Name.....

School .....

Roll Number.....

Somali Federal Ministry of Education, Culture & Higher Education

Form Four National Standardized Examinations.

MAY / JUNE 2016

CHEMISTRY EXAMINATION

TIME 2 HOURS

INSTRUCTIONS:

- This paper consists of 16 printed pages
- There are 2 sections.
  - ⇒ **PART 1**: 20 Multiple Choice Questions **(40 marks)**
  - ⇒ **PART 2:** 10 Structured Questions **(60 marks)**

  TOTAL **(100 marks)**
- Answer all questions in the spaces provided
- No extra paper is allowed

PART 1: 20 MULTIPLE CHOICE QUESTIONS (40 MARKS). *For each question in this section, circle the correct answer*

1. Which of the following acids is **NOT** an organic compound?

   a) $H - COOH$
   b) $CH_3 - COOH$
   c) HNO_3
   d) $C_6H_5 - COOH$

2. The hydrocarbon in which all the four valencies of carbon atoms are fully utilized are called_____

   a) alkanes
   b) alkanes
   c) alkynes
   d) alcohols

3. Removal of..... from a molecule is called dehydration.

   a) Acid
   b) water
   c) base
   d) ions

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4. Which of the following is the most reactive hydrocarbon?

a) ethane
b) ethyne
c) ethene
d) benzene

5. When one hydrogen atom of alkane is removed then it is called

a) Alkene
b) Alkyl
c) Aldehyde
d) Saturated hydrocarbon

6. Which of the following hydrocarbons is saturated?

a) C_3H_8
b) C_2H_4
c) C_4H_6
d) C_8H_{16}

7. The functional group of alcohol is

a) – OH
b) C = O
c) – COOH
d) R – OR

8. Which of the following compounds is the oxidation number of nitrogen (N) equals +5?

a) NO

b) N_2O_4

c) N_2O_5

d) NO_2

9. In the following compounds which is an ester

a) C_2H_5 -OH

b) $HCOOCH_3$

c) CH_3-COOH

d) R - NH_2

10. This biochemical molecules is considered a subset of a large group of molecules.

a) Carbohydrates

b) Lipids

c) Proteins

d) Enzymes

11. Which compound is structurally an isomer of the compound show below?

a) Butane

b) Methane

c) Pentane

d) Hexane

$$CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2 - CH_3$$

12. Which formula represents an aromatic compound?

a) C_2H_2
b) C_6H_6
c) C_6H_8
d) C_6H_{14}

13. Which family of organic compound does $CH_3 - CO - CH_2 - CH_3$ belong to?

a. Alcohol
b. Aldehyde
c. Ketone
d. Carboxylic acid

14. Which of the following is **NOT** a condition of dynamic equilibrium?

a) A reaction must be in a closed system.
b) The reaction must occur at constant temperature.
c) The reaction can be reached from either direction.
d) The rate of forward reaction is not equal to the rate of backward reaction.

15. If the nucleus of the Uranium has a mass number 238 and its protons are 92, how many neutrons does it contain?

a) 156 neutrons.
b) 142 neutrons
c) 146 neutrons
d) 132 neutrons

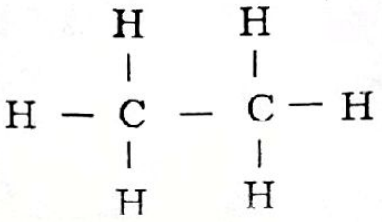
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16. If two or more smaller nuclei join together to form a single nucleus is referred to as

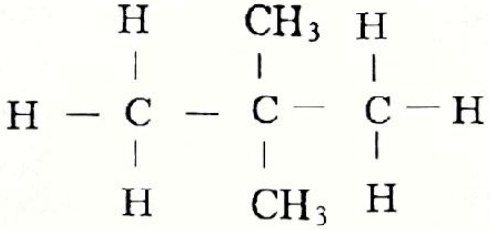
a) Nuclear fission
b) Nuclear atom.
c) Nuclear fusion.
d) Gama particle.

17. The type of bonding in the carbon bonds of ethane (below) are?

a) sp
b) sp^2
c) sp^3
d) dsp^3



18. Which of the following names is correct for the molecular structure shown?

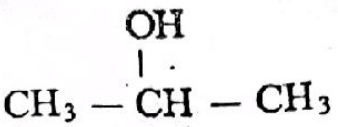


a) 2, 2 – dimethyl butane
b) 1, 2 – dimethyl pentane
c) 1, 1 – dimethyl butane
d) 2, 2 – dimethyl propane

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19. The name of the below compound is:

a) 2 – butanol
b) 2 -- propanol
c) 1 – propanol
d) 2 – pentanol



20. Isotopes are compounds that have the same atomic number but different

a) Proton numbers.
b) Atomic numbers.
c) Mass numbers.
d) Molecular number

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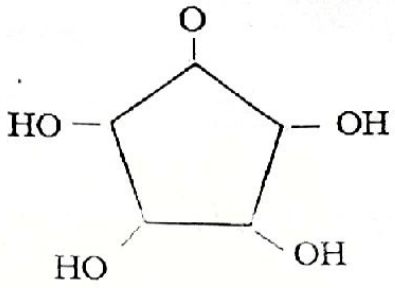
PART 2: STRUCTURED QUESTIONS (60 MARKS)

QUESTION 1 **(6 marks)**

a) Define Biochemistry.

Is the study of chemical reactions that occur At the molecular level of organism.

b) The structure of ribose is shown below.



What is the difference between this ribose structure and that of DNA molecule?

Ribose found in RNA is "anormal" sugar with one oxygen atom attached to each carbon atom
Deoxyribose found in DNA is amodified sugar lacking one oxygen atom.

QUESTION 2 **(6 marks)**

a) Define an oxidizing agent.

A reactant that causes an oxidation by taking Electrons from another reactant.

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b) According to the following reaction equation, state the oxidation and the reducing agent.

$H_2 + S \rightarrow H_2S$

Reduction

0 0 +1 -2

$H_2 + S \longrightarrow H_2S$

oxidation

QUESTIONS 3 (6 marks)

1. Define catalyst.

Is a Substance that changes the rate of achemical Reaction with out itself being Consumed in the reaction.

2. At the given temperature $CO_{(g)} + H_2O_{(g)} \Leftrightarrow H_{2(g)} + CO_{2(g)}$ produce the following concentration at equilibrium [CO] = 0.2M, [H_2O] = 0.5M, [H] = 0.32M, [CO_2] = 0.42M. find K.

$K = \frac{[H_2][CO_2]}{[CO][H_2O]} = K = \frac{[0.32][0.42]}{[0.2][0.5]} = \frac{0.1344}{0.1}$

$K = 1.344$

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QUESTION 4 **(6 marks)**

a) Write the complete nuclear symbol of chlorine (Cl) that contains 17 protons and 20 neutrons.

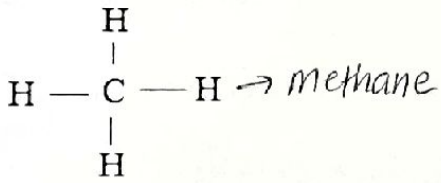
$^{37}_{17}Cl$

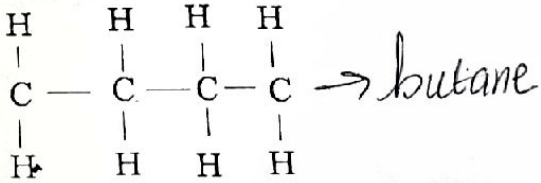
b) How many protons and how many neutrons are present in the nucleus are present in the nucleus of lithium 7?

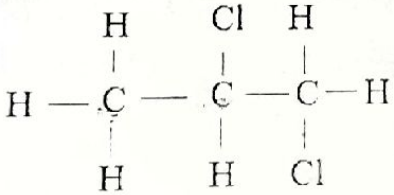
$^{7}_{3}Li$ P = 3 N = 4

QUESTION 5 **(6 marks)**

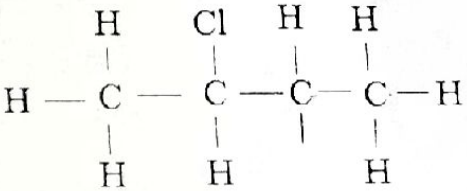
Using the letters (a, b, c and d) answer the following questions.

a)  → methane

b)  → butane

c) 

1, 2, dichloro propane

d) 

2, chloro butane

i) Define an isomer.

Are Compounds having Same molecular formula but different Structural formula.

ii) Which components can have only one isomer? "Try your self""

iii) Which compounds have the .molecular formula $C_4Hg - Cl$?

2-chlorobutane.

QUESTION 6 **(6 marks)**

a) Define alkenes

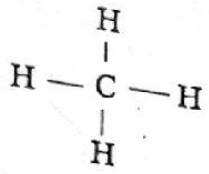
Are Compounds Contain Carbon and hydrogen but at least one double bonded Carbon atom.

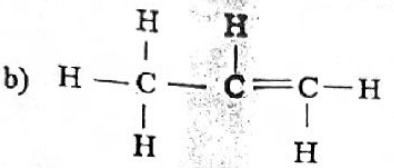
b) Fill the blank spaces in the following table

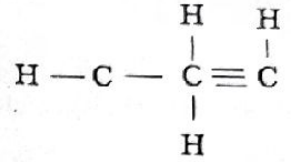
	Compound Name	Molecular Formula	Structured Formula
1	Ethane	C_2H_6	$CH_3 - CH_3$
2	Ethene: Ethene	C_2H_4	$CH_2 = CH_2$
3	Propyne	C_3H_4	$CH \equiv C - CH_3$ $CH_3 - C \equiv CH$

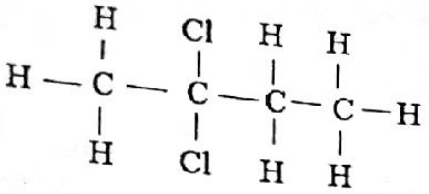
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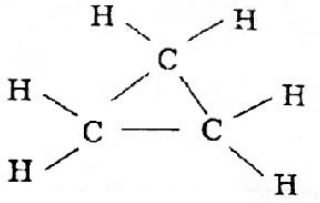
QUESTION 7 **(6 marks)**

a) 

b) 

c) 

d) 

e) 

Answer the following questions using the letters (a, b, c, d and e). Which of these compounds

i) Is saturated cyclo-hydrocarbon?

a), Saturated, d, Saturated e, Saturated

ii) Saturated acyclic hydrocarbon?

iii) Have the general formula of C_nH_{2n}

b) Have the general formula of C_nH_{2n}

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QUESTION 8 **(6 marks)**

a) The following two compounds are isomers

i) $C_2H_5 - OH$

ii) $CH_3 - O - CH_3$

Explain why they are isomers

because.....

.....

.....

.....

.....

.....

b) Fill the blank spaces in the following table

Compound Name	Chemical Formula	General Formula
Methanol	$CH_3 - OH$	R – OH
ethyl-methyl ether	$CH_3 - O - C_2H_5$	R – O – R
Ethanoic acid	$CH_3 - CH_2 - \overset{O}{\overset{\|\|}{C}} - OH$	R – COOH
methanal	$CH_3 - CHO$	R – CHO

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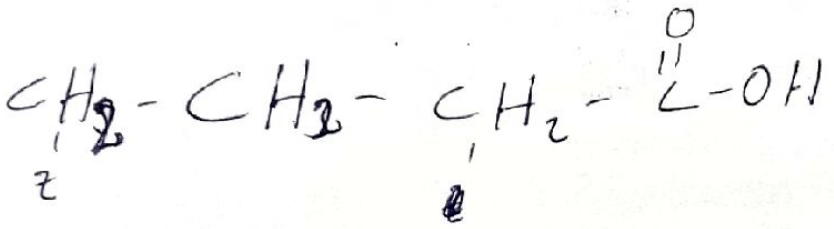
QUESTION 9 (6 marks)

a) Draw the following structures.

i) Fluorobenzane



ii) Z – butanoic



b) Name the following components according to the IUPAC system of nomenclature.

Formula	Name
i) $CH_3 - CH_2 - O - CH_3$	Methoxyethane ✓ Methoxyethane or ethyl-methyl ether
ii). $C_2H_5 - COOCH_3$	Methyl propoate → Methyl propanoate.

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QUESTION 10 (6 marks)

a) What is the difference between primary and secondary alcohols?

Primary alcohols are ones where the Carbon atom is attached to the hydroxy group and one alkyl group.

Secondary alcohols Are ones where the Carbon Atom is attached to the hydroxyl group and Two alkyl group.

b) What are the common Names of the following compounds?

Hydrocarbon	Common Name
Ethyne	Alkyl
Ethanoic acid	orggreic acid
Methanol	alcohol
Methanoic acid	organic acid
Propanone	ketones

END