

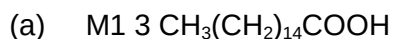
Name of the Student: _____

Max. Marks : 19 Marks

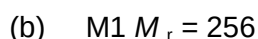
Time : 19 Minutes

Mark Schemes

Q1.

*Penalise additional product(s) once*

2



$$\text{M2 } n(\text{CH}_3(\text{CH}_2)_{14}\text{COOH}) = \frac{0.387}{\text{M1}} = 1.51 \times 10^{-3}$$

$$\text{M3 } Q = 150 \times 4.18 \times 13.6 = 8527.2 \text{ (J)}$$

$$\text{M4 } \Delta H = \frac{\text{M3}}{\text{M2}} \div 1000 = (-)5641$$

$$\text{M5 } \Delta H = -5640 \text{ kJ mol}^{-1}$$

Must be negative and 3sf (allow ecf on M4)

5

*Allow Less negative (value) / Lower**Allow products of incomplete combustion*

2

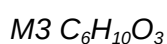
(d)

		C	H	O	S
		37.08	5.15	24.72	M1 = 33.05
M2	$\div A_r$	= 3.09	= 5.15	= 1.55	= 1.030
	$\div$ smallest	= 3	= 5	= 1.50	= 1
M3	Empirical formula = $\text{C}_6\text{H}_{10}\text{O}_3\text{S}_2$				

M1 % S = 33.05

*M2 Calculation of moles**M3 Ratio of moles AND Empirical Formula**If no Sulfur used ecf for M2 and M3*

M2 3.09 : 5.15 : 1.55



3

(e) M1 Acid rain
Allow smog

M2 SO₂
Allow NO_x

2

(f) M1 Bonds broken = 9459 kJ mol⁻¹
(5C-C + 7C-O + 7C-H + 5O-H)
Allow if they cancel the common bonds
M1 4233

M2 Bonds formed = 9682 kJ mol⁻¹
(2C-C + 10C-H + 2C-O + 2O-H + 4C=O)
M2 4456

M3 $\Delta H = M1 - M2 = -223 \text{ kJ mol}^{-1}$
M3 can be awarded as ecf from their M1 and M2

3

(g) M1 $\Delta H = -235 - (2 \times -394) - (3 \times -242)$
M2 = +1279 kJ mol⁻¹
If no sign assume positive

2

[19]