Organic: Test 1

Multiple choice (15 marks)

1. Which one of the following formulae could represent an alkanal?

A.	$C_2 H_4 O$	B.	$C_2H_4O_2$
C.	C_2H_6	D.	C_2H_6O

2. Which one of the following formulae represents an ester?

A.	H ₃ CCOOH	B.	H ₃ CCHO
C.	H ₃ COCH ₃	D.	HCOOCH ₃

3. When the following aqueous solutions are arranged in order of increasing electrical conductivity (lowest conductivity first), what is the correct order?

i. 0.10 N	1 NaOH
ii.	0.10 M CH ₃ CH ₂ OH
iii.	0.10 M CH ₃ COOH

A.	i, ii, iii	B.	ii, i, iii
C.	iii, ii, i	D.	ii, iii, i

4. Which substance is expected to have the lowest boiling point?

A. CH ₄	B. C_2H_2
C. CHCl ₃	D. CH ₃ OCH ₃

5. When but-1-ene, H₂C=ChCh₂Ch₃, reacts with bromine, the most likely product is

A. H	I_3 CCHBr CH ₂ CH ₃ B.	$H_2C=CHCH_2Br$
C. H	BrC=CBrCH ₂ CH ₃	D. H ₂ BrCCHBrCH ₂ CH ₃

6. How many different isomers can be written for substances with the formula C_5H_{12} ?

A. 1	B. 2
C. 3	D. 5

7. How many of the following compounds contain at least one C=O bond?

i. Etha	nol
ii.	Propanone
iii.	Methylmethanoate

A. 0	B . 1
C. 2	D. 3

8. How many moles of oxygen gas are required to burn 1 mole of propane, C_3H_8 , completely?

A. 3	B. 5
C. 7	D. 11

9. When an Alkene is Hydrated, the product is a (an)...

A. acid	B. aldehyde
C. ketone	D. alcohol

10. Why are **alkenes more reactive than alkanes**?

- A. Both parts o the double bond in alkenes are equivalent
- B. The pi bond in alkenes is weaker than the sigma bond and is more susceptible to chemical attack
- C. The sigma bond in alkenes is weaker than the pi bond and is more susceptible to chemical attack
- D. The pi bonds in the alkanes are too weak

11. how can **ethyne be produced** in the laboratory?

- A. By putting calcium carbonate into water
- B. By putting sodium metal into oil
- C. By putting calcium carbide into water
- D. By putting baking soda into water

12. What is the common name for ethyne?

A. zylene	B. ethylene	C. toluene	D. acetylene
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13. A gas which has a molecular mass of 42 units, has the simplest formula CH₂. The molecular formula of this gas is...

A. C_2H_4 B. C_3H_6 C. C_6H_{12} D. C_2H_2

- 14. For the molecule given below, which statement is **TRUE**? CH_2 =CHC=CCH₂CH₂OH
 - A. The molecule contains a total of 14 sigma bonds
 - B. Carbon number 1 is best described by sp hybridation
 - C. The molecule contains two pi bonds
 - D. Carbon number 3 is best described by sp³ hybridation
- 15. A gaseous alkane and a gaseous alkene are treated separately in the following ways. Which treatment will distinguish between them?
 - A. They are ignited in excess oxygen
 - B. They are passed over hearted copper
 - C. They are bubbled through an aqueous solution of bromine
 - D. They are bubbled through an aqueous solution of propanal.

Short Questions (25 marks)

- 1. The combustion of a 5.048g sample of a compound of C, H, and O gave 7.406g CO_2 and 3.027g H₂O. Calculate the empirical formula of the compound. If the molecular mass is 30, What is its molecular formula? Show the possible structure(s) of this compound and name them. (4)
- 2. Select the substance with the higher boiling point in each of the following pairs. Explain your reasoning.

A.
$$C_2H_6$$
 and C_3H_8
B. CH_3CH_2OH and CH_3OCH_3 (4)

- 3. $C_{20}H_{41}OH$ is the formula of an alcohol. Dodecanol.
 - A. From your knowledge of chemistry, state and explain if the alcohol is likely to be a solid, liquid or gas at room temperature.
 - B. Dodecanol, $C_{20}H_{41}OH$, is only slightly soluble in water. Explain this property. (4)
- 4. A. For the addition of bromine to...



Name, and outline the mechanism of the reaction.

- B. When hydrogen bromide reacts with the alkene in (A) above, there are two possible products. Give the structural formulas of the two products.
- C. Give the structures of the two carbocations (carbonium ions) which could, in theory, be foremed at the first stage of the reaction with HBf. Identify the major producat and explain why it is formed in the larger amount. (10)
- 5. A. Distinguish between *Hydrogenation* and *hydration* of an organic compound.
 B. Write one chemical equation to illustrate each reaction in 5 A. (3)