QUESTIONSHEET 1

(a)	(i)	increases	1
	(ii)	decreases	1
(b)		105 kJ per mole	1
(c)		while bond length increases	1
		bond energy decreases	1
(d)		none	1
		because astatine is likely to be insoluble	1
(e)		C1, Br, I, At	2
		or if one out of order	1
(f)		no	1
		as bond energy decreases	1
		expect reactivity to increase	1

TOTAL 12

QUESTIONSHEET 2

(a)	sulphur dioxide	1
(b)	$-10^{o}C$	1
(c)	the gas has been dried	1
	pH paper reacts to aqueous solutions	1
(d)	pH falls below 7 / paper becomes yellow/orange/red	1
(e)	$2SO_2 + O_2 \quad 2SO_3$	2
(f)	catalyst	1
(g)	heat given out	1
(h)	$SO_3 + H_2O \rightarrow H_2SO_4$	2
(i)	the bulk of the liquid absorbs the heat	1
	so no spray is caused	1

TOTAL 13

QUESTIONSHEET 3

(a) (i) yellow/green gas 1

(ii) iron(III) chloride 1

(iii) $2Fe(s) + 3Cl_2(g) \rightarrow 2FeCl_3(s)$ 2

(iv) chlorine is poisonous 1

(b) less vigorous 1

(c) (i) $2Na(s) + Br_2(l) \rightarrow 2NaBr(s)$ 2

(ii) potassium and fluorine 1
potassium is the most reactive metal (1), fluorine the most reactive non-metal (1) 2

TOTAL 11

QUESTIONSHEET 4

(i) glowing splint - relights in oxygen but not in nitrogen 2

(ii) flame - 'pop' noise in hydrogen only or litmus paper goes red and then bleached in chlorine only 2

(iii) lime water goes white/milky in carbon dioxide only 3

(iv) litmus goes blue in ammonia solution only 3

[The above will perhaps be the most common answers - there are alternative answers!]

TOTAL 10

QUESTIONSHEET 5

(a) (i)

	S	:	O	
mass(g)	3.2	:	3.2	1
moles:	3.2/32=0.1	:	3.2 / 16 = 0.2	1
ratio	1	:	2	

So formula is SO_2 1

(ii) oxygen 1

(b) (i) a reaction that can go backwards or forwards 1

(ii) $SO_2 + 2O_2 \quad 2SO_3$ 2

(c) in oxygen there is less distance between the nucleus and the outer shell/orbit (1), therefore more easy to gain electrons (1) 2

TOTAL 9

QUESTIONSHEET 6

(a) N,P,K are the chemical symbols of nitrogen, phosphorus, potassium 1
fertilisers contain these 1

(b) (i) nitrogen 1

(ii) nitrogen 1

(iii) potassium 1

(c) magnesium 1

(d) M_r for NH_4NO_3 = 14+4+14+48 = 80 1
80 g NH_4NO_3 contains 28 g nitrogen 1
N content = $\frac{28}{80} \times 100$ = 35% 1

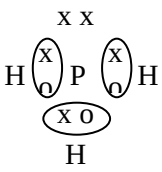
(e) the nitrate also supplies potassium 1

TOTAL 10

QUESTIONSHEET 7

(a) 2, 8, 5 1

(b)



2

Formula PH_3 1

(c) (i) gas 1

(ii) covalent bonding 1
weak attraction between molecules 1

(d) fertilisers 1

TOTAL 8

QUESTIONSHEET 8

(a)		appearance: thin/ mobile amber/yellow	1
		structure: short chains of sulphur atoms	1
		appearance: liquid becomes thicker	1
		structure: chains of sulphur atoms tangle	1
(b)		allotropes	1
(c)		must have cooled slowly	1
		trapping crystals under surface	1
(d)	(i)	needle structure disappears/ become lozenge-shaped	1
	(ii)	none	1

TOTAL 9

QUESTIONSHEET 9

(a)	points plotted correctly	1
	best fit curve	1
(b)	support	1
(c)	appears to help prevent tooth decay	1
(d)	involves enforced "mass medication" / too much fluoride is harmful	1
(e)	tablet form	1
	toothpaste	1

TOTAL 7

QUESTIONSHEET 10

(a)		methane, ammonia, nitrogen, oxygen, carbon dioxide, sulphur dioxide	6
(b)		points correctly plotted	1
		best fit curve	1
(c)	(i)	0.86 dm^3	1
	(ii)	0.60 dm^3	1
(d)	(i)	46 g	1
	(ii)	N = 14, & O = 16, so sum = 30	1
		to make 46 one more O is needed	1
		so formula = NO_2	1
(e)		HF = 1 + 19 = 20	1
		line drawn on graph from 20 on x axis to curve	1
		line drawn on graph from curve to y axis	1
		from graph, volume = 1.2	1
		dm^3	1

TOTAL 19

QUESTIONSHEET 11

(a)	(i)	fluorine	1
	(ii)	two atoms per molecule	1
	(iii)	2,8,7.	1
	(iv)	Cl atom gains an electron (1) to become a negative Cl ion/Cl^- (1)	2
(b)	(i)	At_2	1
	(ii)	black solid	1
	(iii)	seven	1
	(iv)	H (x) O (x) At (x x x x) or H-At	2
		Type of bonding – covalent	1

TOTAL 11

QUESTIONSHEET 12

(a) B 1

(b) (i) A, B & E 3

(ii) do not conduct heat/not shiny/low boiling point - any two 1

(c) Type of bonding: covalent/electrons shared by the two non-metals 1
Reason: atoms covalently bonded together give molecules 1
forces of attraction between molecules are weak/molecules are easily seperated 1

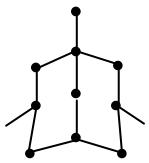
(d) hydrogen 1

[A = sulphur, B = bromine, C = sodium, D = copper, E = hydrogen]

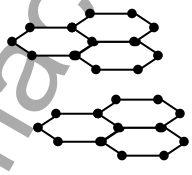
TOTAL 9

QUESTIONSHEET 13

(a) the existence of an element in two or more forms 1

(b) (i) 

(2)

(ii) 

(2) 4

(c) (i) carbon atoms are linked by very strong covalent bonds 1
in a three-dimensional/ macromolecular structure 1

(ii) carbon atoms use only three of their outer electrons to form covalent bonds 1
remaining electrons are delocalised/ can move along the layers and therefore conduct electricity 1

TOTAL 9

QUESTIONSHEET 14

(a) (i) bromine 1
(ii) carbon 1
(iii) chlorine 1
(iv) sulphur or oxygen 1

(b) NH_3 covalent 2

(d) sulphur 1

(d) X = sulphur or oxygen 1
Y = carbon 1

TOTAL 9

QUESTIONSHEET 15

(a)		no smell/tasteless/colourless/almost insoluble in water/lighter than air - any two	2
(b)	(i)	zinc (1) hydrochloric acid (1) [and many more!]	2
	(ii)	make sure that there is no air/oxygen left in the apparatus before igniting	1
	(iii)	water	1
	(iv)	anhydrous copper sulphate (1) goes from white to blue (1) or anhydrous cobalt chloride (1) goes from blue to purple (1)	2
(c)		helium	1

TOTAL 9

QUESTIONSHEET 16

(a)	(i) C (ii) B (iii) A		3
(b)	(i)	iodine (ii) diamond (iii) sodium chloride	3
(c)	(i)	the breaking down of a substance by electricity	1
	(ii)	2 in front of the Cl^- (1), + $2e^-$ (1)	2

TOTAL 9

QUESTIONSHEET 17

(a)	water vapour	1
(b)	helium	1
(c)	becomes solid	1
(d)	nitrogen	1
(e)	fractional distillation	1
(f)	N = 78%, O = 21%	2
(g)	some oxygen dissolves in water	1
	nitrogen does not	1
(h)	less of it in air	1
(i)	carbon dioxide is soluble in water	1

TOTAL 11

QUESTIONSHEET 18

(a)	A = carbon, B = lime water/calcium hydroxide	2
(b)	C = decomposition, D = photosynthesis, E = oxidation/burning	3
(c)	heat (1) with carbon (1)	2
(d)	fizzy drinks/fire extinguisher/'dry ice' - any one	1
(e)	CO_2 (1) 2 2 (1)	2
(f)	CO_2 has a simple molecular structure, SiO_2 has a giant molecular structure	2

TOTAL 12

QUESTIONSHEET 19

(a)	(i)	O, (ii) K	1
(b)	(i)	carbon (ii) sodium	1
(c)		iron and sulphur	1
		sodium, oxygen and hydrogen	1
		potassium chloride	1
(d)	(i)	two	1
	(ii)	two	1
(e)	(i)	three	1
	(ii)	seven	1

TOTAL 9

QUESTIONSHEET 20

(a)	(i)	increase	1
	(ii)	increase	1
(b)	(i)	gas	1
	(ii)	gas	1
	(iii)	liquid	1
	(iv)	solid	1
(c)		solid	1
(d)		insoluble	1
(e)		F, C1, Br, I, At 1 if 1 out of order	2

TOTAL 10