

MARKING SCHEME

CHEMISTRY PAPER 2 ARISE AND SHINE TRIAL 1 EXAM March/April-2020

1.(a)(i) Fractional distillation √1

Any two

(ii) Molecular mass

1mk each

- density

- Boiling points

(b)(i). C_3H_6 √1

(ii). Shake a sample with bromine water √1, C_3H_8 do not decolourize √1 C_3H_6 decolourize √1 OR use acidified potassium permanganate C_3H_8 do not decolourize C_3H_6 decolourize (Reject chlorine)

Or

Burn a sample of C_3H_8 -burns with a non-luminous flame C_3H_6 -burns with a luminous flame

Or

Use acidified potassium dichromate- C_3H_8 do not decolourize

- C_3H_6 decolourize

(d)(i). Ethanol √1/ C_2H_5OH / CH_3CH_2OH √1

(ii). slightly soluble in water/insoluble in water

(d). Name-polythene/polyethen √1

Disadvantage-it is non-biodegradable poisonous gases when burn √ (Any one)

2.(a). Name the method that can be used to obtain pure iron (III) chloride from a mixture of iron (III) chloride and sodium chloride (1 mark)

Sublimation √1

(b). A student was provided with a mixture of sunflower flour, common salt and a red dye. The characteristics of the three substances in the mixture are given in the table below.

Substance	Solubility in water	Solubility in ethanol
Sunflower flour	Insoluble	Insoluble
Common salt	Soluble	Insoluble
Solid red dye	soluble	soluble

The student was provided with ethanol and any other materials needed. Describe how the student can separate the mixture into its three components. (3 marks)

Add ethanol $\sqrt{1/2}$

Filter $\sqrt{1/2}$

Evaporate $\sqrt{1/2}$

Add water $\sqrt{1/2}$

Filter $\sqrt{1/2}$

Evaporate $1/2$

(c) The diagram shows part of the periodic table. The letters do not represent the actual symbols of the elements. Use the diagram to answer the questions that follow.

								Q
R					K $\sqrt{1}$	V	W	
	Z						X	
Y			N					

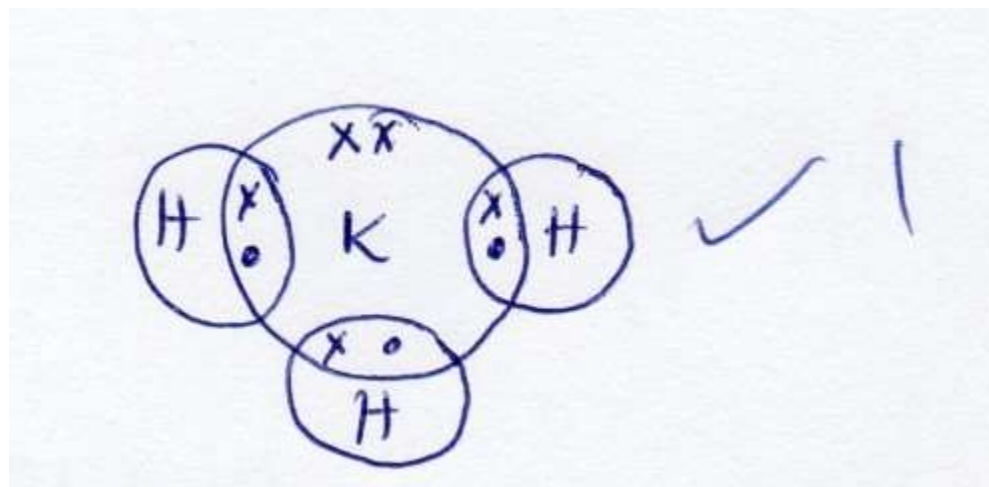
- (i). - W has a shorter atomic radius than X $\sqrt{1}$
 - W accepts electrons more readily than X $\sqrt{1}$
 - W has less energy levels than X
 - W has less screening effects than X Any two

(ii). – R has a higher m.p than \sqrt{T} . R has a giant metallic structure while T has a molecular structure/R has metallic bonds while R has eak $\sqrt{1}$ van der waals forces

(iii). –ZW₂ $\sqrt{1}$ penalize use of equation

(iv).

(v).



- (i) Q/He ✓1
 (ii) N/A ✓1

3(a). Purify to remove impurities $\frac{1}{2}$ ✓, bubble through $\frac{1}{2}$ ✓ NaOH/KOH to remove CO_2 , reduce the $\frac{1}{2}$ ✓ temp, to remove water vapor compress to liquefy the residual air, then fractional distillation to obtain oxygen at -180°C

- i) concentrated sulphuric (vi) acid ✓1
 ii) $\text{SO}_2(\text{aq}) + \text{H}_2\text{SO}_4(\text{l}) \longrightarrow \text{H}_2\text{S}_2\text{O}_7(\text{l})$ ✓1

c). (i). Platinum ✓1

(ii). It is cheap/cheaper ✓ $\frac{1}{2}$

Not easily poisoned/action stopped by impurities $\frac{1}{2}$

(d). Turns from blue to white. Forms white powder sulphuric (VI) ✓1 acid dehydrates copper (II) sulphate crystals/remove water of crystallization.

e). It is less volatile ✓1

(f). Manufacture of sulphate fertilizer/superphosphate fertilizer/production of Ray on making dyes/used in car batteries/As an electroly manufacture of soaps/detergents/cleaning of metals manufacture of pain HCL/HNO₃, Oleum. As a drying agent, as a dehydrating agent/manufacture of nylon AL₂SO₄/ALCOH₃/sulphate drugs, pigments

Any four $\frac{1}{2}$ each

4(a). Energy change that occurs when one mole of a substance is completely burnt in oxygen ✓1

(b). The energy changes in converting reactants to ✓1

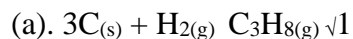
Products is the same regardless of the path in which the chemical change occurs

$$\Delta H^\ominus\text{C}(\text{Graphite}) = -393\text{kJ mol}^{-1}$$

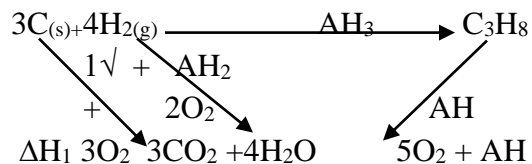
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$$\Delta H_{\text{C}}(\text{H}_2(\text{g})) = -286 \text{ kJ mol}^{-1}$$

$$\Delta H_{\text{f}}(\text{C}_3\text{H}_8(\text{g})) = -104 \text{ kJ mol}^{-1}$$



(II)



(iii). $\Delta H_4 = \Delta H_1 + \Delta H_2 - \Delta H_3$ √1
 $= (-393 \times 3) + (4 \times -286) - (-104)$

$$\Delta H_4 = -879 - 1144 + 104$$

$$\Delta H_4 = -1919 \text{ kJ mol}^{-1}$$

Penalize ½ for wrong missing unit

(d). - Availability

- Safety Any one

e). Dil HNO_3 and HCl √1 ionize fully in water while ethanoic acid partially ionizes √1

5.(a). It is a solution which cannot dissolve any more solute at a particular temperature √1

(b)(i) I-24g/100g of water √1

II- mass dissolved = 62g ½

- mass of undissolved = 80 - 62 = 18g √½

c). RFM of $\text{KNO}_3 = 39 + 14 + 16 \times 3$

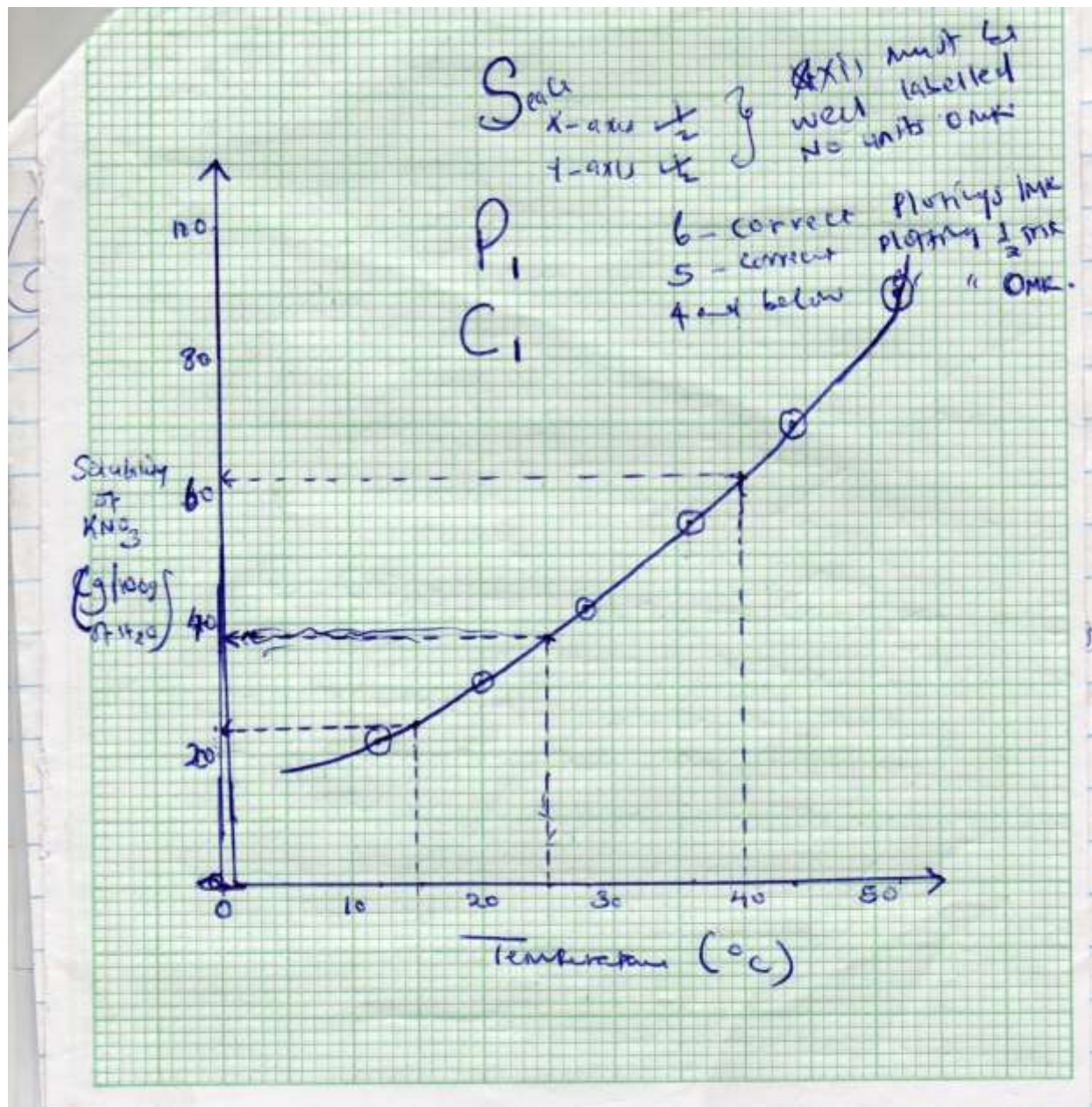
$$= 101 \sqrt{1/2}$$

Mole of KNO_3 at 18°C = $\frac{24}{101} \sqrt{1/2} = 0.2376 \sqrt{1/2}$ moles

$$101$$

$$\text{Molarity} = \frac{\text{no of moles} \times 1000}{\text{Volume}} = \frac{0.2376 \sqrt{1/2} \times 1000 \sqrt{1/2}}{100}$$

$$= 2.376 \text{ M KNO}_3 \sqrt{1/2}$$



- 6(a)(i) - preservative $\sqrt{1/2}$
 - Add taste/flavor $\sqrt{1/2}$

- (ii). Effervescence occur $\sqrt{1}$
 - CO₂ was dissolved under pressure $\sqrt{1}$

- (iii). - H₂CO₃ $\sqrt{1}$ penalize fully for an equation

(b)(i). $2\text{Zn}(\text{NO}_3)_2(\text{s}) \longrightarrow 2\text{ZnO}(\text{s}) + 4\text{NO}_2(\text{g}) + \text{O}_2(\text{g})$ penalize $\sqrt{1/2}$ for wrong /missing state Symbols

(ii). $\frac{5.76}{188.5} \times 0.03 \sqrt{1/2}$

Moles of $\text{NO}_2 = \frac{4 \times 0.03}{2} = 0.06 \sqrt{1/2}$

Moles of oxygen = $\frac{0.03 - 0.15}{2} \sqrt{1/2}$

Total moles = $(0.06 + 0.015) \sqrt{1/2} = 0.075$

Volume of gases = $0.075 \sqrt{1/2} \times 24 = 1.8 \text{dm}^3$ penalize $\sqrt{1/2}$ for wrong or missing units

c)(i). White solid $\sqrt{1}$ turns yellow on heating
the yellow $\sqrt{1}$ solid turns grey because zinc oxide is reduce to $\sqrt{1}$ zinc

(ii). $\text{ZnO}(\text{s}) + \text{CO}(\text{g}) \longrightarrow \text{Zn}(\text{s}) + \text{CO}_2(\text{g})$ –penalize $\sqrt{1/2}$ for missing/wrong state symbols
Penalize fully if equation is not balanced

7(a)(i) $\text{O}^{2-} \sqrt{1}$

(ii). $\text{CuCO}_3 \sqrt{1}$, $\text{ZnSO}_4 \sqrt{1}$

(b) $\text{Ba}^{2+}(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) \longrightarrow \text{BaSO}_4(\text{s})$ penalize a chemical
Penalize $\sqrt{1/2}$ for missing wrong st. symbols

c). - solution change from blue to colourless/fede $\sqrt{1}$
- a brown solid is formed $\sqrt{1}$ mg dissolves
- discharged of Cu^{2+} because Mg displaced $\sqrt{1}$ Cu^{2+} from the solution
- Apparatus become worn $\sqrt{1/2}$ is exothermic/heat given out

d)(i) Add excess PbO to $\sqrt{1/2}$ the HNO_3 and filter $\sqrt{1/2}$ add soluble sulphate /sulphuric acid to the filtrate. Filter to obtain $\text{PbSO}_4(\text{s})$ then dry the residue between filter papers

e)(i) determine mpt – if its pure mpt is sharp