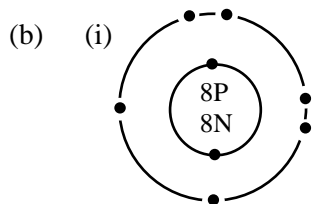


QUESTIONSHEET 1

- (a) oxygen 2 6 (0) 1
sulphur 2 8 6 1



correct nucleus 1
correct electronic arrangement 1

- (ii) lose 6 electrons 1
gain 2 electrons 1

- (c) (i) chlorine radicals have unpaired electrons 1
are chlorine atoms 1

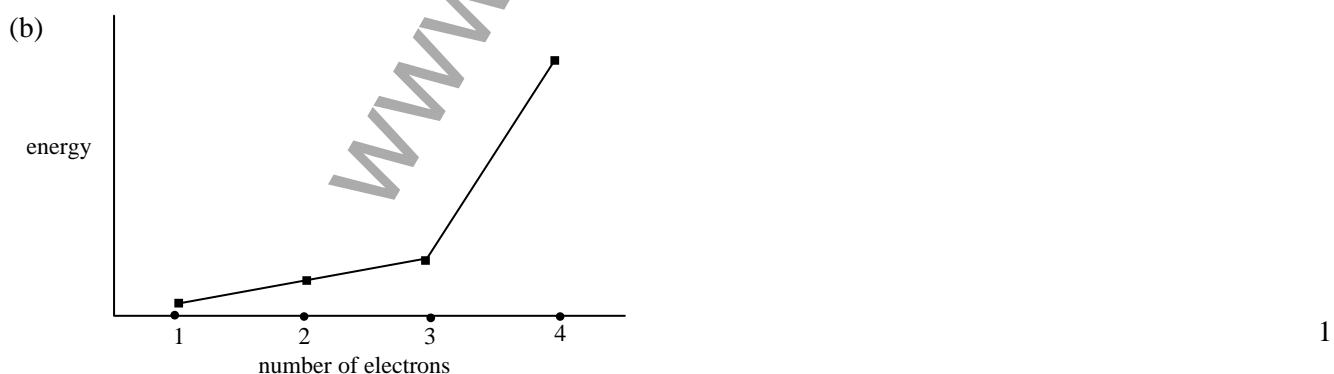
OR
chlorine molecules have no unpaired electrons 1
are pairs of chlorine atoms 1

- (ii) CFCs/chlorofluorocarbons 1
(NOT – aerosols, fridges etc as these are not substances)

TOTAL 9

QUESTIONSHEET 2

- (a) (i) outer shell electron 1
furthest from nucleus 1
(ii) all electrons in same shell 1
(iii) nearest electrons to nucleus 1



three electrons in outside shell 1
after this removing from next shell in 1

TOTAL 7

QUESTIONSHEET 3

- (a) (i) relative atomic mass/mass number = 40 1
atomic number/proton number = 20 1
- (ii) protons – 20 1
neutrons – 20 1
electrons – 20 1

(b)

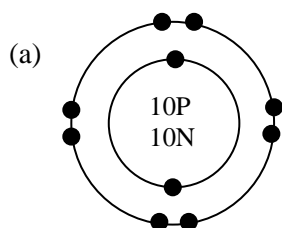
protons	neutrons	electrons
1	0	0
4	5	2
26	30	23
53	74	54
34	45	36

8

½ mark each
rounded to whole number

TOTAL 13

QUESTIONSHEET 4



- correct and same electronic arrangement 1
correct and same protons in each 1
correct neutrons 1

- (b) $90/100 \times 20 = 18$ 1
 $10/100 \times 22 = 2.2$ 1
relative atomic mass = $18 + 2.2 = 20.2$ 1
(correct answer alone scores 3)

Note: that the answer alone scores full marks. Always show working as an incorrect answer with no working will score zero. Correct working will gain some marks.

- (c) all chemical properties are the same 1
chemical properties depend on number of electrons 1
electrons are the same in both isotopes 1

TOTAL 9

QUESTIONSHEET 5

- | | | | |
|-----|------|-------------------------------|---|
| (a) | (i) | 18 | 1 |
| | (ii) | argon | 1 |
| (b) | (i) | 20 | 1 |
| | (ii) | Calcium ion/ Ca^{2+} | 1 |
| (c) | (i) | 1/ one | 1 |
| | (ii) | 20 | 1 |
| (d) | (i) | 7/ seven | 1 |
| | (ii) | 37 | 1 |

TOTAL 8**QUESTIONSHEET 6**

- | | | | |
|-----|---|-------------|---|
| (a) | 13 protons | 11 neutrons | 1 |
| | 13 electrons | | 1 |
| (b) | atoms with same number of protons/ atoms of same element
with different numbers of neutrons | | 1 |
| (c) | both isotopes have same number of electrons/ arrangement of electrons
it is number/arrangement of electrons that determines chemical behaviour | | 1 |
| (d) | $25/100 \times 24 = 6$ | | 1 |
| | $75/100 \times 28 = 21$ | | 1 |
| | $6 + 21 = 27$ | | 1 |
| | (correct answer alone scores 3) | | |

Note: that the answer alone scores full marks. Always show working as an incorrect answer with no working will score zero. Correct working will gain some marks.

- | | | |
|-----|--------------|---|
| (e) | aluminium/Al | 1 |
|-----|--------------|---|

TOTAL 10

QUESTIONSHEET 7

(a)	B	1
(b)	E	1
(c)	A	1
(d)	F	1
(e)	A	1
(f)	B & C/C & B	1
(g)	D & E/E & D/D & F/F & D	1

TOTAL 7**QUESTIONSHEET 8**

(a)	(i)	2,8,8,2	1
	(ii)	2,8,7	1
(b)	(i)	atoms become stable by obtaining full outer shells	1
		calcium loses 2 electrons	1
		chlorine gains one electron	1
		electrons transferred from calcium atoms to chlorine atoms	1
	(ii)	Ca ²⁺ , Cl ⁻	2
	(iii)	CaCl ₂	1
(c)		ionic bonds/forces between ions/particles are very strong	1
		they take a lot of energy to break/overcome	1

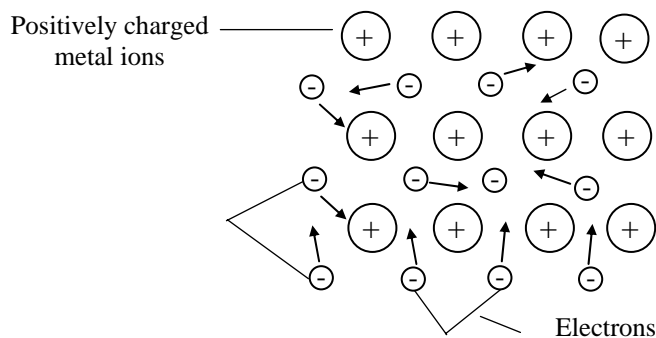
TOTAL 11**QUESTIONSHEET 9**

(a)		covalent	1
(b)	(i)	bonds between atoms are very strong	1
		require a lot of energy to break	1
	(ii)	atoms arranged in layers	1
		forces between layers weak/layers slide past each other easily	1
(c)		free electrons	1
		move along the layers	1

TOTAL 7

QUESTIONSHEET 10

- (a) regular pattern of ions 1
tightly packed 1
free electrons 1
hold structure together 1
(All four marks could be obtained from a clearly labelled diagram)



- (b) (i) forces holding lattice together are strong 1
ions/atoms in lattice tightly packed 1
(ii) layers of ions/atoms can slide past each other 1
(c) free electrons take in heat 1
passed on as electrons collide 1
(d) alloy 1

TOTAL 10

QUESTIONSHEET 11

- (a) (i) 2,8,1 1
(ii) 2,8,7 1
(b) (i) Na^+ 1
(ii) Cl^- 1
(c) NaCl 1
(d) (i) ions able to move freely 1
(ii) melt it 1
(e) (i) inert/noble gas/ Group 0 1
(ii) has a full outer shell 1

TOTAL 9

QUESTIONSHEET 12

- | | | | |
|-----|-------|--|--------|
| (a) | (i) | two sodium with 1+ needed to cancel 2- in sulphate
Na_2SO_4 | 1
1 |
| | (ii) | one potassium with 1+ needed to cancel 1- in nitrate
KNO_3 | 1
1 |
| | (iii) | one calcium 2+ needed to cancel 1- in two chlorines
CaCl_2 | 1
1 |
| | (iv) | one magnesium 2+ needed for two nitrates 1-
$\text{Mg}(\text{NO}_3)_2$ | 1
1 |
| | (v) | one potassium 1+ needed for one chloride 1-
KCl | 1
1 |
| (b) | (i) | ionic | 1 |
| | (ii) | electrons are transferred from one atom
to another | 1
1 |
| (c) | (i) | I^- | 1 |
| | (ii) | Sr^{2+} | 1 |
| | (iii) | SrI_2 | 1 |

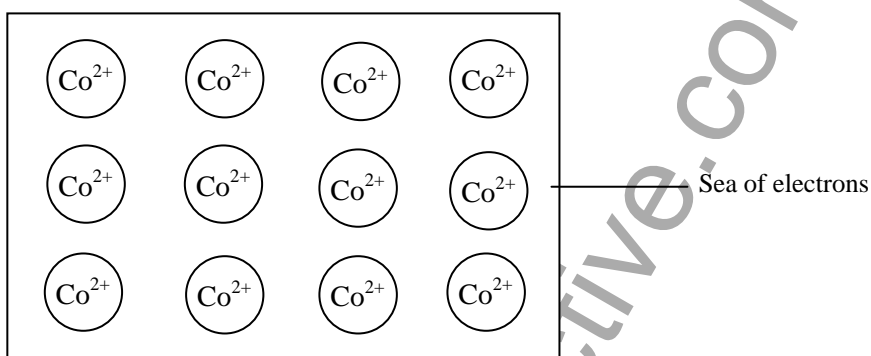
TOTAL 16

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QUESTIONSHEET 13

- (a) (i) simple molecular 1
(ii) giant atomic 1
(iii) simple molecular 1
(iv) giant metallic 1
(v) giant ionic 1
- (b) both will be low 1

(c)



regular arrangement of cobalt ions
surrounded by free electrons

1
1

TOTAL 8

QUESTIONSHEET 14

- (a) A & E/E & A 2
(b) B 1
(c) B & D/D & B 2
(d) C 1
(e) F 1
(f) E 1
(g) F 1

Note: that you may use each atom once, more than once or not at all. This is sometimes stated on the question paper. Students often go wrong by thinking that they must use all the alternatives at some point in the answer.

TOTAL 9

QUESTIONSHEET 15

(a)	(i)	4	1
	(ii)	4	1
(b)		1	1
(c)	(i)	4	1
	(ii)	2	1
(d)	(i)	carbon & silicon/silicon & carbon/C & Si/Si & C	1
	(ii)	four electrons in outer shell of both means they are both in group 4	1 1
			TOTAL 8

QUESTIONSHEET 16

(a)	(i)	nucleus	1
	(ii)	protons neutrons	1 1
	(iii)	positive/+/+12	1
(b)	(i)	12	1
	(ii)	2,8,2	1
(c)	(i)	two/2/II has two electrons in outer shell	1 1
	(ii)	three/3/III outer electrons in third shell/energy level	1 1
			TOTAL 10

QUESTIONSHEET 17

(a)	(i)	K ₂ O	1
	(ii)	MgO	1
	(iii)	Al ₂ O ₃	1
(b)	(i)	FeO	1
		Fe ₂ O ₃	1
	(ii)	iron(II) oxide & iron(III) oxide	1
			TOTAL 6

QUESTIONSHEET 18

(a)	(i)	sodium chloride	1
	(ii)	sodium sulphate	1
	(iii)	sodium hydrogencarbonate	1
(b)	(i)	sodium sulphate/ Na ₂ SO ₄	1
	(ii)	7	1
(c)	(i)	sodium hydrogencarbonate/ NaHCO ₃	1
	(ii)	sodium (no marks as given in question)	
		hydrogen	1
		carbon	1
		oxygen	1
			TOTAL 9

QUESTIONSHEET 19

One mark each for the following in the correct order

smallest

neutrons

positive

negative

nucleus

equal

ion

atomic number

mass number/atomic mass

different

protons

electrons

neutrons

TOTAL 13**QUESTIONSHEET 20**

one mark each

Name of element	neon	<i>magnesium</i>	sodium	<i>nitrogen</i>	carbon
symbol	<i>Ne</i>	Mg	<i>Na</i>	N	<i>C</i>
mass number	20	24	23	14	12
atomic number	10	12	11	7	6
number of neutrons	10	12	12	7	6

TOTAL 9