**FORM 3 CHEMISTRY PAPER 2 MARKING SCHEME**

**TERM III-2023**

1. a)

|  |  |  |
| --- | --- | --- |
|  | C | H |
| %composition  Moles √1/2    Mole ratio √1/2 | 85.7  85.7/12  **7.142**  **1** | **14.3**√1/2  14.3/1  **14.3**  **2** |

Empirical formula

CH2 √1/2

(12+2)n =42

14n=42

n=3√1/2

Molecular formula C3­H6 √1/2

b). H H

C = C – C – H √1

H H

c) Alkenes √1

d) 2-bromopropane √1

H H H

H - C – C – C – H √1

H Br H

e) Source of fuel; √1

Manufacture of plastics; √1

Ripening of fruits any two for 2mks

f) i) X Pent-2-ene √1

W 2,3-dibromo pentane √1

ii) The brown bromine vapor is decolorized. √1

iii) C5H10+Br2 C5H10Br2 √1

1. a) (i) Nitrogen√1 ; hydrogen √1

(ii) Platinum-rhodium √1

(iii) NH3(g)+HNO3(aq) NH4NO3(aq) √1

(iv) Neutralization √1

(v) The nitric(V) acid must be hot √1

(vi) Copper(II)nitrate √1

(vii) Cu √1

(viii) CuO(s)+H2(g) Cu(s)+H2O(l) √1

Mol of Hydrogen gas=12/24

=0.5√1/2

Ratio of H2:Cu=1:1 √1/2

Mol of Cu=0.5 √1/2

Mass of Cu=0.5\*63.5

=31.75g √1/2

b) (i) Nitrogen(IV)Oxide√1

(ii) Oxidizing agent √1

3. a) **24.4**√1 **24.8**√1 **24.7**√1

b) (24.8+24.7) √1/2

2 = 24.75cm3√1/2

c) Molarity=mass/RFM

0.05 =5.0/RFM √1/2

RFM=5.0/0.05 √1/2

=100 √1/2

2+X+2(18)=100

X=62 √1/2

d) Mole=(M\*Vol)/1000

0.05\*25/1000√1/2 =0.00125 √1/2

e) Mole of MnO4- =(2\*0.00125)/5 √1/2

=0.0005 √1/2

f) Molarity=mol/vol

0.0005/24.75\*1000 √1/2

=0.02M √1/2

4. a) i) Insert a burning splint/flame√1/2 into a gas jar of gas. It will burn with a pop sound√1/2.

ii) Grey iron wire changes to green √1

iii) Fe(s)+HCl(g)→FeCl2(s)+H2(g) √1

iv) a) chlorine gas is poisonous√1, the experiment should be done in the fume chamber/in the open√1

b) Iron(III)Chloride √1/2

c) 2FeCl2(s)+Cl2(g)→2FeCl3(s) √1/2

moles of Q=

= 0.03262√1/2

Moles of Chlorine gas reacted= 0.03262x2 volume of chlorine=24000x0.01631

=0.01631√1/2 =391.38cm3√1/2

d) Chlorine reacts with water to form HOCl which donates atomic oxygen to the dye√1 oxidizing it, while Sulphur(IV)Oxide forms H2SO3 which absorbs atomic oxygen from the dye√1 hence reducing it.

5. a) Hydocarbon√1

b) (i) Fractional distillation√1

(ii) Fuels√1; Source of hydrogen during cracking (any one acceptable for 1mk)

c) (i) calcium carbide√1

(ii) Phosphoric(V) acid√1

(iii) H-C≡C-H√1

(iv) Hydration√1

(v) a) Plastic pipes√1 ( accpt any other relevant use)

b) Hardening oils to form margarine√1

(vi)) C2H4(g) + 3 O2(g) 2 CO2(g) + 2 H2O(g) √1 (don’t penalize state symbols)

1V 3V 2V 2V √1/2

30cm3 90cm3 **60cm3**√1/2

6. i) Transition elements√1/2

ii) Atomic radius of U is smaller√1. U has more protons√1/ has stronger nuclear attraction for outermost electrons/ has a higher nuclear charge.

iii) Group V period 2, (award mks if only shown on the grid√1)

iv) M, has a smaller atomic radius√1, hence outermost electron is strongly√1/2 attracted to the nucleus. A lot of energy is required to remove this electron√1/2.

v) It is chemically inert. √1

vi) T3(PO4)2√1

* vii) covalent bond√1, molecular structure√1.
* viii) S√1

X√

7. a) Magnesium oxide√1

b) 2Mg(s)+O2(g)⟶2MgO(s) √1

c) Sodium sulphate√1

d) MgO(s)+H2SO4(aq)⟶MgSO4(aq)+H2O(l) √1

e) Mg2+(aq) +CO32-(aq)⟶MgCO3(s) √1

f) MgCO3(s)⟶MgO(s)+ CO2(g) √1

g) i)Sulphur (iv)oxide√1

ii) Na2SO3(s)+2HCl(aq)⟶2NaCl(aq)+SO2(g)+H2O(l) √1

iii) The red litmus paper changes to white ( is bleached) √1

iv) White precipitate√1.Due to the formation of insoluble lead(ii) sulphite.

√1/2

END