

FEDERAL REPUBLIC OF SOMALIA

GRADE 12 EXAMS, 2024

CHEMISTRY



OFFICE OF EXAMINATIONS AND CERTIFICATION



Ministry of Education, Culture & Higher Education

National Examinations and Certifications Office

Form Four National Examinations.

June, 2024

SUBJECT: CHEMISTRY

TIME: 2 HOURS

INSTRUCTIONS: Answer all questions in the ANSWER BOOKLET

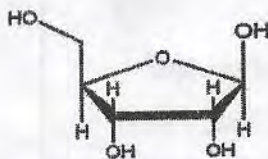
SECTION A: MULTIPLE CHOICE: CIRCLE THE LETTER OF THE CORRECT ANSWER
[20 MARKS]

1. Which of the following is an example of hydrocarbons?

- a) 2-ethyl-2-methyl-4-heptanol b) 3-ethyl-2-methanol propanoic acid
c) 2-ethyl-3-methylheptane d) 2-Bromo-3-chloro-Octanal

2. The sugar that is in the backbone of RNA:

- a. Deoxyribose
b. Glucose
c. Fructose
d. Ribose

3. The equilibrium expression k_c for the reaction below is: $\text{H}_2(\text{g}) + \text{F}_2(\text{g}) \rightleftharpoons 2\text{HF}(\text{g})$

- a) $k_c = \frac{[\text{HF}]}{[\text{H}_2][\text{F}_2]}$ b) $k_c = \frac{[\text{HF}]^2}{[\text{H}_2][\text{F}_2]}$ c) $k_c = \frac{[\text{H}_2][\text{F}_2]}{[\text{HF}]^2}$ d) $k_c = \frac{[\text{H}_2][\text{F}_2]}{[\text{HF}]}$

4. ALL monosaccharides and disaccharides are reducing sugars EXCEPT:

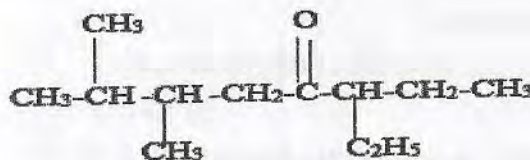
- a) Sucrose b) Lactose c) Fructose d) Maltose

5. The group 16 or VIA elements of modern periodic table is called.

- a) Carbon family b) Nitrogen family c) Halogen family d) Oxygen family

6. The IUPAC name for the structure below is:

- a) 3-ethyl-7,6-dimethyl-4-heptanone
b) 3-ethyl-6,7-dimethyl-4-octanone
c) 3-ethyl-6,7-diethyl-4-octanone
d) 3-ethyl-7,6-dimethyl-4-heptanone

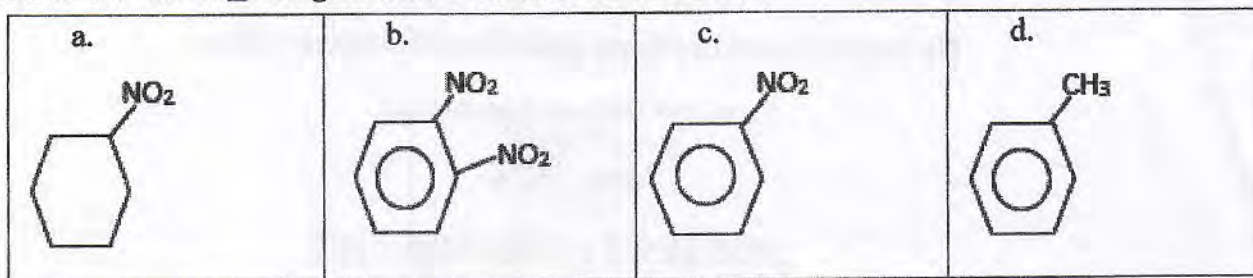


7. This is an example of

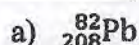
- a) Nuclear fusion
b) Nuclear fission
c) Nuclear agent
d) Nuclear weapons



8. Which one of the following structures indicate nitrobenzene?



9. Identify the product that balances the following nuclear reaction.



10. Primary (1°) alcohols oxidize to produce:

a) Ketones

b) Aldehydes

c) Ethers

d) Alkanes

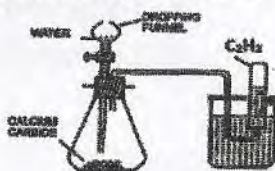
11. The reaction of water with calcium carbide produces only:

a. Ethane

b. Ethene

c. Ethyne

d. Propyne



12. The properties that determines the functional groups:

a. Nomenclature, preparation and physical properties

b. preparation, Nomenclature and physical properties

c. Nomenclature, preparation and chemical properties

d. Nomenclature, physical and chemical properties

13. Which of the following is a primary alcohol?

a) 1 – Propanol b) 3-methyl -2- hexanol c) 2-ethyl-2-octanol d) 2-methyl-3-heptanol

14. The half-life of polonium -218 is 3.04min A sample of polonium contains 0.00558g of polonium - 218.how many half-lives will remain after 18.24 min?

a) 4 half- life

b) 5 half- life

c) 6 half- life

d) 7 half- life

15. The only factor that affects the value of the equilibrium constant is:

a) Concentration

b) Pressure

c) Catalyst

d) Temperature

16. The molecular formula of ethylbenzene is

a) C_8H_8 b) C_8H_{10} c) C_6H_8 d) C_6H_6

17. Which of the following is a tri-carboxylic acids:

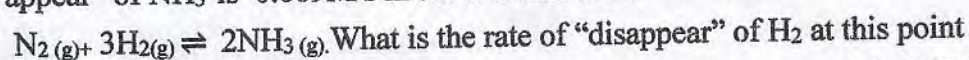
a) Citric acid

b) Acetic acid

c) Oxalic acid

d) Malonic acid

18. If the rate of “appear” of NH_3 is 0.069M/s in the reaction described below



a) 0.1350 M/s

b) 0.3105 M/s

c) 0.1035 M/s

d) 0.1305 M/s

19. Which of the following elements will have the electronic configuration of $1\text{S}^22\text{S}^22\text{P}^5$

a) Carbon

b) Oxygen

c) Nitrogen

d) Fluorine

20. Which two nucleotides are collectively known as purines:

- a) Adenine and uracil b) Adenine and guanine
c) Guanine and cytosine d) Guanine and thymine

SECTION B: FILL IN THE BLANK SPACES (10 MARKS)

Use the words in the box to fill in the blank spaces

Radon	myoglobin	Radiation	Mol/l.s ⁻¹	Ethanol
exothermic	formic acid	Rem	acetylene	Boron

- The unit of rate of reaction is _____.
- _____ is used in radiotherapy for treatment of cancer.
- The unit most commonly used to express radiation exposure is _____.
- The IUPAC name of CH₃-CH₂-OH is _____.
- _____ is the simplest of organic acid.
- _____ can be either ionizing or non-ionizing.
- _____ is the lightest elements in group 13 elements of periodic table .
- If the reaction is endothermic in forward then its backward is _____.
- _____ is used for cutting and welding metals .
- _____ is an example of globular protein .

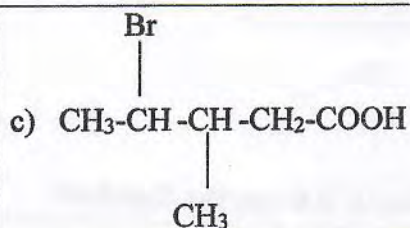
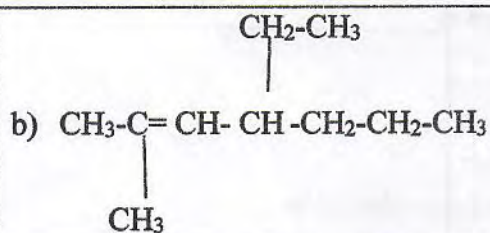
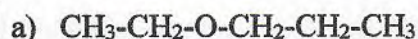
SECTION C: MATCHING (10 MARKS)

Match the words in Column A with corresponding words in Column B using the Brackets

Column A	Column B
1. Meat and milk are example	[] Halogens
2. Interior carbonyl	[] the formation of peptide bond by the combination of amino acids
3. Catechol and quinol are examples of	[] is the product of oxidation of aldehydes
4. Natural gas	[] primary alcohol
5. Carboxylic acid	[] Phenol
6. Group 17 elements are called	[] collision
7. A condition required for a reaction to occur	[] Proteins
8. 1-propanol is an example of	[] non-Benzenoid
9. Primary structure of protein	[] is a one of the sources of hydrocarbons
10. Furan and pyrrole are examples of	[] is the functional group of ketone

SECTION D: STRUCTURED QUESTIONS (60 MARKS)
Answer all the following questions

- Define the following terms (6 marks)
 - Chemical equilibrium
 - Phenol
 - Carbohydrate
- Write the general formula of: (6 marks)
 - Alkynes
 - Aldehydes
 - Cycloalkanes.
- Give the IUPAC names of the following structures (6 Marks)



- Classify the following compounds into organic and inorganic (5 marks)
 - NaHCO_3
 - C_3H_8
 - NaCl
 - $\text{C}_2\text{H}_5\text{OH}$
 - $\text{C}_6\text{H}_{12}\text{O}_6$
- Answer the following questions:
 - What are the possibilities of the chemical reactions (3 marks)?
 - calculate the K_c from the following equilibrium concentrations for the reaction $\text{HCl(aq)} + \text{NaOH(aq)} \rightleftharpoons \text{NaCl} + \text{H}_2\text{O(l)}$: (3 Marks)

$$[\text{HCl}] = 3.2 \text{ M} \qquad [\text{H}_2\text{O}] = 1 \text{ M}$$

$$[\text{NaOH}] = 4.3 \text{ M}$$

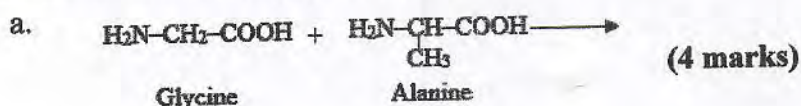
$$[\text{NaCl}] = 6.0 \text{ M}$$
 - Does this reaction is product favored or reactant favored? (1marks)

6. The table below shows p-Block elements in the periodic table:

P – block elements					18
13	14	15	16	17	He
B	C	N	O	F	Ne
Al	Si	P	S	Cl	Ar
Ga	Ge	As	Se	Br	Kr
In	Sn	Sb	Te	I	Xe
Tl	Pb	Bi	Po	At	Rn

- Identify the group in which oxygen ($Z=8$) belongs to. (2 marks)
- Which element has the most abundant by mass in the earth's crust? (2 marks)
- Write the electronic configuration of sulfur ($Z=16$). (2 marks)
- Which element is radioactive metal in oxygen family? (2 marks)

7. Draw the structure of dipeptide formed by the following amino acids:



b. Name the dipeptide formed (2marks)

8. List the factors affecting rate of reactions? (5 marks)

9. Answer the following questions which are relevant to the ketones:

- Define ketone? (2 marks)
- What are the products formed when ketones are reduced? (2 marks)
- The simplest ketone is called Dimethyl ketone. describe its other name? (1 marks)

10. Technetium -99m is an ideal radioisotope for scanning organs it has a half-life of 6.0hours

- How many milligrams of 80.mg of Technetium -99m would remain after 24hours? (3 marks)
- The diagram below shows, the penetrating power of different radioactive decays.

(3 marks)

Name parts labeled:

- Y
- Z
- X

