

Name of the Student: _____

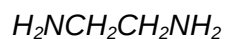
Max. Marks : 21 Marks

Time : 21 Minutes

Mark Schemes

Q1.

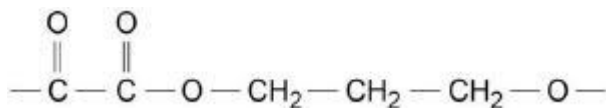
A



[1]

Q2.

(a)



M1 ester link including C-O-C

ignore brackets and 'n'

allow (CH₂)₃

*-O- at either end but **not** both*

1

M2 rest of structure including trailing bonds

***not** M2 if more than one repeating unit*

***allow** for one mark -OCCOOCH₂CH₂CH₂- as long as trailing bonds included*

1

(b) polyesters: C=O/C-O **OR** polar bonds / chain **AND**
polyalkenes: (only) C-C **OR** non-polar bonds / chain

***not** just 'polyesters are polar'*

***not** M1 if C=C mentioned*

1

(polyesters) susceptible to nucleophilic attack / can be hydrolysed

1

(c) **M1** amount of Na₂C₂O₄ = $\frac{0.162}{134.0} = 0.00121 \text{ mol}$

M1 x $\frac{2}{5}$

1

M2 stoichiometry $\left(\frac{2}{5}\right)$ (4.84 x 10⁻⁴)

1

M3 scaling (÷10)

$$= 0.00121 \times \frac{2}{5} \div 10 = 4.84 \times 10^{-5} \text{ mol}$$

M2 ÷ 10 (conc/40)

M3 x $\frac{1000}{23.85}$

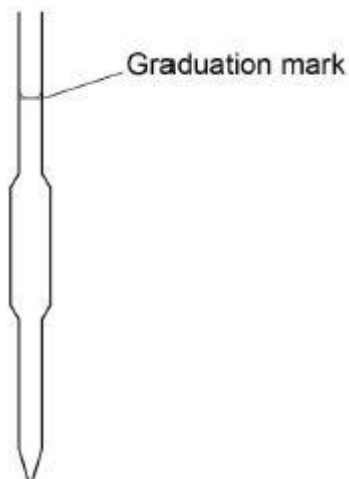
1

M4 concentration of MnO₄⁻ = $\frac{4.84 \times 10^{-5}}{\frac{23.85}{1000}} = 0.00203 \text{ mol dm}^{-3}$

Min 2 sig figs

1

(d)



Meniscus curved with the bottom of the curve on the horizontal line

1

(e) (burette) fill below/at eye level

ignore make sure tap closed / funnel / gloves

1

(solution) wear gloves

allow wash/rinse hands after any spillage **not** fume cupboard

ignore lab coat / stir carefully

1

(f) colourless to pink/pale purple

not just purple

not 'clear' for 'colourless'

1

(g) remove funnel

1

ensure jet is filled / no (air) bubbles

allow open tap to fill space below tap

1

(h)

This question is marked using Levels of Response. Refer to the Mark Scheme Instructions for Examiners for guidance.	
Level 3 5-6 marks	All stages are covered and each stage is generally correct and virtually complete. Answer is communicated coherently and shows a logical progression from Stage 1 to Stages 2 and 3 Covers at least 2 point for stage 1, 1 for stage 2 and 2 for stage 3. If given equation must show correct stoichiometry for six marks
Level 2 3-4 marks	All stages are covered but stage(s) may be incomplete or may contain inaccuracies OR two stages are covered and are generally correct and virtually complete. Answer is communicated mainly coherently and shows a logical progression from Stage 1 to Stages 2 and 3.

Level 1 1-2 marks	Two stages are covered but stage(s) may be incomplete or may contain inaccuracies OR only one stage is covered but is generally correct and virtually complete. Answer includes isolated statements but these are not presented in a logical order.
Level 0	Insufficient correct chemistry to gain a mark.

Stage 1 - ΔH

1a ΔH negligible

1b make & break same number of bonds 1c make & break same type of bonds / bonds have similar enthalpies

Stage 2 - ΔS

2a increase in entropy

2b increase in particles in solution / from 4 to 7 particles (ecf from incorrect equation showing increase in no. of moles)

Stage 3 - ΔG

3a $\Delta G = \Delta H - T\Delta S$

3b ΔG negative (for forward reaction)

3c correct discussion of why ΔG is negative based on ΔH and $T\Delta S$

6

[20]