SET 6

CHEMISTRY PAPER 1

MARKING SCHEME

1.

 ½ Solvent line

A

C

 ½

B

D

 Baseline (z) ✓ 1

 A B C D K

2. (i) X – 2.6 ½

 Y – 2.8.6 ½

 (ii) Covalent bond ✓ 1

3. (a) Under the same conditions of temperature and pressure, the rate of diffusion of a gas is inversely

 proportional to the squareroot of its density ✓ 1

 (b) $\frac{RA}{RB}$ = $\frac{TB}{TA}$ = $\frac{MMB}{MMA}$ ✓ 1

 $\frac{RO2}{RNO2}$ = $\frac{TNO2}{TO2}$ = $\frac{MMNO2}{MMO2}$ ½ NO2 = 14 + (16 x 2) = 46

 O2 = 16 x 2 = 32

 $\frac{TNO2}{50}$ = $\frac{46}{32}$ ½

:. TNO2 = 50 x $ \frac{46}{32}$

 TNO2 = 59.95 sec

4. (a) The black copper (II) oxide ½ changes from black to brown ½

 (b) (i) Add few drops of liquid Y to anhydrous Copper (II) Sulphate it changes colour from white

 powder to blue crystal. Dip Cobalt (II) Chloride paper into the liquid, it changes from blue to pink.✓ 1

 (ii) Nitrogen gas/N ✓ 1

5. (a) (i) K ½

 (ii) J ½

 (b) In methylbenzene hydrogen chloride remains as a molecule✓ 1/it does not ionize ✓ 1

 (c) L is a better conductor than ½ J because L is a strong acid hence ionizes fully/completely ✓ 1 to

 provide/yield many hydrogen ions responsible for better conductivity.

(6) (i) Its bleached/turns white/colourless. ✓ 1

 (ii) Put a filter paper dropped into orange potassium dichromate (VI) ✓ 1

 (iii) Bromine water is decolourised ✓ 1

7. (a) A black solid is turned. ✓ 1

 (b) FeS (s) + 2HCl (aq) → FeCl2 (aq) + H2S (g) ✓ 1

8. (i) X is Sodium Peroxide ✓ 1

 (ii) 2Na2O2 (s) + 2H2O(l) 4NaOH (aq) + O2 (g) ✓ 1

 (iii) It is almost insoluble in water. ✓ 1

9. (i) – Atoms with same atomic number but different mass number. ✓ 1

 (ii) R.A.M = 2.0 x 90.92 + 21 x 0.26 + 22 x 8.82 ✓ 1

 100

 = 2,017.9

 100

 = 20.179 ✓ 1

10. Lot P = (x)

 H = (•)

 + The change must be shown.

 H

 H P H

 H

11. (i) Deliquescence

 (ii) Sublimation

 (iii) Polymerization/self addition reaction.

12. (a) The gas dissolves in water to form an acid solution which turns blue paper red. ✓1

 (b) HCL/Hydrogen Chloride gas. ✓1

 (c) To prevent sucking back of the solution/increase surface area for dissolving/absorption of the gas. ✓1

13. Mass of water of crystallization = (8.0 – 5.1)g = 2.9g

|  |  |
| --- | --- |
| CuSO4 | n H20 |
| Mass 5.1RFM 159.5Moles $\frac{5.1}{159.5}$ = 0.0320$\frac{0.0320}{0.0320}$ = 1 | 2.918.0$\frac{2.9}{18}$ = 0.1611$$\frac{0.1611}{0.032}$$ |

 :. n = 5

 CuSO4.5H2O

14. (i) X is hydrogen ✓1

 (ii) Mg (s) + H2O MgO(s) + H2(g) ✓1

 (iii) Lining of furnaces ✓1

 H H CH3

 | | |

15. (a) H – C – C – C - C ≡ C – H ✓1

 | | |

 H H CH3

 (b) (i) 4 – bromo – 3 – methylpent – 1 – ne ✓1

 (ii) 4 – methylpent – 2 – yne ✓1

16. (a) Haber process

 (b) Finely divided iron catalyst impregnated with aluminium oxide.

 (c) Ammonia is catalyzing oxidized to form Nitrogen (II) Oxide which is immediately oxidized by

 atmospheric oxygen to form nitrogen (IV) oxide which appears as brown fumes.

 Accept equations Pt

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

 2NO(g) + O2 2NO2 (g)

 Colourless Brown fumes

17. Heat the metal in air ½ to form the oxide of copper ½ CuO.

 Add excess ½ dilute hydrochloric acid to the oxide to obtain copper (II) chloride, CuCl2 ½

 Concentrate the filtrate and leave to crystallize ½ filter and dry the crystals at room temperature between

 pieces of filter paper ½

 or

 Add excess copper ½ to dilute nitric acid ½ to form copper nitrate.

 Filter to remove excess copper ✓1/unreacted copper. Add Na2CO3 ½ to the filtrate to precipitate ½

 CuCO3, filter.

 Filter and add dilute hydrochloric acid to residue ½ to obtain Copper (II) Chloride CuCl2

18. K2O (s) + 2HCl (aq) 2KCl (aq) + H2O (l) ✓1

 Moles of K2O = RFM = 39 x 2 + 16

 = 94

 Moles = $\frac{9.4}{94}$ = 0.1 moles ½

 Mole ratio K2O: HCL is 1:2

:. Moles of HCl are twice moles of K2O.

:. Moles of HCl = 2(0.1)

 = 0.2 moles ½

2.2 moles are in 1000cm3.

2.2 moles are in 1000cm3.

0.2 moles of HCl are in

0.2 x 1000 ½

 2.2

= 90.90 cm3 ½

19. (a) Brown solution/yellow solution turns into pale green/green.

 (b) 2FeCl3 (aq) + H2S (g) 2FeCl2 (aq) + S (s) + 2HCl (aq)

 (c) Oxidation

20. (a) (i) M ✓1

 (ii) O ✓1

 (b) (i) P ✓1

 (ii) Q ✓1

21. The sting produced an acidic ✓1 compound, ammonia being basic neutralized ✓1 the acidity.

 Acid + NH3 Salt + Water

 Alkali (Neutralization)

22. (a) Iron (II) Sulphide/Copper Sulphide and hydrochloric acid. ✓1

 Accept formula: FeS/HCl

 Lead (II) Sulphide and Nitric (V) Acid

 (b) Hydrogen Sulphide ✓1

 It reduces Sulphur (IV) Oxide to yellow deposit of sulphur.

 (c) - Vulcanization of rubber

 - Manufacture of sulphur drugs, dyes.

 - Manufacture of explosives, fungicides Any 1

23. (i) Step 1 2 moles of Hydrogen gas ✓1

 Step II 1 mole of Hydrogen gas ½

 Step IV soda lime (NaOH and CaO) ½

 (ii) 2 CH = CH (g) + 5O2 (g) 4CO2 (g) + 2H2O (l)

24. Calcium carbonate reacts to form an insoluble Calcium Sulphate which forms a coating ½ on the

 carbonate that prevents further reaction between the carbonate and acid hence less volume ½ of CO2

 formed.

25. (a) By free ions/mobile ions/free.

 (b) By delocalised electrons.

26. (a) At room temperature/cold and dilute Sodium Hydroxide.

 (b) - Used in sterilizing of water/treatment of water/killing germs.

 - Used as bleaching agent.

 - Antiseptic for mouth wash.

 - Fungicide (Any 1)

27. (a) When fuel carbon burns under limited supply of oxygen. ✓1

 (b) Carbon (IV) oxide ✓1, Nitrogen (IV) oxide Sulphur (IV), Sulphur (VI) Oxide ✓1

28. (i) Ethene ✓1

 (ii) To indicate the temperature when gas X is formed. ✓1

 H2SO4(l)

 (iii) CH3CH2OH (l) C2H4 (g) + H2O (l)