

CHEMISTRY

Marking scheme

PAPER TWO

JULY/AUGUST 2026

1.(a) (i) Cracking ✓ 1

(ii) When the gas is burnt in air ✓ 1 it burns with a pale blue flame. ✓ 1

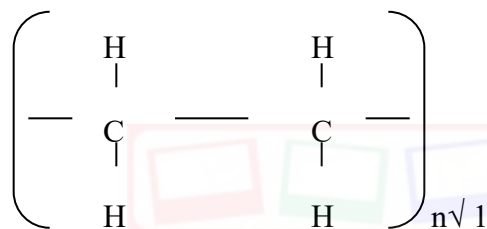
OR

Does not decolourize ✓ 1 purple acidified potassium manganate (VII). ✓ 1

(iii) I. A. Ethane ✓ 1

II. B 1-Chloroethane ✓ 1

(iv)



(v) (i) Combustion ✓ 1

(ii) Dehydration ✓ 1

(vi) Conc. H₂SO₄ ✓ 1

Temperature of 170°C. ✓ 1

(b) (i) Pent-2-ene ✓ 1

(ii) Prop-1-yne. ✓ 1

2. a) (i) Mass of Mg is 20.36-19.52=0.84g ✓ ½

Mass of MgO is 20.92-19.52=1.40g

Mass of oxygen is 20.92-20.36=0.56g ✓ ½

$$\% \text{ mass of Mg in MgO is } \frac{0.84}{1.40} \times 100\% \\ = 60\% \checkmark \frac{1}{2}$$

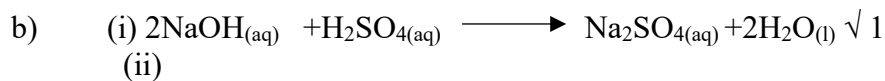
$$\% \text{ mass of O}_2 \text{ in MgO is } \frac{0.56}{1.40} \times 100\% \\ = 40\% \checkmark \frac{1}{2}$$

(ii)

| | | |
|----------|----|----|
| Elements | Mg | O |
| %comp | 60 | 40 |

| | | |
|------------|----------------------|----------------------|
| R. A. M | 24 | 16 |
| Moles | $60 \div 24$ =2.5 | $40 \div 16$ =2.5 |
| Mole ratio | $1 \sqrt{1}$ | $1 \sqrt{1}$ |

Empirical formula is thus $\text{MgO} \sqrt{1}$



I. Moles of H_2SO_4 in 20cm^3 is $\frac{20 \times 0.25}{1000}$
=0.005 moles $\sqrt{1}$

Mole ratio of base to acid is 2:1

Moles of NaOH is thus $\frac{2}{1} \times 0.005$
=0.01 moles of NaOH $\sqrt{1}$

II. Moles of NaOH in 1L is thus

$$\frac{0.01 \times 1000}{50} \sqrt{1}$$

=0.2 moles $\sqrt{1}$

III. Mass of NaOH in 1L is

$$0.2 \times 40 = 8\text{g}$$

$$\text{Mass of NaCl in the mixture is } 8.8 - 8 = 0.8\text{g} \sqrt{1}$$

$$\% \text{ mass of NaCl is } \frac{0.8}{8.8} \times 100\%$$

$$= 9.09\% \sqrt{1}$$

3. a) (i) Bonds Broken are $4\text{C-H} = 4 \times 413 = 1652$

$$1\text{C} = \text{C} = 1 \times 610 = 610$$

$$1\text{Br} - \text{Br} = 1 \times 193 = 193$$

$$\text{Total energy absorbed} = 2455 \text{ kJmol}^{-1} \sqrt{1}$$

Bonds formed are $4\text{C-H} = 4 \times 413 = 1652$

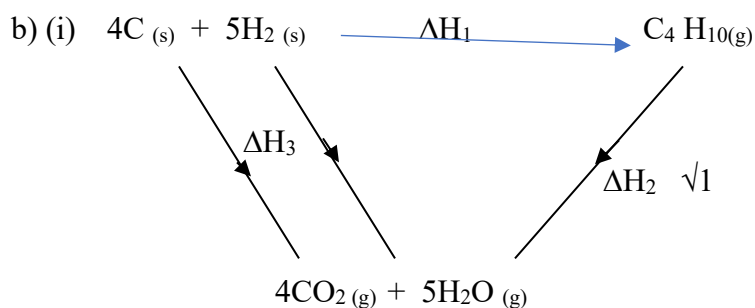
$$2\text{C} = \text{Br} = 2 \times 280 = 560$$

$$1\text{C} - \text{C} = 1 \times 346 = 346$$

$$\text{Total energy given out} = 2558 \text{ kJmol}^{-1} \sqrt{1}$$

$$\Delta H = 2455 - 2558 = -103 \text{ kJmol}^{-1} \sqrt{1}$$

(ii) Addition reaction $\sqrt{1}$



$$\begin{aligned} \Delta H_f^\circ(C_4H_{10}) &= \Delta H_3 - \Delta H_2 \\ &= 4(-393) + 5(-286) - (-2877) \quad \checkmark 1 \\ &= -3002 + 2877 \\ &= -125 \text{ kJmol}^{-1} \quad \checkmark 1 \end{aligned}$$

(ii) $\Delta H + \Delta H_{hyd}$

$$\begin{aligned} &= 690 + -322 + -364 \\ &= 690 - 686 \\ &= +4 \text{ kJ/mol} \end{aligned}$$

4. a) $\checkmark 1$

- i. Burette $\checkmark 1$
- ii. Pipette $\checkmark 1$
- iii. Measuring cylinder

b)

- i. Due to incomplete combustion, it produces white hot carbon particles that emits a lot of light $\checkmark 1$
- ii. It produces soot that makes apparatus dirty $\checkmark 1$
It does not produce much heat $\checkmark 1$

c)

- i. Nitrogen $\checkmark 1$ and oxygen $\checkmark 1$
- ii. It can be separated by physical means $\checkmark 1$
Components of air are not chemically combined $\checkmark 1$
- iii. Pass air through lime water ($Ca(OH)_2$) $\checkmark 1$ the lime water forms white precipitate indicating presence of carbon(IV)oxide $\checkmark 1$

5. (a) Alkali metals $\checkmark 1$

(b) Electron arrangement $2.8.5 \checkmark 1$
position: group V period 3 $\checkmark 1$

(c) The atom of R is larger $\checkmark \frac{1}{2}$ // has a larger atomic radius than the ion $\checkmark \frac{1}{2}$ This is because the ion of R is formed when the atom loses the electrons in the outermost energy level $\checkmark \frac{1}{2}$ therefore, the ion has one less energy level than the atom. $\checkmark \frac{1}{2}$

(d) (i) $P_2W \checkmark \frac{1}{2}$

(ii) $TY_4 \checkmark \frac{1}{2}$

(e) S has a higher $\checkmark \frac{1}{2}$ melting point than Q $\checkmark \frac{1}{2}$

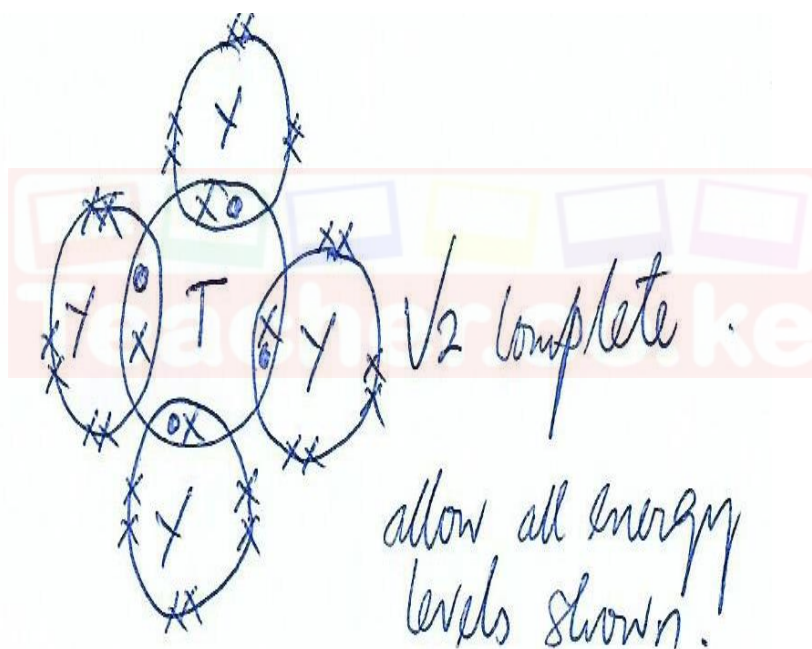
This is because e S has more valence electrons in its metallic structure hence a stronger metallic bond $\checkmark \frac{1}{2}$ than Q $\checkmark \frac{1}{2}$

(f) M $\checkmark 1$

It has a completely filled outermost energy level $\checkmark \frac{1}{2}$ and therefore, does not need to react with other elements to gain stability $\checkmark \frac{1}{2}$

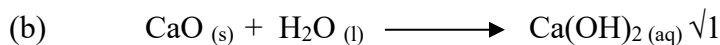
(g) S has a higher electrical conductivity than Q $\checkmark 1$.

S does not corrode easily like Q. $\checkmark 1$



(h)

6. (a) A – Ammonia $\checkmark 1$
B – Calcium oxide $\checkmark 1$



(c) Reaction is exothermic $\checkmark 1$

(d) Filtration $\checkmark 1$

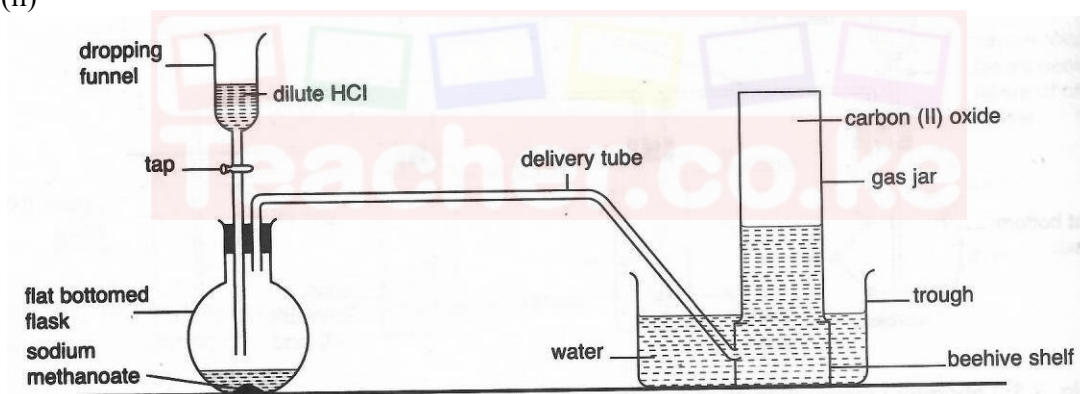
- (e) - Ammonia $\sqrt{1}$
 - Carbon (IV) oxide $\sqrt{1}$
- (f) (i) $C_{(s)} + 2H_2SO_{4(l)} \longrightarrow CO_{2(g)} + 2H_2O_{(l)} + 2SO_{2(g)}$ $\sqrt{1}$
 (ii) Oxidising property $\sqrt{1}$
- (g) - Manufacture of glass $\sqrt{1/2}$
 - Softening of hard water $\sqrt{1/2}$
 - Making of soaps and detergents
 - For making sodium hydrogen carbonate used in baking soda and fire extinguishers

(Any 2 correct answers each $\frac{1}{2}$ mk)

7.(a) (i)

| Substance | Carbon (IV) oxide | Carbon (II) oxide |
|-----------|--|--|
| K | Dilute hydrochloric acid $\sqrt{1/2}$ | Concentrated sulphuric (VI) acid $\sqrt{1/2}$ |
| L | Marble chips or calcium carbonate $\sqrt{1/2}$ | Sodium methanoate or ethanedioic acid (oxalic acid) $\sqrt{1/2}$ |

(ii)



Complete diagram = 1 mark, Labelling = 1 mark

- (iii) Carbon (IV) oxide reacts with lime water / calcium hydroxide solution $\sqrt{1/2}$ to yield white precipitate while carbon (II) oxide does not. $\sqrt{1/2}$
 Carbon (II) oxide burns $\sqrt{1/2}$ with blue flame while carbon (IV) oxide does not burn. $\sqrt{1/2}$
- (b) (i) $CO_{2(g)} + C_{(s)} \rightarrow 2CO_{(g)}$ $\sqrt{1}$
 (ii) Reducing agent in extraction of some metals from their oxides. $\sqrt{1}$
- (c) The bulb lights in set up I or conducts electricity while set up II does not. $\sqrt{1}$
 In graphite, three out of four valence electrons of carbon atom are bonded leaving one delocalised $\sqrt{1}$ electron thus conducts electricity while in diamond, all the four valence electrons are bonded and is without delocalised electrons. $\sqrt{1}$