

CHEMISTRY FORM 2 MARKING SCHEME

1. Both graphite and diamond are allotropes of element Carbon. Graphite conducts electricity whereas diamond does not. Explain. (2mks)

Graphite uses only three of its four delocalised during bonding leaving an extra valence electron which conducts electricity. Diamond uses all its four valence electrons in bonding, leaving none to conduct electricity.

2. Starting with Lead (II) carbonate explain how you would prepare a pure sample of ^{excess} Lead (II) sulphate. (3mks)

(i) Place lead carbonate in a test tube and add dilute nitric acid. This forms lead nitrate solution. To this add a sodium sulphate solution. This forms a precipitate. Filter to obtain the residue. Dry it between two filter papers.

3. Explain why magnesium is a better conductor of electricity than sodium. (2mks)

Magnesium has two valence electrons while sodium has only one valence electron. Hence more current is carried in magnesium than sodium.

4. Explain why luminous flame is capable of giving out light and soot. (2mks).

The air-hole is closed, due to its incomplete combustion of carbon particles, they glow & hence giving light.

5. In an experiment, ammonium chloride was heated in test-tube. A moist red litmus paper placed at the mouth of test first changed blue then red. Explain these observations. (3mks)

It decomposes into ~~ammonia~~ ^{ammonia} gas and ~~hydrogen chloride~~ ^{HCl} gas. Ammonia gas is basic, hence it changes to blue. HCl gas is produced hence it changes to red.

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6. (i) Diamond and silicon (IV) Oxide have a certain similarity in terms of structure and bonding. State it

(i) Both use three delocalised electrons to bond (2mk)

(ii) Both have a giant covalent bonds

7. (ii) State one use of diamond.

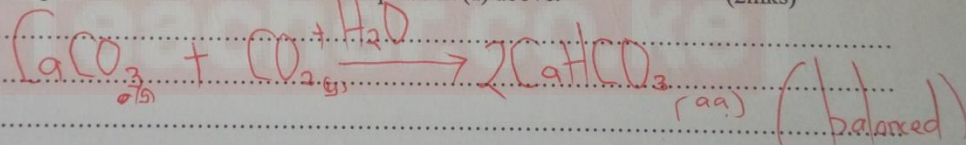
Used in drilling due to its very high melting and boiling point. (1mk)

8. When Carbon (IV) oxide is passed through lime water, a white precipitate is formed but when excess Carbon (IV) Oxide is passed, the white precipitate disappears;

(a) Explain why the white precipitate disappears.

The precipitate (Calcium Carbonate) upon further reaction with Carbon (IV) oxide forms Calcium Hydrogen Carbonate which is soluble. (2mks)

(b) Give an equation for the reaction that takes place in (a) above.



9. Water has a boiling point of 100°C while hydrogen chloride has a boiling point of -115°C. Explain (2mks)

Water in addition to Van der Waal forces shows hydrogen bonding hence a high boiling point while hydrogen chloride has a weak Van der Waal forces which require less heat to break.

10. Explain why the boiling point of ethanol is higher than that of hexane.

(Relative molecular mass of ethanol is 46 while that of hexane is 86).

Ethanol in addition to Van der Waal forces shows hydrogen bonding hence a higher boiling point since they require more heat to break while hexane has weak Van der Waal forces. (3mks)

11. Sodium and Magnesium belong to the same period on the periodic table and both are metals. Explain why magnesium is a better conductor of electricity than sodium. (2mks)

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Magnesium has more delocalised electrons, hence better conductor of electricity than Sodium which has only one valence electron.

12. Sodium Carbonate Decahydrate crystals were left exposed on a watch glass for two days.

a) State the observations made on the crystals after two days. (1mk)

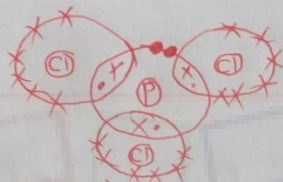
The crystals changed in a white powder since they lost their water of crystallization.

b) Name the property of salts investigated in the above experiment (1mk)

Efflorescence.

13. Using dots and crosses to represent electrons, draw the structures of the following:

Phosphorous chloride (PCl_3). (2mks)



14. a) What is an isotope? (1mk)

Atoms of the same element, same atomic number but different mass number.

15. Carbon and Silicon are in the same group of the periodic table. Silicon (IV) Oxide melts at 2440°C while solid Carbon (IV) Oxide sublimes at -70°C . In terms of structure and bonding, explain this difference. (3mks)

Carbon (IV) oxide displays a simple molecular structure in which molecules are held by weak van der Waal forces, easy to break. Silicon (IV) oxide shows a giant covalent structure. Hence, more heat is required to break the atom-atom bonds.

16. Carbon and silicon belong to the same group of the periodic table, yet Carbon (IV) oxide is a gas while silicon (IV) oxide is a solid with a high melting point. Explain this difference (3mks)

Carbon (IV) oxide, gas exhibits a simple molecular structure in which molecules are held by weak van der Waal forces which are easy to break hence low melting point while Silicon (IV) oxide has a giant covalent structure this requires a higher amount of heat.

18. When the oxide of element H was heated with powdered Carbon, the mixture glowed and Carbon (IV) oxide was formed. When the experiment was repeated using the oxide of element J, there was no apparent reaction.

