposes.
- C It is produced by animals, such as cows.
- D It is used as a fuel.

35 Which is an air pollutant that affects a part of the body other than the lungs and blood system?

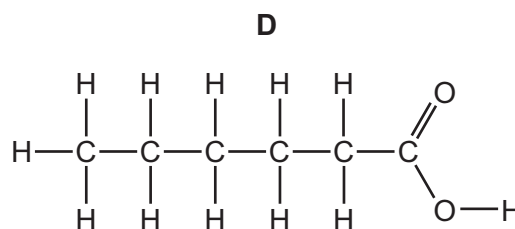
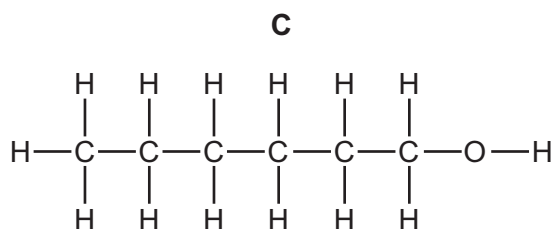
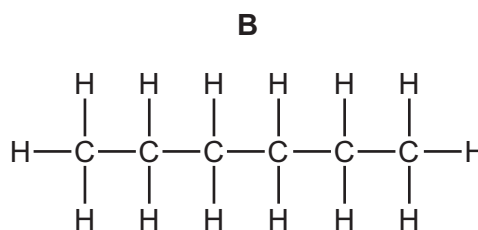
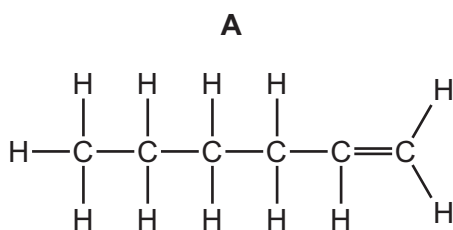
- A lead compounds
- B nitrogen
- C oxides of nitrogen
- D sulfur dioxide

- 36 Increasing the number of atoms in one molecule of a hydrocarbon increases the amount of energy released when it burns.

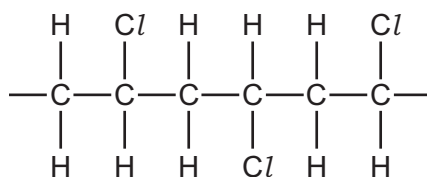
What is the correct order?

	less energy released	→	more energy released
A	ethene		ethane
B	ethene		methane
C	methane		ethane
D	methane		ethene

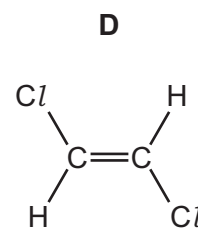
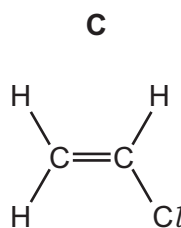
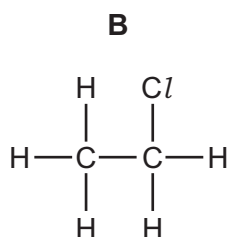
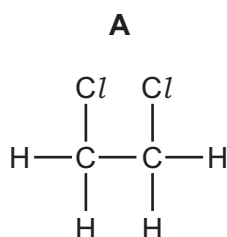
- 37 Which molecular structure shows hexene?



- 38 The diagram shows three repeat units in the structure of an addition polymer.



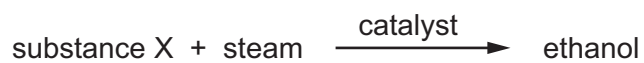
Which alkene monomer is used to make this polymer?



39 Which statement about alkenes is **not** correct?

- A The functional group is C=C.
- B The structural difference between one member and the next is $-\text{CH}_2-$.
- C They form a homologous series.
- D They turn aqueous bromine from brown to colorless.

40 Ethanol can be manufactured from substance X.



What is substance X?

- A carbon dioxide
- B ethene
- C hydrogen
- D oxygen

DATA SHEET
The Periodic Table of the Elements

		Group									
		I	II	III	IV	V	VI	VII	VIII	IX	X
		1 H Hydrogen 1									
		4 He Helium 2									
7	9	3	4	5	6	7	8	9	10	11	12
Li Lithium	Be Beryllium	B Boron	C Carbon	N Nitrogen	O Oxygen	F Fluorine	Ne Neon	Na Sodium	Mg Magnesium	Al Aluminum	Si Silicon
11	12	13	14	15	16	17	18	19	20	21	22
Na Sodium	Mg Magnesium	Al Aluminum	Si Silicon	P Phosphorus	S Sulfur	Cl Chlorine	Ar Argon	K Potassium	Ca Calcium	Sc Scandium	Ti Titanium
19	20	21	22	23	24	25	26	27	28	29	30
K Potassium	Ca Calcium	Sc Scandium	Ti Titanium	V Vanadium	Cr Chromium	Mn Manganese	Fe Iron	Co Cobalt	Ni Nickel	Cu Copper	Zn Zinc
37	38	39	40	41	42	43	44	45	46	47	48
Rb Rubidium	Sr Strontium	Y Yttrium	Zr Zirconium	Nb Niobium	Mo Molybdenum	Tc Technetium	Ru Ruthenium	Rh Rhodium	Pd Palladium	Ag Silver	Cd Cadmium
55	56	57	58	59	60	61	62	63	64	65	66
Cs Caesium	Ba Barium	La Lanthanum	Hf Hafnium	Ta Tantalum	W Tungsten	Re Rhenium	Os Osmium	Ir Iridium	Pt Platinum	Au Gold	Hg Mercury
87	88	89	90	91	92	93	94	95	96	97	98
Fr Francium	Ra Radium	Ac Actinium	Th Thorium	Pa Protactinium	U Uranium	Np Neptunium	Pu Plutonium	Am Americium	Cm Curium	Bk Berkelium	Cf Californium
103	104	105	106	107	108	109	110	111	112	113	114
Lr Lawrencium	Rf Rutherfordium	Db Dubnium	Sg Seaborgium	Bh Bohrium	Hs Hassium	Mt Meitnerium	Ds Darmstadtium	Rg Roentgenium	Cn Copernicium	Nh Nihonium	Fl Flerovium
121	122	123	124	125	126	127	128	129	130	131	132
Uu Ununium	Uub Unubium	Uut Ununtrium	Uuq Ununquadium	Uup Ununpentium	Uuq Ununhexium	Uus Ununseptium	Uuq Ununoctium	Uuh Ununhennium	Uuq Ununnilium	Uuh Ununnilium	Uuq Ununnilium
151	152	153	154	155	156	157	158	159	160	161	162
U Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium
171	172	173	174	175	176	177	178	179	180	181	182
U Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium	Ubu Unbinilium

*58-71 Lanthanoid series
†90-103 Actinoid series

Key
 a = relative atomic mass
 X = atomic symbol
 b = proton (atomic) number

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

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