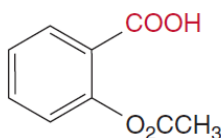


1. A hydrocarbon is a gas at room temperature. When 1 mole of the compound burns in air, 2 mole of CO₂ are produced. When it is bubbled into bromine water, the bromine loses colour. Which of the following compounds could it be?
- a) C₂H₅OH b) CH₂CHCH₃
- c) CH₃CH₃ d) CH₂CH₂

2. Aspirin, whose structure is shown, contains which functional groups?

- a) A ketone and an alcohol
b) An ester and a ketone
c) An ester and a carboxylic acid
d) A ketone, alcohol and ester



3. From the list of 4 compounds below, identify the compound that is NOT an isomer of any other compound in the list.

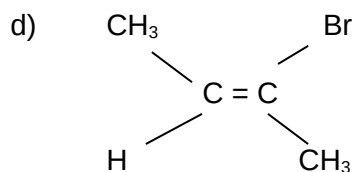
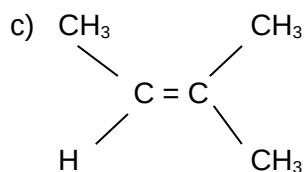
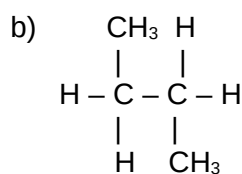
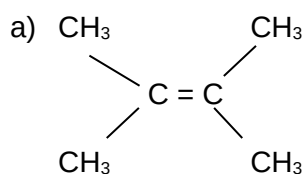
Butanoic acid, butanal, methylpropanoate, ethylethanoate

- a) Butanoic acid
b) Butanal
c) Methylpropanoate
d) Ethylethanoate

4. Which of the following pure substances will have the highest melting point?

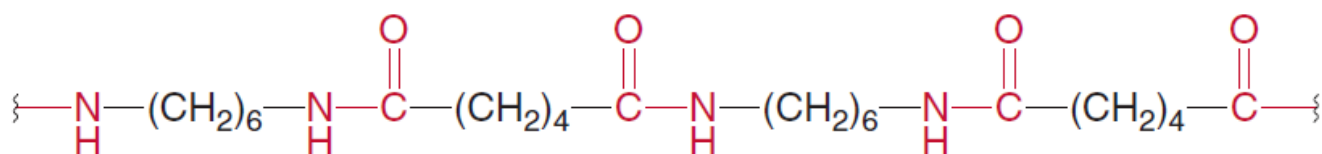
- a) Ethane
b) Ethanal
c) Ethanoic acid
d) Ethanol

5. Which of the following compounds can have geometric isomers?



6. A student labelled an organic compound 1-bromo-2,2-dimethylethane, but the name was incorrect according to IUPAC standards. The correct name would be
- 2-dimethyl – 1 – bromoethane
 - 1-bromo-2-methylpropane
 - 2-methyl-3-bromopropane
 - 1,1-dimethyl-2-bromoethane
7. Which of the following substances would you expect to be most soluble in water?
- 1-butanol
 - Pentane
 - Propanone
 - Methylpropanal
8. Which of the following statements is FALSE?
- Oxidation of 1-butanol with potassium permanganate produces butanal and subsequently butanoic acid
 - Oxidation of 2-butanol with potassium permanganate produces 2-butanone
 - Methane when treated with hydrogen chloride produces chloromethane and hydrogen gas
 - Ethanoic acid reacts with magnesium to produce hydrogen gas.

Study the section of polymer below to answer questions 9 and 10:

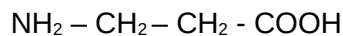


9. This segment is probably part of
- A polyester
 - A polyamine
 - A polypeptide
 - A polycarbide
10. A monomer from the polymer could be:

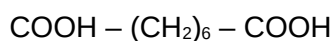
a)



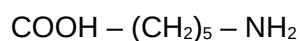
b)



c)



d)



END OF MULTIPLE CHOICE



Year 12 Chemistry

Organic Chemistry Test 2016

Student Name:

Teacher:

- 60 minutes working time
- Non-programmable calculator and data sheet allowed.

Multiple Choice	Short Answer	Extended Answer	Total	
10	23	27	60	

Section I – Multiple Choice

Mark your choice with a cross (X). Please do not circle your answer.

- | | | | | |
|-----|---|---|---|---|
| 1. | A | B | C | D |
| 2. | A | B | C | D |
| 3. | A | B | C | D |
| 4. | A | B | C | D |
| 5. | A | B | C | D |
| 6. | A | B | C | D |
| 7. | A | B | C | D |
| 8. | A | B | C | D |
| 9. | A | B | C | D |
| 10. | A | B | C | D |

Section II – Short Answer Questions

Question 1

Identify the **organic** reactants that could be used to produce each of the following organic compounds (name or chemical formula):

Compound	Reactants
Butanone	
2-bromopropane	
Ethylheptanoate	

[3 marks]

Question 2

Give the correct IUPAC name or complete structural formula for the following compounds:

IUPAC Name	Structural Formula
2-amino-3-hydroxy-pentanoic acid	
	$\begin{array}{c} \text{CH}_2 - \text{CH} - \text{CH}_2 - \text{CHO} \\ \quad \\ \text{F} \quad \text{Br} \end{array}$
	$\begin{array}{c} \text{CH}_2 = \text{CH} - \text{CH} - \text{CH}_2 - \text{CH}_3 \\ \\ \text{CH}_2 - \text{CH} - \text{CH}_3 \\ \\ \text{CH}_3 \end{array}$
2,4-dimethyl-cyclohexanol	

--	--

[4 marks]

Question 3

Write balanced equations for the following reactions:

a) Combustion of octene in a plentiful supply of air.

[2 marks]

b) The reaction between ethanoic acid and solid sodium carbonate.

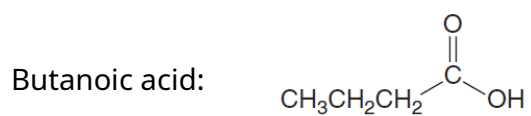
[2 marks]

c) The reaction between potassium dichromate with ethanal.

[3 marks]

Question 4

The molecular formula $C_4H_8O_2$ can represent the molecule shown below:



There are many isomers of this molecule. Draw **two** that are esters and **one** that is a carboxylic acid.

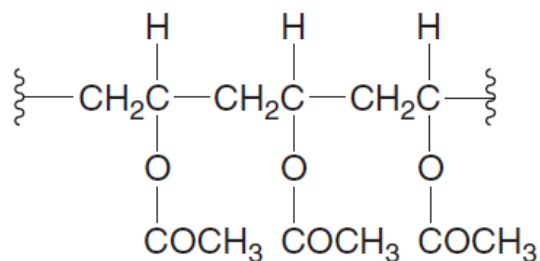
	Structure
Ester	
Ester	
Carboxylic acid	

Question 5

a) What is a monomer?

[1 mark]

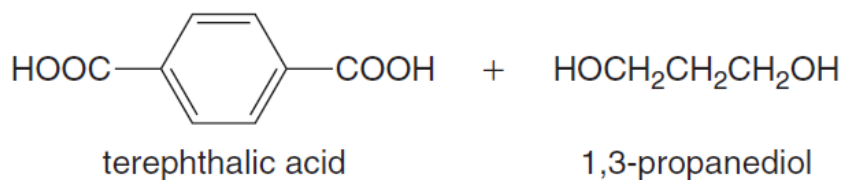
b) Poly vinyl acetate is a soluble polymer with the following structure.



c) Draw the structure of the monomer responsible for the polymer.

[2 marks]

d) The structural formulae for terephthalic acid and 1,3-propanediol are shown below:



Using these monomers draw a section polymer showing exactly two complete repeating units.

[2 marks]

e) State the type of polymerization involved in this reaction:

Section III – Extended Answer Questions

Question 6

Amino acids form polymers through peptide linkages.

- a) Connect two **alanine** molecules with a peptide link.

[2 marks]

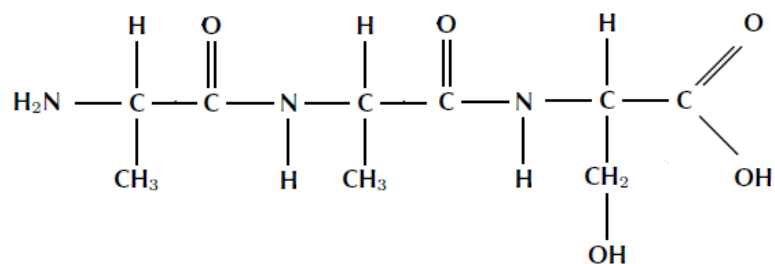
- b) Amino acids exist as zwitterions. Rewrite **alanine** as it would be found at the pH values indicated below:

pH	Structure of Alanine
3	
7	
10	

--	--

[3 marks]

- c) Circle and name the three amino acids that have been used to make the polypeptide shown below.



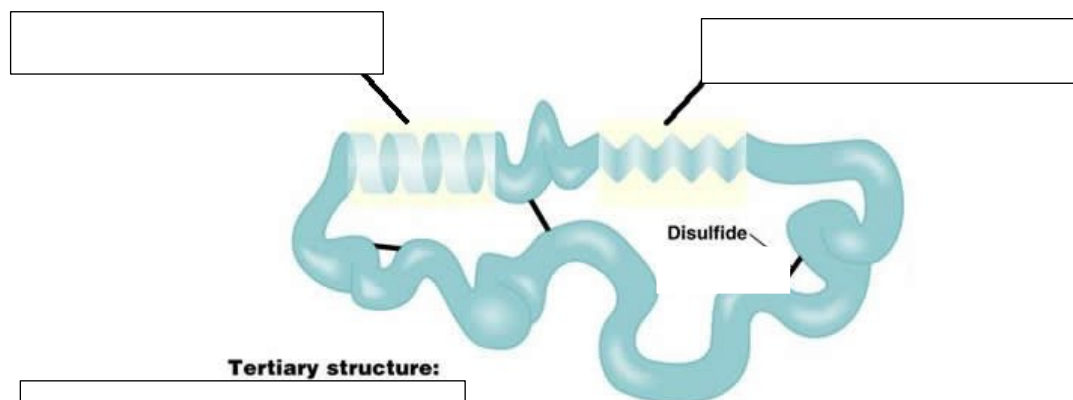
[3 marks]

- d) Explain the following with regard to protein structure and explain how each structure is held together.

Primary	
Secondary	
Tertiary	

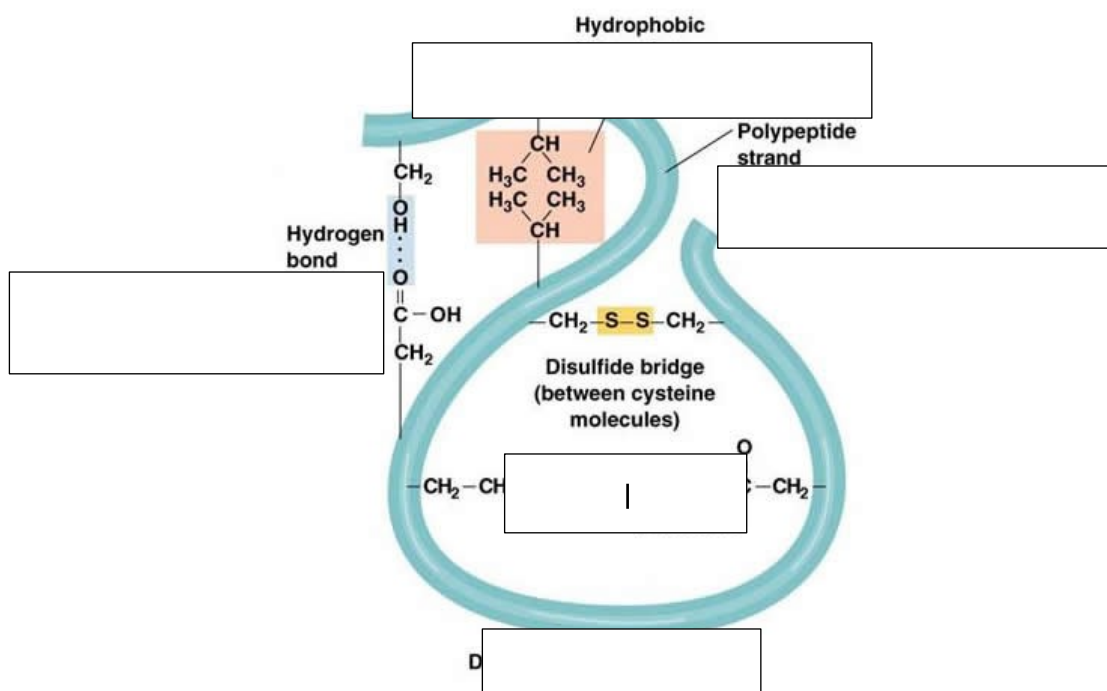
[3 marks]

e) Label the different parts of the diagrams below:



Tertiary structure:

_____ structure



[7 marks]

f) Explain how heat and pH changes can disrupt protein structure.

[3 marks]

Question 7

A sample of a compound containing carbon, hydrogen and nitrogen only was burned in oxygen and produced 2.64 g of carbon dioxide, 0.630 g of water and 0.460 g of nitrogen dioxide.

a) Calculate the empirical formula of the compound.

[5 marks]

- b) If the molecular mass of the compound is approximately 93 g.mol^{-1} , determine the molecular formula of the compound.

[1 mark]