



Name: _____

Class: _____

CHEMISTRY STRUCTURED REMEDIAL
TOPIC: ORGANIC CHEMISTRY
(ALCOHOL AND CARBOXYLIC ACID)

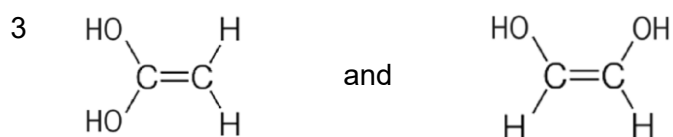
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Multiple Choice Questions (Time allocation: 12 min)

1 Which pairs of molecules are constitutional isomers?

1 $\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)_2$ and $(\text{CH}_3)_4\text{C}$

2 propanoic acid and methyl ethanoate



A 1, 2 and 3

B 1 and 2 only

C 1 and 3 only

D 2 and 3 only

2 How many alcohol isomers are there with the molecular formula $\text{C}_3\text{H}_8\text{O}_2$?

A 4

B 5

C 6

D 7

3 What is the minimum number of moles of oxygen molecules required for the complete combustion of one mole of propanol?

A 3.0

B 4.5

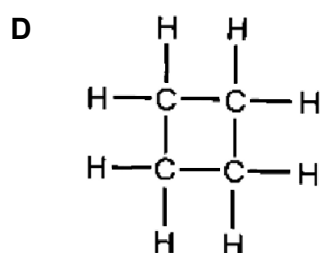
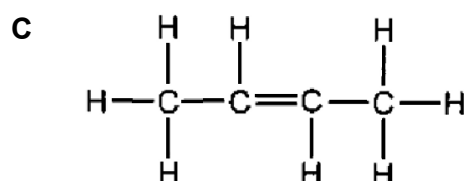
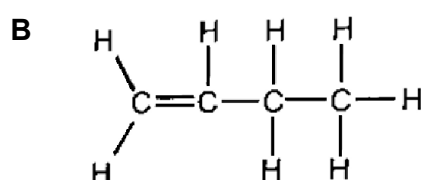
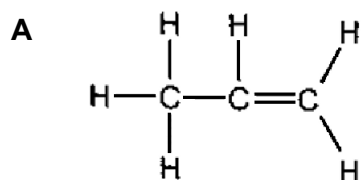
C 5.0

D 8.0

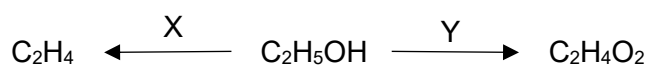
4 Compound Y

- has the empirical formula CH_2
- has an M_r of 56.0
- forms two alcohols that have different structural formulae when reacted with steam

What is compound Y?



5 The diagram shows the products of two reactions of ethanol, $\text{C}_2\text{H}_5\text{OH}$.



Which types of reaction are reaction X and Y?

	X	Y
A	elimination	oxidation
B	elimination	reduction
C	reduction	elimination
D	oxidation	elimination

- 6** Pentaerythritol is used as an intermediate in the manufacture of paint. It has the molecular formula $C_5H_{12}O_4$ and contains four primary alcohol groups.

After prolonged heating under reflux with an excess of $Cr_2O_7^{2-}/H^+$, it forms compound X which also has five carbon atoms.

What is the molecular formula of compound X?

- A** $C_5H_4O_8$
- B** $C_5H_4O_4$
- C** $C_5H_8O_4$
- D** $C_5H_8O_8$

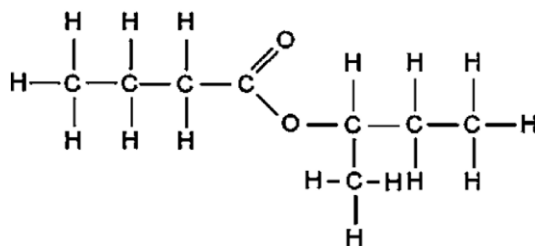
- 7** An ester of molecular formula $C_4H_8O_2$ was produced by the reaction of an alcohol with a carboxylic acid.

	alcohol	acid
1	methanol	propanoic acid
2	ethanol	ethanoic acid
3	propanol	methanoic acid

Which of the following could be the alcohol and the acid?

- A** 1, 2 and 3
- B** 1 and 2 only
- C** 1 and 3 only
- D** 2 only

- 8 An ester has the structure shown.



Which two compounds will react together to form this ester?

- 1 butanoic acid
- 2 3-methylbutanoic acid
- 3 butan-2-ol
- 4 2-methylbutanol

- A** 1 and 3
- B** 1 and 4
- C** 2 and 3
- D** 2 and 4

Time allocation: 4.5 min

- 9 Put a tick (✓) in each of the correct boxes to show in which of the following would a reaction occur.

	ethene	ethanol	ethanoic acid
$\text{Br}_2(\text{aq})$, rtp in the dark			
$\text{KMnO}_4(\text{aq})$, dilute H_2SO_4 , heat			
$\text{K}_2\text{Cr}_2\text{O}_7(\text{aq})$, dilute H_2SO_4 , heat			
$\text{Na}(\text{s})$, rtp			
$\text{NaOH}(\text{aq})$, rtp			
$\text{Na}_2\text{CO}_3(\text{s})$, rtp			

[Total: 3]

Time allocation: 9 min

- 10** A student is given two unlabelled bottles containing colourless liquids.

One of the liquids is butan-1-ol and the other one is butanoic acid.

The student identified two different simple chemical tests that would distinguish between each of the two substances.

- (a)** Describe the reagents and conditions for a chemical test that gives a positive result only with butan-1-ol. Describe what would be observed and write a balanced chemical equation for the reaction occurring.

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[3]

- (b)** Describe the reagents and conditions for a chemical test that gives a positive result only with butanoic acid. Describe what would be observed and write a balanced chemical equation for the reaction occurring.

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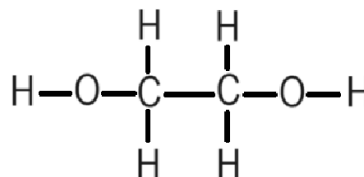
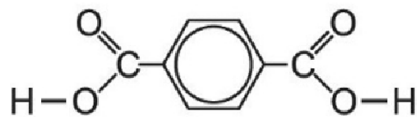
[3]

[Total: 6]

Time allocation: 4.5 min

- 11 The polymer poly(ethylene terephthalate) is also known as PET.

It is made from the two monomers shown.



PET is a thermoplastic polymer which can be used for making bottles.

- (a) Draw **one** repeat unit of PET.

[1]

- (b) State the type of polymerisation that produces PET.

[1]

- (c) Name the bond formed during this polymerisation and suggest why PET should **not** be used for storing alkaline cleaning materials.

[1]

[Total: 3]