

QUESTIONSHEET 1

- (a) (i) noble/inert/rare gases 1
- (ii) two out of helium, neon, argon, krypton, xenon, radon. 2
- (b) (i) C 1
- (ii) atoms do not combine/monatomic atoms/inert gas so atoms don't join/
A, B and C show molecules and group 0/8 elements do not form molecules 1
- (c) splint goes out/does not burn 1
- (d) (i) all unreactive/stays the same 1
- (ii) density increases 1
- (iii) all non metals/stays the same 1
- (e) (iv) measure the density of each 1

TOTAL 10**QUESTIONSHEET 2**

- (a) (i) A 1
- (ii) 'A' has 11 electrons and atomic number of sodium is 11 1
'A' has one electron in outside shell but ions have full outer shell 1
- (iii) one electron in outside shell 1
- (b) (i) charged atom/group of atoms 1
- (ii) K^+ 1
- (c) Any two from:
very reactive
react with air
react with oxygen in the air
react with water in the air 2
- (d) (i) oxygen (in the air) 1
- (ii) potassium oxide 1
- (iii) potassium + oxygen \rightarrow potassium oxide 1
- (iv) $4K + O_2 \rightarrow 2K_2O$ 2

TOTAL 13

QUESTIONSHEET 3

- (a) (i) lithium + chlorine \rightarrow lithium chloride 1
- (ii) $2\text{Li} + \text{Cl}_2 \rightarrow 2\text{LiCl}$ 1
- (b) (i) group 1 1
- (ii) 1 1
- (iii) 7 1
- (c) $\text{Li} + \begin{array}{c} \bullet \bullet \\ \bullet \text{Cl} \bullet \\ \bullet \bullet \end{array} \text{Cl} \quad \text{Li}^+ \quad \left(\begin{array}{c} \bullet \bullet \\ \bullet \text{Cl} \bullet \\ \bullet \bullet \end{array} \right)^-$
- diagram to show:
- chlorine seven electrons 1
- lithium one electron being transferred to chlorine 1
- lithium ion one positive charge, chloride ion one negative charge 1
- (d) (i) more reactive 1
- (ii) common/table/cooking salt 1

TOTAL 10

QUESTIONSHEET 4

- (a) (i) ions 1
- (ii) sodium ion 1
- (iii) chloride ion 1
- (iv) attraction of opposite charges/ electrostatic attraction 1
- (b) (i) 1
- (ii) 7
- (iii) 3
- (iv) 3
- (v) 1
- (vi) 7 6
- (c) (i) sodium needs to lose one electron 1
to empty outside shell/ to give full/complete outer shell/octet/stable electron arrangement 1
sodium transfers electron to chlorine atom 1
which completes its octet 1
- $\overset{x}{\text{Na}} + \begin{array}{c} \bullet \bullet \\ \bullet \text{Cl} \bullet \\ \bullet \bullet \end{array} \zeta \text{Na}^+ \begin{array}{c} \bullet \bullet \\ \bullet \text{Cl} \bullet \\ \bullet \bullet \end{array} \overset{x}{} \quad 1$
- (ii) one sodium ion electrically balances one chloride ion 1

TOTAL 16

QUESTIONSHEET 5

- (a) (i) to kill bacteria/germs in water 1
(ii) antiseptic/put on cuts to kill bacteria/germs 1
- (b) (i) halogens 1
(ii) non-metal 1
(iii) non-metal 1
- (c) (i) 17 protons in nucleus/17 electrons in uncombined atom 1
(ii) 3 1
(iii) 7 1
(iv) sodium iodide 1
NaI 1

TOTAL 10**QUESTIONSHEET 6**

- (a) (i) goes dark 1
(ii) photosynthesis/colour fading 1
- (b) (i) ion/anion/negative ion 1
(ii) no 1
- (c) (i) go dark 1
(ii) $\text{Ag}^+(\text{aq}) + \text{I}^-(\text{aq}) \rightleftharpoons \text{AgI}(\text{s})$ 3

(2 marks for correct equation; only 1 if ions not shown. 1 mark for state symbols)

TOTAL 8

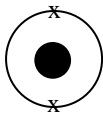
QUESTIONSHEET 7

(a)	(i)	isotopes	1
	(ii)	different number of neutrons	1
	(iii)	number of protons number of electrons in uncombined atom	1 1
	(iv)	35 (neutrons + protons) – 17 (protons) 18 neutrons	1 1
(b)		mixture of different isotopes/chlorine-35 and chlorine-37	1
(c)	(i)	no difference	1
	(ii)	Any two from: chemical properties stay the same both elements have 7 electrons/same number of electrons in their outside shell chemical properties depend on number of electrons in outside shell	2
	(iii)	no	1
	(iv)	different masses/physical properties depend on the mass	1
			TOTAL 12

QUESTIONSHEET 8

(a)	(i)	3	1
	(ii)	second electron shell is full next electron has to go into third shell/one electron in outside shell	1 1
(b)	(i)	sodium, magnesium and aluminium/Na, Mg and Al (all three needed for mark)	1
	(ii)	go from metallic (left hand side) to non-metallic (right hand side)	1
(c)	(i)	6 (electrons)	1
	(ii)	sodium oxide: Na ₂ O magnesium oxide: MgO aluminium oxide: Al ₂ O ₃	3
			TOTAL 9

QUESTIONSHEET 9

- (a) group 0/8 / noble gases/inert gases 1
- (b) (i) drop/go down/fall 1
- (ii) Any two from:
lower down in the group
group 0/8 elements get denser as the atomic number increases
krypton denser/heavier for the same volume than the gases in the other balloons/air 2
- (c) (i)  1
- (ii) outer shell complete 1
helium does not combine/react with anything 1
- (d) (i) very light/less dense than air 1
unreactive/does not react with air/non-flammable 1
- (ii) unreactive/inert/full outer electron shells 1
won't react with hot filament of light bulb 1

TOTAL 11**QUESTIONSHEET 10**

- (a) (i) group 1 1
- (ii) alkali metals 1
- (iii) white 1
- (b) Any three from:
use platinum/nichrome wire
clean wire/by dipping in hydrochloric acid and putting into a hot flame
dip wire into salt/solution of salt/hydrochloric acid and then salt
put into blue flame/hottest part of flame/side of a blue flame
look at colour of flame. 3
- (c) A = sodium chloride 1
B = lithium chloride 1
C = potassium chloride 1

TOTAL 9

QUESTIONSHEET 11

- (a) (i) chlorine, bromine, iodine 1
- (ii) atomic number 1
- (b) (i) 7 1
- (ii) molecules 1
- (iii) Any two from:
outer shell incomplete
each chlorine atom needs one more electron to complete its octet
each atom shares one electron 2
- (c) (i) 1
- diagram to show: two electron shells 1
two electrons in first shell, seven in outside shell 1
- (ii) gas 1
- (iii) -220°C (accept -200°C to -250°C) 1
- (d) boils/becomes a gas/vapour 1

TOTAL 11

QUESTIONSHEET 12

- (a) (i) colourless 1
- (ii) Any two from:
a solid
in a liquid
very small particles of solid. 2
- (iii) silver chloride 1
- (b) (i) silver nitrate + sodium chloride \rightarrow silver chloride + sodium nitrate 1
- (ii) (aq) 1
- (iii) (s) 1
- (iv) $\text{AgNO}_3(\text{aq}) + \text{NaCl}(\text{aq}) \rightarrow \text{AgCl}(\text{s}) + \text{NaNO}_3(\text{aq})$ 2
- (c) B and C 2

TOTAL 11

QUESTIONSHEET 13

- (a) (i) transition elements/ transition metals 1
- (ii) metals 1
- (iii) Fe = iron, Cu = copper, Zn = zinc 3
- (b) (i) A 1
- (ii) A 1
high melting point/B would melt when the water boiled 1
- (iii) hard 1
can be pulled out to make a wire 1
shiny surface that can be polished 1

TOTAL 11**QUESTIONSHEET 14**

- (a) (i) one out of scandium, titanium, vanadium, chromium, manganese, iron, cobalt, nickel, zinc, or between atomic numbers 39-48, 57, 72-80 including silver, gold, platinum and mercury 1
- (ii) limewater 1
- (iii) lime water went cloudy/milky/white precipitate 1
- (iv) carbon dioxide 1
- (b) (i) copper(II) oxide 1
- (ii) gas made 1
copper carbonate changed colour 1
- (iii) copper carbonate → copper oxide + carbon dioxide 1
- (iv) $\text{CuCO}_3 \rightarrow \text{CuO} + \text{CO}_2$ 1
- (c) (i) B 1
- (ii) Any two from:
there was a reaction in B/no reaction in A
zinc carbonate/transition metal carbonate breaks down on heating
sodium carbonate/group 1 metal carbonates do not break down on heating
zinc oxide is yellow when hot and white when cold 2
- (iii) Any two from:
A was sodium carbonate
sodium carbonate does not break down on heating
group 1 metal carbonates do not break down on heating 2

TOTAL 14

QUESTIONSHEET 15

- (a) (i) transition elements 1
(ii) blue/green 1
- (b) (i) add a small amount of sodium hydroxide solution 1
colour of precipitate indicates which metal ion is present 1
- (ii) A = copper
B = green
C = iron(III)
(all three for 2 marks one or two for one mark)
- (c) (i) Fe^{2+} 1
(ii) OH^- 1
(iii) $\text{Fe}^{2+} + 2\text{OH}^- \rightarrow \text{Fe}(\text{OH})_2$ 1

TOTAL 9**QUESTIONSHEET 16**

- (a) (i) 2 1
(ii) 8 1
(iii) the number of electron shells 1
- (b) (i) 2 1
(ii) 4 1
(iii) the number of electrons in the outside shell 1
- (c) (i) 6 protons in atom/ in the nucleus 1
6 electrons in uncombined atom 1
(ii) mass number/ relative atomic mass 1
(iii) number of neutrons plus number of protons 1

TOTAL 10

QUESTIONSHEET 17

- (a) (i) One out of: Li, Be, Na, Mg, Al, K, Ca, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge. 1
- (ii) One out of: H, N, O, F, Cl, He, Ne, Ar, Kr. 1
- (iii) One out of: Ti, V, Cr, Mn, Fe, Co, Ni, Cu. (allow Sc and Zn) 1
- (b) (i) 7 1
- (ii) 3 1
- (iii) 3 1
- (iv) 7 1
- (c) number of protons/number of electrons in neutral (uncombined) atom 1
- (d) (i) inert/noble/rare gases 1
- (ii) unreactive/do not react 1
- (iii) outer electron shell contains 8 electrons/ complete octet 1

TOTAL 11**QUESTIONSHEET 18**

- (a) (i) lithium 1
- (ii) rubidium 1
- (iii) potassium 1
- (b) blue 1
- (c) (i) burnt with a 'pop'/small explosion 1
- (ii) hydrogen 1
- (d) (i) more reactive 1
- (ii) hydrogen and sodium hydroxide 1
- (e) Any two from:
react with water to give alkalis
all metals
hydroxides are alkalis
hydroxides all dissolve in water to give alkaline solutions 2

TOTAL 10

QUESTIONSHEET 19

- (a) (i) Any two from:
high melting point
good conductors of heat
strong/high tensile strength 2
- (ii) expensive/copper compounds are poisonous 1
- (iii) good conductor of electricity 1
ductile/high tensile strength 1
- (iv) cars: strong/high tensile strength/(relatively) cheap 1
planes: high density 1
- (b) (i) speeds up a reaction 1
- (ii) with transition elements 1
- (c) (i) positive/cation 1
- (ii) Cu^{2+} Fe^{3+} 2

TOTAL 12**QUESTIONSHEET 20**

- (i) I C or E 1
II F or A 1
III A 1
IV D 1
V D 1
VI G 1
VII E 1

TOTAL 7