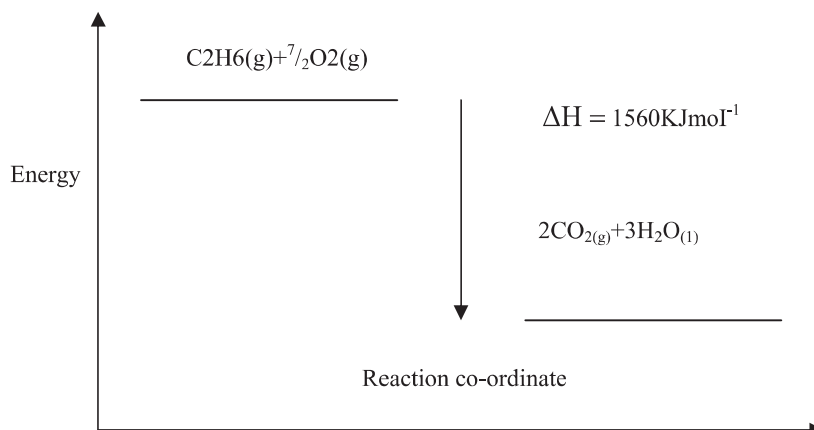


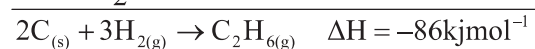
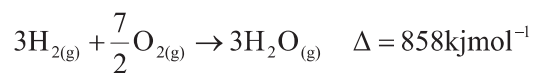
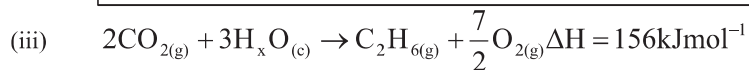
Heat of formation of water.

(2 marks)

(ii)



(3 marks)



or if compressed

(2 marks)

(iv) I. Heat change =  $\frac{500 \times 21.5 \times 4.2}{1000}$  kJ  
= 45.15 kJ

II. No. of moles of ethane

$\frac{45.15}{1560} = 0.0289423$  moles

Therefore mass of ethane =  $0.0289423 \times 30\text{g}$   
= 0.868269g  
= 0.9g

(4 marks)

### 30.6.3 Chemistry Paper 3 (233/3)

#### Procedure A

Table 1

Time (min)	0	½	1.0	1.5	1.0	2.5	3.0	3.5	4.0	4.5	5.0
Temperature (°C)	19	18.5	18.0	18.0	18.0	X	13.0	13.0	13.5	13.5	14.0

(5 marks)

(3 marks)

(ii)  $\Delta T = 6^{\circ}\text{C}$  (1 mark)

(iii)  $\Delta H = 20 \times 4.2 \times 6$   
 $= 504 \text{ joules}$  (2 marks)

**Procedure B**

**Table 2**

	I	II	III
Final burette reading	16.5	32.20	32.20
Initial burette reading	0.0	16.0	16.0
Titre ( $\text{cm}^3$ )	16.5	16.20	16.20

(3 marks)

(i)  $\frac{16.2 + 16.2}{2} = 16.2 \text{ cm}^3$  (1 mark)

(ii) I  $\frac{16.2 \times 0.1}{1000} = 0.00162\text{m}$  (1 mark)

II Moles of HCl = Moles of NaOH  
 $= 0.00162$  (1 mark)

III  $0.00162 \times 10 = 0.0162\text{m}$  (1 mark)

IV  $\frac{20 \times 2}{1000} = 0.04$  (1 mark)

V  $0.04 - 0.00162 = 0.00238$  (1 mark)

(c)  $0.0238 \text{ moles} = 504$

1 mole  $= \frac{504}{0.0238} \times \frac{1}{1000}$   
 $= +21.176 \text{ kJmol}^{-1}$  (2 marks)

2.

Observations	Inferences
(a) <ul style="list-style-type: none"> <li>Green solid turned black.</li> <li>Colourless liquid condenses on cool part water of crystallization.</li> <li>Blue litmus paper turned pink.</li> <li>Red litmus paper remains the same.</li> </ul>	<ul style="list-style-type: none"> <li>Solid d is hydrated or contains water of crystallization.</li> <li>Acidic gas is produced</li> </ul> <p>(3 marks)</p>
(b) <ul style="list-style-type: none"> <li>No effervescence.</li> <li>Black solid reacts to form a green solution.</li> </ul>	<ul style="list-style-type: none"> <li>Black solid is basic.</li> <li>Coloured ion present i.e <math>\text{Fe}^{2+}</math> or <math>\text{Cu}^{2+}</math>.</li> </ul> <p>(2 marks)</p>
(c) (i) <ul style="list-style-type: none"> <li>Blue precipitate formed.</li> <li>Re-dissolves in excess to form a deep. blue/Royal blue solution.</li> </ul>	<ul style="list-style-type: none"> <li><math>\text{Cu}^{2+}</math> present.</li> </ul> <p>(2 marks)</p>

<i>Observations</i>	<i>Inferences</i>
(ii) <ul style="list-style-type: none"> <li>▪ Effervescence occurs.</li> <li>▪ Brown solid deposited.</li> <li>▪ Colourless formed.</li> <li>▪ Green solution turns.</li> <li>▪ Test-tube gets warm.</li> </ul>	<ul style="list-style-type: none"> <li>▪ E is a metal more reactive than copper or E displaces Copper or E reduces <math>\text{Cu}^{2+}</math> to Cu.</li> </ul> <p style="text-align: right;"><i>(2 marks)</i></p>
3. (a) Yellow smoky flames/sooty flame.	F is long chain hydrocarbon or an unsaturated organic compound. <i>(1 mark)</i>
(b) Dissolves to form a colourless.	It is probably a soluble salt or Polar organic compound. <i>(2 marks)</i>
(c) (i) <ul style="list-style-type: none"> <li>▪ Effervescence occurs.</li> <li>▪ Colourless gas given out.</li> </ul>	Compound is acidic – $\text{COOH}$ or $\text{H}^+$ or $\text{H}_3\text{O}^+$ <i>(2 marks)</i>
(ii) Orange/Yellow colour persists.	Absence of Hydroxyl group. <i>(2 marks)</i>
(iii) $\text{KMnO}_4(\text{aq})$ is decolourised.	$\diagdown$ C = C or $\text{--C}\equiv\text{C--}$ $\diagup$ present. <i>(2 marks)</i>