2020 FORM 4 TERM 1 OPENER EXAMS

F0RM 4 CHEMISTRY PP2

MARKING SCHEME.

1. Q √1
   - Sharp/ constant melting point and boiling point.

ii) Melting point – lower the M.P √ 1
Boiling point – raises the b.p√ 1

b) B – Melting √1
D - Condensation√1

ii) Sublimation √1

iii) Iodine √ ½
- Ammonium chloride √ ½ Any two 1mk.
- Solid ice √ ½
- Iron (III) chloride√
- Aluminum chloride √ ½

iv) Exothermic √ ½
Involves heat loss ½

2. a) Nitrogen gas√ 1

b) i)Carbon (iv) oxide gas√1
ii)Oxygen gas√1
iii) Nitrogen√1

c) To remove/absorb water vapour or dry / drying agent.

d)i) $2\ NaOH_{(Aq)} + CO_{2(g)} \longrightarrow Na_2CO_{3(S)} + H_2O_{(L)}$√1

ii)$3Mg_{(s)} + N_{2(g)} \longrightarrow Mg_3N_{2(S)}$√1

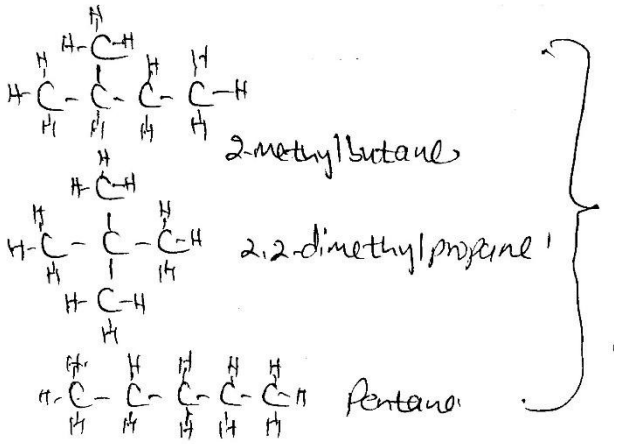
Penalize ½ if state symbols miss/wrong
Penalize fully if not balanced.

e) Brown solid changes to black√1
Brown copper metal oxidized/ reacts with oxygen to form copper (II) oxide (black)

f) - Argon
- Neon Any one. (1mk)
- Helium

3

An
Dr
Na
Pe
wr



b J- Hydrogenation√1
K –Bromination/Halogenation √1
T-Polymerisation√1

(ii) J-Hydrogen gas √ ½
K- Bromine gas √ ½

(iii) U-carbon (IV) Oxides gas √1
W chloroethane √ 1
S – Polyethene√ 1

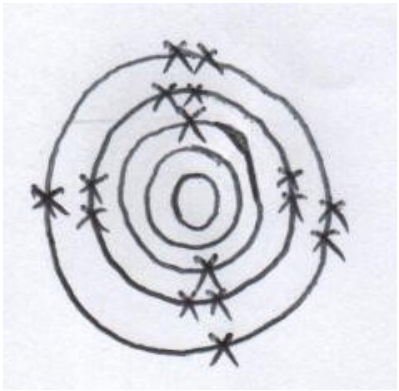
Y – Sodium propanoate√ 1

C) CH_2CH_2 √ 1 burns with a yellow sooty flame while CH_3CH_3 √1 burns with a blue non- sooty flame.

4 a) C and T (Mark tied to the two elements)

b) J – has five energy levels/ highest number of energy levels.

c)



d) i) Y -2,8,8,2 √ 1

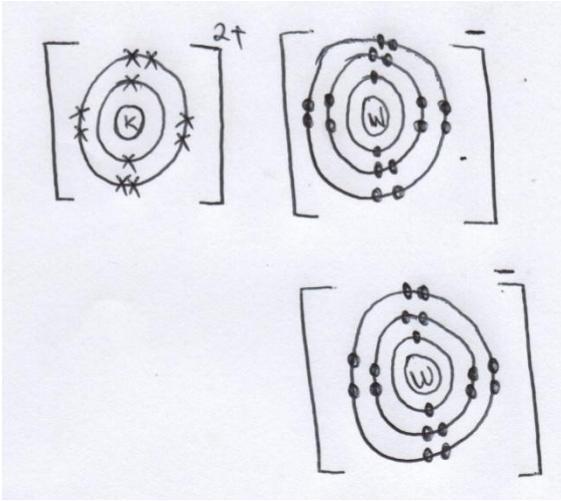
W – 2,8,7√1

e) Period 3 should be shown on the grid

Group 5 otherwise penalize fully

f) M √

g) K W_2



h. K has a smaller √ ½ atomic radius than X

K has more √ ½ protons in the nucleus which increase the nucleus force of attraction √ ½ (higher nuclear charge) hence the electrons on the energy levels are strongly attracted towards the nucleus.

5 (i) $2\ Pb(NO_3)_{2(S)} \xrightarrow{Heat} 2\ PbO_{(s)} + 4\ NO_{2\ (g)} + O_2$

- Penalize ½ mk if state symbols miss /wrong
- Penalize fully if not balanced

(ii) Sodium nitrite√ ½

Sodium nitrate √ ½

(iii) Charcoal glow red hot √1

(iv) To absorb Carbon (IV) oxide gas formed√1

(v) Carbon (II) oxide gas √1

b) i) Nitrogen gas – fractional distillation of liquid air√ 1

Hydrogen gas – Electrolysis of brine

- Cracking of hydrocarbon
- Water gas√ 1

(ii) Catalyst P platinum/ platinum – rhodium √ 1

b) Gas M – Nitrogen (II) Oxide √ 1

c) Liquid F – water √ 1

(iii) $4NH_3 + 5O_2 \xrightarrow{\text{platinum}} 4NO_{(g)} + 6H_2O_{(1)}$

iv) $4\ NO_{2\ (g)} + 2H_2O_{(l)} + O_{2(g)} \longrightarrow 4\ HNO_{3(aq)}$

v) – Manufacture of nitrate fertilizers, synthetic fibre, dyes, drugs, explosives,

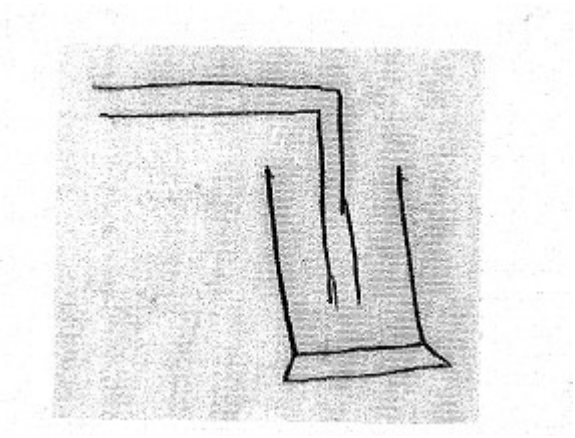
Purification of metals (Any one 1 mk).

6. (a) (i) solid W – Sodium sulphite

(ii) Dropping funnel

(b)Drying agent

(c)



d Yellow iron (III) sulphate solution √1 turned pale green sulphur (IV) oxide gas reduced iron (III) ions to iron (II) ions√1.

e) $Na_2SO_{3(S)} + 2HCl_{(aq)} \longrightarrow 2\ NaCl_{(aq)} + SO_{2(g)} + H_2O_{(l)}$

moles of HCl

2 moles ⟶ 1000 cm^3

50 cm^3√ (1 mk)

$$\frac{2\times 50}{1000} = \frac{100}{1000} = 0.1 \text{moles}$$

Mole ratio Hcl : SO_2

2 : 1 √ ½

Moles of $SO_2 = \frac{1}{2} = 0.05$moles

1Mole ⟶ $24dm^3$

1.05 oles ⟶ ? = $1.2dm^3$√ ½

2 $\frac{0.05\times 24}{1}$√½

j) - to make calcium hydrogen sulphite used to bleach wood pulp in the manufacture of paper

- as a fumigant
- as a preservative in jam and fruit juices

(Any two)

7(a) (i) A-Concentrated hydrochloric acid (1mk)

B-water (1mk)

(ii) Calcium oxide/CaO (1mk)

(iii) to absorb unreacted/excess chlorine (1mk)

(iv) $2KMnO_{4(S)} + 16HCl_{(aq)} \longrightarrow 2KCl_{(aq)} + 2MnCl_{(aq)} + 8H_2O_{(l)} + 5Cl_{2(g)}$ (1mk)

(v) Solid C sublimes (1mk) hence collects on the cooler place away from heating.

(vi)

Elements present			
Mass/volume	0.675	1800	cm^3

R.A.M/M.G.V		24000cm^3
No of moles	$\frac{5}{}$ = 0.025	$\frac{0}{0}$= 0.075 ½mk
Mole ratio	$\frac{5}{5}$= 1	$\frac{5}{5}$ = 3 ½mk
	EF=$AlCl_3$ ½mk	

$(AlCl_3)_n$=267 ½mk

$(27 + 35.5 \times 3)_n = 267$

$n = \frac{267}{133.5} = 2$

M.F. = $(AlCl_3)_2 = Al_2Cl_6$ ½mk

(b)(i) - bleaching agent in pulp

-Used as herbicides Any one (1mk)

(ii)chlorine bleaches by addition of oxygen while sulphur iv oxide

C) Hydrogen chloride gas dissociates in water to form an acidic solution which produces gas with zinc carbonate (1mk) while in methylbenzene the gas remains molecular hence the solution has no acidic properties and does not react with zinc carbonate (1mk)

Bleaches by reduction (1mk)