**ENTRY EXAMS FORM 4 PP2 MARKING SCHEME**

1 (a) Allotropy is the existent of an element in more than one form without a change of state (1mark)

(b) (i) D – Graphite (1mark)

(ii) E – Diamond (1mark)

1. In electrolysis as an electrode or used as a lubricant lead pencils or atomic piles. (Anyone) (1mark)
2. D or diamond (1mark); all its 4 outermost electrons are involved in bonding. (½mark)

Thus it has no free/mobile electron to conduct electricity. (½mark)

(c) (i) CO2(g) is denser than air (1mark)

CO2(g) does not burn (1mark) (Any two)

2. A (i) (a) Carbon (IV) oxide (CO2) (1mark) (Any)

(b) KOH(aq)  + CO2(g)  KHCO3(aq) (1mark)

*Wrong balanced = 0*

*State symbols wrong or missing (½mark)*

1. Oxygen gas or O2(g) or (O2)oxygen gas (1mark)
2. Nitrogen gas or N2(g) or nitrogen N(2) gas (1mark)

B (i) Moles of nitrogen =  (½mark) = 0.11 (½mark)

Moles of oxygen =  (½mark) = 0.22 (½mark)

N O

1. Mole ratio  = 1(½mark) = 2 (½mark)

Simplest formula NO2 (1mark)

1. Compound has low melting and boiling points (1mark) because it has a weak

Van der waal forces. (1mark) Continuous electricity supply (1mark) (any one)

3. (a) (i) Dehydration. (1mark)

(ii) 170ºC/(heating). (1mark)

(iii) Chloromethane (1mark) Vinyl chloride.

(iv) Ethanol (1mark) *(4marks)*

(b) CnH2n+1 OH (1mark)

(c) (i)

n

H H H H H H

C C C C C C

H H H H H H

1. Polythene. (1mark)

(d) (i) Molecular formula of compound T.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Element | O | H | C |  |
| % by mass | 50 | 12.5 | 37.5 |  |
| RAM | 16 | 1 | 12 | (½mark) |
| moles | 3.125 | 12.5 | 3.125 | (½mark) |
| Mole ratio | 1 | 4 | 1 | (½mark) |

(CH4O)n =32

32n = 32

n = 1

Molecular formulae are CH4O (½mark)

1. H

H C OH (1mark)

H

4. (a) (i) I Dust (1mark)

II Carbon (IV) oxide (1mark)

III Water vapour (1mark)

1. - 196ºC Nitrogen (1mark)

- 186ºC Argon (1mark)

- 183ºC Oxygen (1mark)

Water

Iron nail

Oil

Boiled water

**A** **B**

½

½

(b)

Set up the experiment as shown above. After 1 week, the iron nails in A rust but those in B do not rust (1mark)

(c) Mole ratio Fe: Fe2O3

Z: 1 (½mark)

(2 56) g of Fe 1 mole of Fe2O3

1000g of Fe  (½mark)

= 8.929 moles (½mark)

5. (a) Electronic configuration N = 2:8:8:2

Group = 2 should be placed

Period = 4 below J in the grid (1mark)

(b) Ionic bond/electrovalent (1mark): There is complete transfer of electrons from D to H to form D+ and H-

(c)  (1mark)

1. Atomic radius L is smaller than that of I. (1mark) This is because electrons in L experience higher

force of attraction than those of I (1mark) (L has higher nucleus charge than I).

1. Oxide of L has giant covalent structure (½mark) with strong covalent bond. (½mark)

While oxide of G has a molecular structure (½mark) with weak Van der waal forces. (½mark)

II (a) It exists as a dimmer. (1mark)

(b) SiCl4 (½mark), SCl2 (½mark)

They have a very low melting point. (1mark)

1. AlCl3 is covalently bonded (½mark) with a higher M.P and B.P.

MgCl2 has ionic bond (½mark) with a higher M.P and B.P.

6.MgCl2 (1mark) because it remains a liquid from a temperature of 710 – 1120 (Range of 710) (1mark)

(a) The ammonia and air mixture are heated to an optimum temperature of 9000C.

(b) 4NH3(g) + 5O2(g) 4NO(g) + 6H2O(g) + heat

(c) temperature of nitrogen (II) oxide and air mixture is lowered up to 300C to allow the two gases combine and form nitrogen (IV) oxide gas.

( d) the reaction in the catalytic chamber is exothermic. The products of the chamber are taken back to the heat exchanger to pre-heat incoming ammonia and air gases.

( e) 4NO2(g) + O2(g) + 2H2O(l) 4HNO3(aq)

( f) By fractional distillation of the nitric acid.

( g) Impurities poison the catalyst.

( h)– Carbon (IV) oxide

* + - * + Water vapour
        + Carbon (II) oxide
        + Dust particles.

7. I (a) Yellow (1mark) solid melts into amber liquid. (1mark) (2marks)

(b)  *Penalize (½mark) for wrong state.*

*Penalize fully for unbalanced*

II (a) K – Hydrogen sulphide (1mark) reject H2S

M – Sulphur (IV) oxide (½mark)

(b) (i) Blue flame (½mark), Misty fumes (½mark), Choking smell (½mark)

1. - Temperature 450C. (½mark)

- 2 to 3 atmosphere. (½mark)

- V2O5 (½mark)/finely divided platinum (pt) on silica.

1. Methylbenzene (1mark)

(iv) A vigorous reaction, that produce dangerous (1mark) poisonous fume occur (1mark)

(c) 

(d) It makes the rubber tougher (1mark) less flexible and less soft; by reducing (1mark)

number of double bonds.