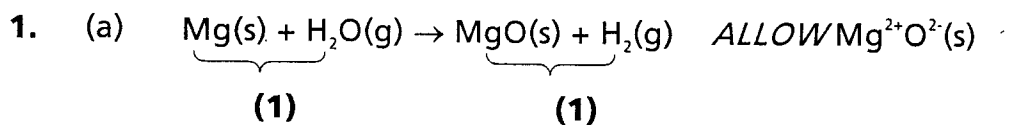


**Unit Test 6251/01**

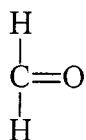


**2 marks**

(b) Oxidised/oxidation  
Gain oxygen/loss of electrons/ increase in O.N.

**1 mark**

2. (a) (i)



**1 mark**

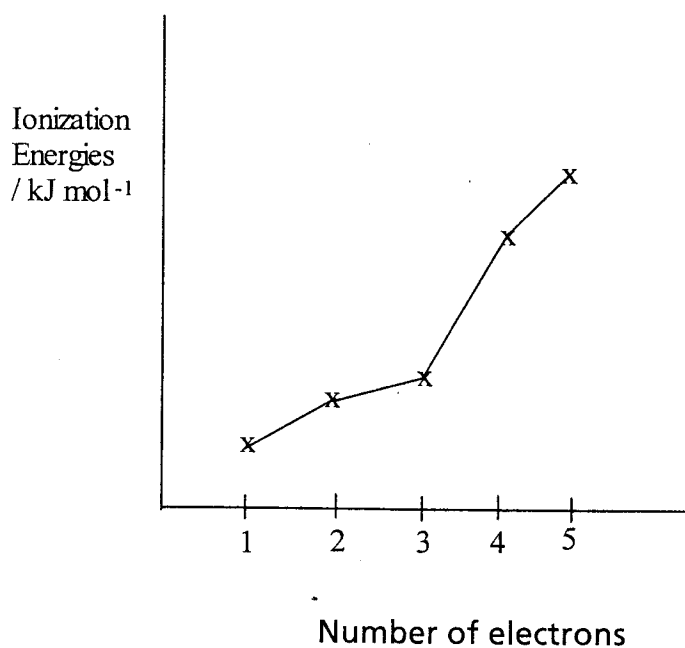
(ii)  $\text{HCO}_2\text{H}$ /  $\text{HCOOH}$   
*NOT* displayed formula

**1 mark**

(b) Sodium methoxide

**1 mark**

3.



General rise  
Big jump between 3<sup>rd</sup> and 4<sup>th</sup> ionization energies

**(1)**  
**(1)**  
**(2 marks)**

1. Aluminium is **more reactive**/higher in the reactivity series than iron (1)

But iron is **more reactive**/ higher in the reactivity series than copper (1)

*Can be stated in reverse "iron is less reactive than...." but comparison needed..* (2 marks)

**TOTAL FOR SECTION A: 10 MARKS**



- (a) Different numbers of neutrons (1)  
 Same number of protons/electrons (1)  
**2 marks**
- (b) Number of moles of acid =  $\frac{25 \times 1.0}{1000}$  (= 0.025) Stage 1 (1)  
 Amount of hydrogen =  $0.5 \times 0.025$  *ie stage 1*  $\times 0.5$  Stage 2 (1)  
 Volume of hydrogen =  $0.0125 \times 24$  *ie stage 2*  $\times 24$  (1)  
 =  $0.30 \text{ dm}^3/300 \text{ cm}^3$  (1)  
**3 marks**
- (c) (i) The hydrogen spectrum consists of (separate) lines (1)  
 Sunlight / a filament lamp gives a continuous/rainbow spectrum (1)  
**2 marks**
- (ii) Look for any indication of energy levels which implies  
 quantisation eg  
 Electrons can only have certain energies in (hydrogen)  
 atoms/energy is quantised. (1)  
**1 mark**
- (d) A hydrogen atom is larger than a hydrogen ion because the hydrogen (1)  
 ion has lost its electron (shell) (1)  
*OR*  
 A hydrogen ion is (much) smaller than a hydrogen atom (1)  
 Because it has lost its electron(shell) (1)  
*OR*  
 A **hydride/H<sup>-</sup>** ion is larger (1)  
 because there is an extra electron and electrons **repel**. (1)  
**2 marks**

**Total 10 marks**



(ii) Ceramic fibre/cotton/glass/mineral wool soaked in butan-1-ol. (1)

Aluminium oxide/pumice/ $Al_2O_3$  (1)

Heat at aluminium oxide – *must be under some of  $Al_2O_3$*   
*ACCEPT Arrow with word heat* (1)

Collection over water. (1)

If phosphoric/sulphuric acid method used.

Round bottom/ pear shaped flask/side-arm boiling tube and butan-1-ol (1)

Heat (1)

Concentrated phosphoric/sulphuric acid (1)

Collection over water (1)

Penalties

Poor diagram –1

Sealed apparatus –1

**4 marks**

(b) but-1-ene but-2-ene  
 (1) (1)

*ALLOW* cis-but-2-ene AND trans-but-2-ene for (2)

**2 marks**

**Total 8 marks**

- (a) (i)  $\text{Na}^+ \text{Cl}^-$  **1 mark**
- (ii)  $1s^2 2s^2 2p^6$  **1 mark**
- (iii)  $\begin{array}{c} \text{oo} \text{ (-)} \\ \text{8Cl} \\ \text{ox} \end{array}$  **1 mark**
- (b) (i) Ethanoic acid is only slightly/partially/less than 1% ionized/dissociated/does not fully ionize. **1 mark**
- (ii) Weak **1 mark**
- (c)  $\text{H}_2\text{O}(\text{l}) \text{H}^+/\text{H}_3\text{O}^+(\text{aq})$  and  $\text{OH}^- (\text{aq})$  **3 marks**
- (d) (i) Covalent **(1)**  
Does not conduct (electricity)/ poor conductor **(1)**  
**2 marks**
- (ii)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$  **1 mark**

**Total 11 marks**

9. (a) (i)  $84 \text{ g mol}^{-1}$  **1 mark**
- (ii)  $0.1 \times 84 = 8.4 \text{ g}$  **1 mark**
- (iii) Add in small amounts/ gradually or large container to prevent frothing (over). **(1)**  
**(1)**  
**2 marks**
- (iv) Heat energy =  $4.18 \times 25 \times 6.0$  **(1)**  
 $= 630/627 \text{ J} / 0.630/0.627 \text{ kJ}$  **(1)** **2 marks**
- (v)  $\frac{25 \times 0.10}{1000} = 0.0025$  **1 mark**
- (vi)  $\Delta H^\ominus = \frac{-630}{0.0025}$   
 $= -250000 \text{ J mol}^{-1}$  OR  $-250 \text{ kJ mol}^{-1}$   
Value **(1)**  
Sign, sig figs and units **(1)** **2 marks**
- (b) (i)  $\Delta H^\ominus = \Delta H_1^\ominus - \Delta H_2^\ominus$  **1 mark**
- (ii)  $\Delta H^\ominus = -250 - (+20)$   
 $= -270/271 \text{ kJ mol}^{-1}$   
Value **(1)**  
Sign and units **(1)** **2 marks**
- (c) **Carbon dioxide** produced **(1)**  
causes cakes/bread/food/product/mixture to rise **(1)**  
**2 marks**

Total 14 marks

**TOTAL FOR SECTION B: 50 MARKS****TOTAL FOR PAPER: 60 MARKS**