Anglo-Chinese School
(Barker Road)
A Methodist Institution
Founded in 1886

CHEMISTRY
DEPARTMENT OF SCIENCE

Name: ..... ( ) Class: SEC 4 .....

OC: ALCOHOLS & CARBOXYLIC ACIDS – ASSIGNMENT

Multiple-Choice Questions [20 Marks]

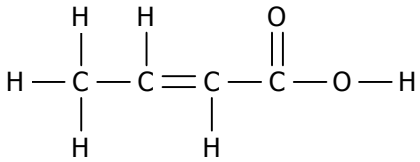
TOTAL SCORE / 30

Write in your selected answer for the multiple-choice questions in the boxes provided.

1	2	3	4	5	6	7	8	9	10

11	12	13	14	15	16	17	18	19	20

1. The structure of an organic molecule is shown below.



Which of the following best describes this molecule?

A It is a carboxylic acid.
B It is a hydrocarbon.
C It is an alkene.
D It is an unsaturated alcohol.

2. Which of the following statements is true of all alcohols?

A All alcohols are good oxidising agents.
B All alcohols burn exothermically.
C All alcohols can be produced by fermentation.
D All alcohols can be used in alcoholic beverages.

3. Which of the following is not a suitable use for ethanol?

A used as a disinfectant
B used as a fuel for motor vehicles
C used in alcoholic beverages
D used in the manufacture of margarine

4. Which two properties explain why ethanol is suitable for use in perfumes and deodorants?

A It is a good solvent and has a low boiling point.
B It is colourless and is flammable.
C It is flammable and is a good solvent.
D It is has a low boiling point and is flammable.

5. Which of the statement correctly describes the chemical properties of alcohols?

A Alcohols are able to react with solid magnesium carbonate.
B Alcohols are able to decolourise acidified potassium dichromate(VI).
C Alcohols have an –OH group and hence have a pH greater than 7.
D Alcohols turn aqueous potassium iodide from colourless to brown.

6. Propanol can be differentiated from propane by

A bubbling the combustion products through limewater.
B heating with acidified potassium dichromate(VI).
C reacting with aqueous sodium carbonate.
D shaking with aqueous bromine.

7. Ethane, ethene, ethanol and ethanoic acid have

A the same number of hydrogen atoms per molecule.
B the same percentage mass of carbon.
C the same products upon complete combustion.
D the same reactions with aqueous bromine.

8. In the alcohol homologous series, as the number of carbon atoms increases,

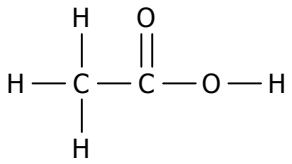
A the density decreases.
B the melting and boiling point decreases.
C the percentage mass of carbon decreases.
D the solubility in water decreases.

9. Ethanol is boiled in a beaker with acidified potassium permanganate. Which of the following is the organic product formed?

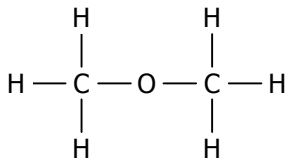
A ethanoic acid **B** ethene **C** ethyl ethanoate **D** polyethene

10. Which of the following molecules is a reducing agent?

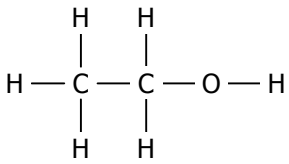
molecule **X**



molecule **Y**



molecule **Z**



A **X** only **B** **X**, **Y** and **Z** **C** **Y** and **Z** only **D** **Z** only

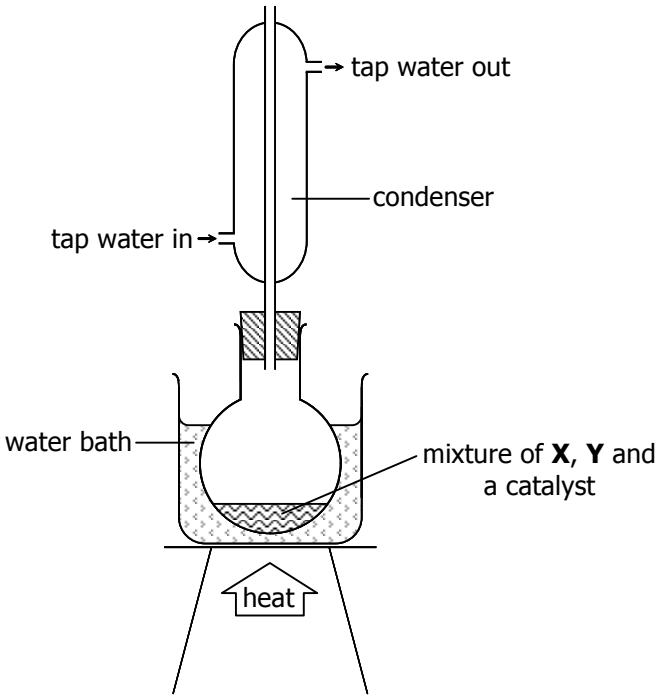
11. When a glass of wine is left exposed for some time, it turns sour. This is because

A the esters had reacted with the ethanoic acid.
B the ethanol has reacted with the atmospheric oxygen.
C the glucose has reacted with the excess yeast.
D the water has reacted with the dissolved ethanol.

12. Butanol and butanoic acid may **not** be differentiated from each other by

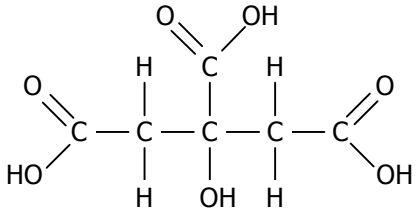
A the addition of acidified potassium dichromate(IV).
B the addition of aqueous bromine.
C the addition of aqueous sodium carbonate.
D the addition of universal indicator.

13. Two chemicals, **X** and **Y**, are allowed to react to form organic product **Z** as shown. What is the purpose of the condenser?



A to allow **Z** to escape as fast as it is formed
B to enable **X** and **Y** to mix more efficiently
C to prevent **Z** from becoming too hot
D to prevent **X** and **Y** from escaping before the reaction is complete

14. The structure of citric acid is shown below.



How many moles of aqueous sodium hydroxide can react with 192 grams of citric acid?

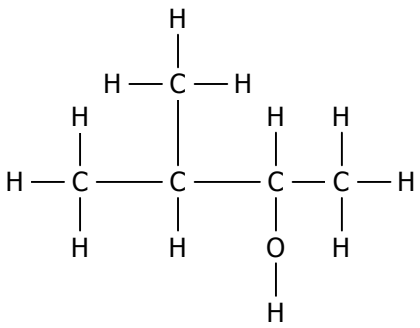
A 1 mole **B** 2 moles **C** 3 moles **D** 4 moles

15. Which compound has the empirical formula CH_2O and reacts with sodium hydroxide?

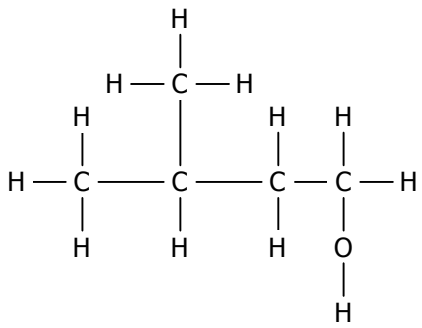
A ethanoic acid **B** glucose **C** methanoic acid **D** methanol

16. Three alcohols, each with the formula $C_5H_{12}O$, are shown below.

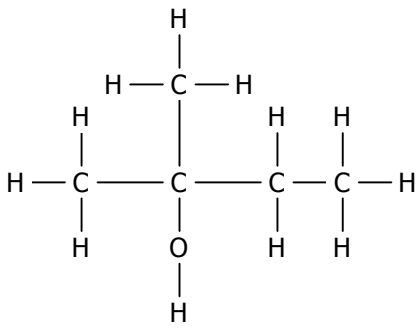
molecule **X**



molecule **Y**



molecule **Z**



Separate samples of the three alcohols were heated under reflux with acidified potassium dichromate(VI). Which of the above substances will (i) react with the acidified potassium dichromate, and (ii) will produce carboxylic acids upon reaction?

	will react with acidified $K_2Cr_2O_7$	*will produce a carboxylic acid*
A	**X** and **Y** only	**Y** only
B	**X**, **Y** and **Z**	**X** and **Y** only
C	**X**, **Y** and **Z**	**X**, **Y** and **Z**
D	**Y** only	**Y** only

17. Ethanoic acid can be produced from glucose through the following sequence of reactions.

Which of the following statements are false?

A Process I produces carbon dioxide as a byproduct.
B Process I requires heating under reflux.
C Process II can occur in an acidic medium.
D Process II produces water as a byproduct.

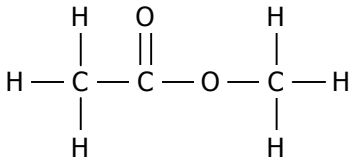
18. Which of the following statements about carboxylic acids is false?

A All carboxylic acids contain a double bond in its structure.
B All carboxylic acids contain oxygen atoms in their structure.
C All carboxylic acids ionise completely when dissolved in water.

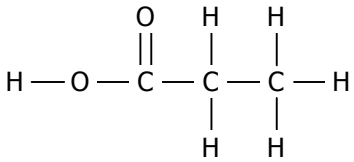
D All carboxylic acids produce carboxylate ions upon dissociation.

19. Which of the molecules below reacts with limestone to produce a gas?

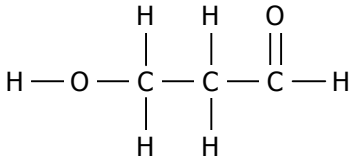
A



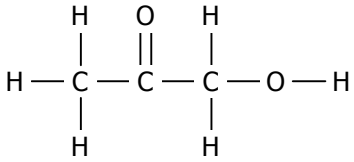
C



B

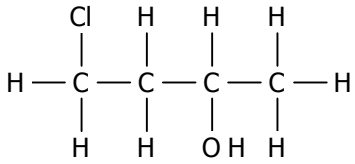


D



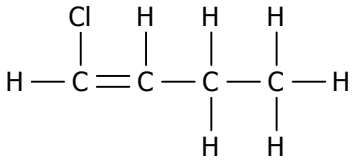
20. An alkene can be converted into an alcohol through an addition reaction, hydration. The reverse of this process is known as an elimination reaction, dehydration. This can be done by heating the alcohol with concentrated sulfuric acid.

    The molecule below is heated with concentrated sulfuric acid.

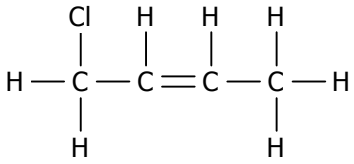


    Which of the following molecules could be produced from the reaction of the above molecule with concentrated sulfuric acid?

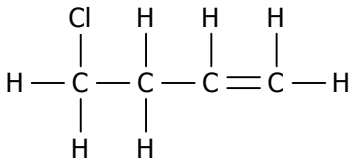
(i)



(ii)



(iii)



A (i) only **B** (iii) only **C** (ii) and (iii) only **D** (i), (ii) and (iii)

Structured Questions [10 Marks]

21. Ethanol can be produced by the catalytic addition of steam to ethene.

(a) State the conditions necessary for this reaction. [1]

.....

(b) (i) Name another method in which ethanol can be produced. [1]

.....

(ii) Construct the chemical equation for this reaction. [1]

.....

(iii) State the conditions necessary for this reaction. [1]

.....

22. Construct chemical equations for

(a) the reaction between methanoic acid and sodium hydroxide, [1]

.....

(b) the reaction between propanoic acid and calcium metal, [1]

.....

(c) the combustion of ethanoic acid in excess air. [1]

.....

23. In the boxes below, draw the full structural formulae of [3]
A: the organic product when ethanol reacts with atmospheric oxygen,
B: the salt formed when sodium hydroxide reacts with methanoic acid,
C: the organic molecule which reacts with steam to form $CH_3CH_2CH(OH)CH_2CH_3$.

A:	**B**:

C:

END