

**AQA – Polymers – A2 Chemistry P3**

1. June/ 2020/Paper\_3/No.29

Which forms a polymer with  $\text{ClOC}(\text{CH}_2)_8\text{COCl}$ ?**[1 mark]****A**  $\text{NH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ **B**  $(\text{CH}_3\text{CO})_2\text{O}$ **C**  $\text{CH}_3\text{CH}_2\text{CONH}_2$ **D**  $\text{NH}_2\text{CH}_2\text{COOH}$ 

2. June/ 2019/Paper\_3/No.28

Which polymer has hydrogen bonding between its chains?

**[1 mark]****A** Kevlar**B** Polythene**C** PVC**D** Terylene

## 3. June/2021/Paper\_3/No.1

0 1

This question is about ethanedioic acid ( $\text{HOOC}\text{COOH}$ ) and the ethanedioate ion ( $\text{OOC}\text{COO}^-$ ).

0 1 . 1

Ethanedioic acid reacts with propane-1,3-diol ( $\text{HOCH}_2\text{CH}_2\text{CH}_2\text{OH}$ ) to form a polyester.

Draw the repeating unit of this polyester.

[2 marks]

0 1 . 2

Explain why polyesters are biodegradable but polyalkenes are not biodegradable.

[2 marks]

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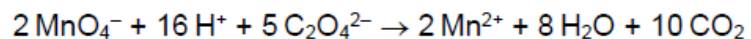
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0 1 . 3

Sodium ethanedioate is used to find the concentration of solutions of potassium manganate(VII) by titration. The equation for this reaction is



A standard solution is made by dissolving 162 mg of  $\text{Na}_2\text{C}_2\text{O}_4$  ( $M_r = 134.0$ ) in water and making up to  $250 \text{ cm}^3$  in a volumetric flask.

$25.0 \text{ cm}^3$  of this solution and an excess of sulfuric acid are added to a conical flask. The mixture is warmed and titrated with potassium manganate(VII) solution. The titration is repeated until concordant results are obtained. The mean titre is  $23.85 \text{ cm}^3$

Calculate the concentration, in  $\text{mol dm}^{-3}$ , of the potassium manganate(VII) solution.

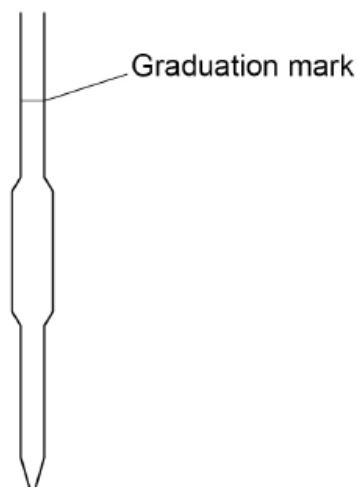
**[4 marks]**

Concentration \_\_\_\_\_  $\text{mol dm}^{-3}$

0 1 . 4

Figure 1 shows the 25.0 cm<sup>3</sup> pipette used to measure the sodium ethanedioate solution.

Figure 1



On Figure 1, draw the meniscus of the solution when the pipette is ready to transfer 25.0 cm<sup>3</sup> of the sodium ethanedioate solution.

[1 mark]

0 1 . 5

Potassium manganate(VII) is oxidising and harmful.  
Sodium ethanedioate is toxic.

Suggest safety precautions, other than eye protection, that should be taken when:

- filling the burette with potassium manganate(VII) solution
- dissolving the solid sodium ethanedioate in water.

[2 marks]

Filling the burette \_\_\_\_\_

\_\_\_\_\_

Dissolving the solid \_\_\_\_\_

\_\_\_\_\_

0 1 . 6

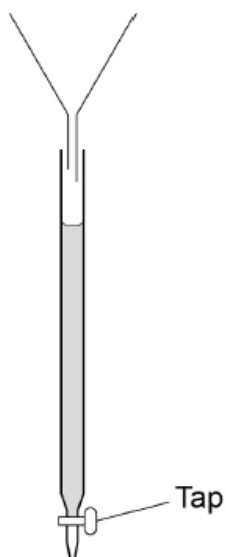
State the colour change seen at the end point of each titration.

[1 mark]

\_\_\_\_\_

0 1 . 7 Figure 2 shows the burette containing potassium manganate(VII) solution.

Figure 2



Give **two** practical steps needed before recording the initial burette reading.

[2 marks]

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_





4. June/2021/Paper\_3/No.23

Which compound has *E-Z* isomers?

[1 mark]

A  $\text{CH}_2=\text{CHBr}$

B  $\text{CH}_2=\text{CBr}_2$

C  $\text{CHBr}=\text{CHBr}$

D  $\text{CBr}_2=\text{CHBr}$

5. June/2021/Paper\_3/No.24

Which polymer has hydrogen bonding between the polymer chains?

[1 mark]

A Kevlar

B PVC

C poly(phenylethene)

D Terylene

6. June/2021/Paper\_3/No.34

Which type of polymer is **not** hydrolysed by heating with concentrated aqueous sodium hydroxide?

[1 mark]

A poly(alkene)

B poly(amide)

C poly(ester)

D protein