

- 1 (a) (i) does not form compounds / does not accept and does not lose electrons / has full outer shell/has 8e in outer shell / it is a Noble Gas / it is in Group 0/8 [1]
- (ii) small number of outer electrons / lose electrons then positive [1]  
 large number of outer electrons / gain electrons then negative [1]
- (iii) any **two** from nitrogen, oxygen and fluorine [1]  
**accept** symbols / molecular formulae
- (b) zinc / aluminium / lead / tin / chromium [1]
- (ii) white precipitate [1]  
 precipitate dissolves / colourless solution forms / forms a clear solution [1]  
 / soluble in excess [1]
- (c) LiF [1]  
 NF<sub>3</sub> [1]
- (ii) LiF has higher mp / bp  
 LiF is a (crystalline) solid, NF<sub>3</sub> is probably a gas / a liquid  
 / LiF is less volatile  
 as liquids only LiF conducts  
 LiF is soluble in water, NF<sub>3</sub> is not  
 when both solids LiF is harder  
 any **two** [2]
- (iii) LiF is an ionic compound [1]  
 NF<sub>3</sub> is a covalent/molecular compound [1]  
 for stating that one is ionic and the other covalent [1] without specifying which is which

[Total: 13]

2 (a) volume given off (in that 20 s interval) [1]  
divided by 20 [1]  
accept 48/20 for [2]  
**Answer to 3 (a) may appear twice, both in 3 (a) and 3 (b). Please ignore in 3 (b).**

(b) 0.6 (cm<sup>3</sup>/s) [1]

(c) concentration [1]  
of hydrogen peroxide decreases [1]

for hydrogen peroxide used up ONLY [1]  
**not** reagent / reactant

(d) rate increases / doubles [1]  
catalyst has bigger surface area / more catalyst particles exposed [1]  
more collisions [1]  
**not** more catalyst / higher concentration of catalyst / more molecules of catalyst

**OR**

volume of oxygen the same [1]  
oxygen from hydrogen peroxide (not catalyst) [1]  
amount / number of moles the same [1]

**OR**

amount/mass/volume/number of moles of hydrogen peroxide the same [2]

catalyst chemically unchanged ONLY [1]  
reactants have not changed (only the catalyst) [1]  
**accept** catalyst does not react [1]

**[Total: 11]**

- 3 (a) diffusion [1]  
 different  $M_r$  **or** ozone molecules heavier than oxygen molecules  
**or** different densities or oxygen molecules move faster than ozone molecules [1]  
**NOT** oxygen is lighter **or** ozone heavier
- OR** fractional distillation [1]  
 they have different boiling points [1]
- (b) (i) from colourless (solution) [1]  
 to brown (solution) [1]
- (ii) I loses electrons (to form iodine molecules) [1]  
 must be in terms of electron transfer **NOT** oxidation number
- (iii) they (electrons) are accepted by ozone [1]  
**or** it is an electron acceptor [1]
- (c) (i) correct structural skeleton [1]  
**COND** 4bp around both carbon atoms [1]  
 2bp and 2nbp around sulfur atom [1]  
**NOTE** marks 2 and 3 can only be awarded if mark 1 has been scored
- (ii) water  
 carbon dioxide  
 sulfur dioxide  
 all **three** [2]  
 any **two** [1]  
**Accept** correct formulae

[Total: 11]

- 4 (a) (i) greater initial slope or levels off later [1]  
Twice final volume [1]
- (ii) smaller slope [1]  
same final volume [1]
- (b) more particles in same volume/particles closer together [1]  
greater collision rate [1]
- molecules move faster [1]  
greater collision rate [1]
- OR** molecules have more energy [1]  
so more will have sufficient energy to react [1]
- (c) (i) glucose [1]  
oxygen [1]
- (ii) chlorophyll [1]
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- 5 (a)  $Zn + I_2 = Zn^{2+} + 2I$  [2]  
For having either reactants **or** products correct ONLY [1]
- (b) for zinc and sodium hydroxide white precipitate [1]  
dissolves in excess (only if precipitate mentioned) [1]
- for zinc and ammonia same results [1]  
Mark either first (sodium hydroxide **or** aqueous ammonia), if completely correct, then an additional [1] can be awarded for stating that the other has the same results.
- (c) zinc and a reason [1]  
Do not mark conseq to iodine in excess
- (ii) final mass of zinc bigger **or** the level section higher **or** less zinc used up [1]  
gradient less steep **or** longer time **or** falls more slowly [1]
- (iii) steeper gradient [1]  
same loss of mass of zinc [1]