THE UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE

REGIONAL ADMINSTRATION AND LOCAL GOVERNMENT

KASULU TOWN COUNCIL

FORM TWO PRE-MOCK EXAMINATION

CODE: 032 **CHEMISTRY**

Time: 2:30 Hours **Thursday, 22.05.2025**

INSTRUCTIONS

1. This paper consists of section A, B and C with a total of ten (10) questions
2. Answer all the questions
3. Section A and C carry fifteen (150 marks each and section B carries seventy (70) marks
4. All writing should be in black or blue ink except diagrams which must be in pencil.
5. Cellular phones and any unauthorized materials are not allowed in assessment room
6. Write your Assessment number/Examination number at the top right corner of every page.
7. The following atomic masses may be used
   H=1, C=12, O=16, Cl=35.4

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SECTION A (15 MARKS)
ANSWER ALL QUESTIONS IN THIS SECTIONS

1. For each of the items (i)-(x) choose the correct answer from the given alternative and write its letter in the box provided.

i) Which of the following group consists of home care products a) Yeast, plastics and disinfectants
   b) Paints, air fresheners and petrol. [ ]
   c) Rubbers, clothes and soaps
   d) Detergents, disinfectant and air fresheners

ii) What should be done if the results obtained from the experiment do not support the hypothesis
   a) The experiment should be changed
   b) The result should be left out
   c) Ideas for further testing to find a solution should be given
   d) A new problem should be identified .[ ]

iii) Which of the following substances occupies the space of the container? a) Solid
   b) Particle
   c) Liquid
   d) Crystal .[ ]

iv) What is the best way of separating the iron filing from sulphur powder? a) Separating funnel
   b) Evaporation
   c) Magnet
   d) Winnowing. [ ]

v) Which term described a rapid chemical reaction that release energy in form of light and heat?
   a) Ignition
   b) Reactivity
   c) Combustion
   d) Heating [ ]

vi) Which of the following gases if mixed with hydrogen, would produce a hot gas of up to 3000?
   a) Oxygen
   b) Neon
   c) Chlorine
   d) Argon .[ ]

vii) The main aim of destructive distillation of coal is a) Removal of oxygen in the atmosphere
   b) Removal of volatile matter
   c) Addition of volatile matter
   d) Addition of oxygen in the furnace. .[ ]

viii) The atomic number for an element T is 9.what is its electronic configuration

a) 2:4:3
b) 2:5:2
c) 2:7
d) 2:6:1 .[ ]

ix) An element T with electronic configuration 2:8:3 belongs to group…….. and period …….. of the periodic table.
a) III and 3
b) III and 2
c) II and 3
d) II and 2 .[ ]

x) Which of the following is a property of covalent compounds
a) They do not conduct electricity
b) They conduct heat easily
c) They are mostly soluble in water
d) Their melting and boiling point are very high. .[ ]

2. Match the suitable for five extinguisher in list A with corresponding type of fire extinguisher in list B by writing the letter of a correct response below the item number in the table provided.

LIST A	LIST B
i) Class A fire ii) Classes A,B and C fires iii) Classes B and C fires, and fire caused by electrical fault iv) Class A fire and fire caused by electrical faults	A. Dry chemical (DC) B. Foam C. Air pressurized water (APW) D. Wet chemical E. Carbon dioxide F. ABC G. Halon

SECTION B (70 MARKS)

Answer all questions in this section

3. Explain the roles of chemistry in the following field
a) Agriculture
b) Human health
c) Manufacturing industry.
d) Transport
e) Communication

4. Copy the following table and fill the missing details of the arbitrary elements given

Element	Atomic number	Mass number	Number of protons	Number of electrons	Electronic configuration
P	17	35			
Q		40	20		
R		12			2:4
S		9		4	
T	3	7			
U		23			2:8:1
V		31	15		2:8:5

5. a) An organic compound consists 26.70% carbon, 2.20% hydrogen and 71.10% oxygen. If its vapour density is 45. Determine its molecular formular.
   b) An atom of element X (atomic number II) and an atom of element Y(atomic number 9) combine to form a compound.
   i) Write the formula of the compound
   ii) State the type of the bond present in the compound

6. a) Describe the energy transformations that take place in each of the following cases.
   i) Energy from the sun is used to generate electricity for lightning a house
   ii) Mechanical energy from the waterfalls is used to generate electricity.
   iii) A bicycle wheel is used to turn a dynamo. The electric energy from the dynamo is used to power a bulb to produce light.

   b) The following results were obtained in an experiment to measure the heat value of biodiesel

Initial temperature of water (To) = 24.7 ºC

Final temperature of water (Tf) = 68.5ºC

Mass of biodiesel burnt = 56g

If the volume of water used in the experiment was 12litre, determine the heat value of the biodiesel. (specific heat capacity of water=4.18kJkg^-1C^-1, density of water=1000Kg m^{-3},

7. a) A student placed a silvery white solid on a deflagrating spoon, ignited it and then lowered the spoon into a gas jar of oxygen .The solid burned with a brick red flame.
   i) Identify the silvery white substance that burned in oxygen.
   ii) Explain the nature of the product in terms of acidic or basic properties.
   iii) Write the product formed after burning the silvery solid.

   b) How would you distinguish pure oxygen from ordinary air.

8. a) What type of charges are these?
   i) Burning charcoal. .....
   ii) Cloud changing into rain. .....
   iii) Rusting of iron. .....
   iv) Magnetizing of iron.....
   v) Melting of ice. .....

   b) Once you open a freezer, you may find an ice on its walls. How does the ice form?.

9. a) The following are the steps to follow in lightning of Bunsen burner. However, the steps are not in the correct order. Re-write them in the correct sequence.
   i) To extinguish the flame, turn off the gas to stop the gas flow.
   ii) Light the gas at the top of the barrel with a lighted match stick
   iii) Turn the collar to close the air hole completely
   iv) Keep your face away from the top of the barrel

v) Adjust the gas tap until the supply of gas is enough for a flame gas enters the burner.

b) Name four sources of heat that can be used in the laboratory.

SECTION C (15 MARKS)

Answer question ten (10)

10. A) Suppose a truck carrying kerosene gets an accident and unfortunately fire breaks out, suggest:

i) The suitable fire extinguisher to use.

ii) The fire extinguisher not suitable to use.

b) A form one student reads a statement from certain book that "if the clothes worn by your friend catch fire, cover them with a fire blanket." Why a fire blanket is to be used in that case?

c) Why are commodities like hand bags and camera bags for sale packed with silica gel?

d) When iron sheet are exposed to wet air for a long time they turn brown in color. Explain

KASULU TOWN COUNCIL FORM II

MARKING GUIDE- CHEMISTRY (PRE MOCK)

SECTION A (15%)

1. @ CARRY 1%=1X10=10%

i	ii	iii	iv	v	vi	vii	viii	ix	X
D	C	C	C	C	A	B	C	A	A

2. @x1=1x5=5%

LIST A	i	ii	iii	iv	v
LIST B	C	A	E	G	F

3. a) It used in production of many products made through chemical processes to obtain better products/agricultural products/field these are fertilizer, pesticides, animal vacines and processed animal feeds..
   b) The chemically produced substances in the form of vacines and medicine are used to ensure our well being/human health through the prevention and treatment of disease.
   c) Manufacturing industries such as fertilizer, chemical, paper, food and beverage industries ,transport, communication, plastic manufacturing industries rely heavily on chemical processes. Most machine part are made of metals, plastics and rubber are produced through chemical processes example of products are cement, plastics, containers, fabrics, chemicals, rubber and papers.
   d) Fuels and lubricants in motor vehicles air craft, motorcycles, ships are produced by chemical processes. Also plastics coolants, carpert and seat covers found in the means of transport.
   e) Letters newspapers and magazines are written using papers and ink that are manufactured through chemical process. Also telephones radios, televisions and computers are rely much on wire, batteries, chemicals are chemically manufactured.
   (2 marks @=2x5=10%)

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4. Each gap 001/2x20=10%

Element	Atomic number	Mass number	Number of protons	Electrons number	Electronic configuration
P	17	35	17	17	2:8:7
Q	20	40	20	20	2:8:8:2
R	6	12	6	6	2:4
S	4	9	4	4	2:2
T	3	7	3	3	2:1

U	11	23	11	11	2:8:1
V	15	31	15	15	2:8:5

5. a) Molecular formula=n x empirical formula
Where n= is a whole number
Step 1. Obtain mass of each element in a compound
Assume you have 100g of a compound
C=26.7g, H=2.2g, O=71.1g **(½%)**
Step 2. Divide each mass of element by its R.A.M
MASS IN SAMPLE/R.A.M **(½%)**
C=26.7g/12, H=2.2g/1, O=71.1g/16
2.2 2.2 4.4
Step 3. Divide throughout smallest value
2.2/2.2: 2.2/2.2 : 4.4/2.2 =1:1:2 **(½%)**
Step 4. Obtain whole number ratio
C: H: O
1 :1 : 2 **(01%)**
Empirical formula= CHO2 **(01%)**
:. From, R.M.M= n x sum of R.A.M **(01%)**
To get R.M.M = vapour density x 2 **(01%)**
=45 x 2
=90
90= n x (12+1+16x2)
90=45n **(01%)**
2=n **(01%)**
:. Molecular formula = C2H2O4 **(01%)**
Total = 8%
OR Altenative , A table may be used.

Element	**C**	**H**	**O**
% Composition	26.7	2.2	71.1
Convert into mass composition in 100g	26.7g	2.2g	71.1g
Divide by R.A.M	26.7/12 2.2	2.2/1 2.2	71.1/16 4.4
Divide by smallest ratio	2.2/2.2 1	2.2/2.2 1	4.4/2.2 2

Empirical formula =CHO2 **(01%)**
Molecular formula = n x empirical formula **(01%)**
= n(CHO2)

Molecular mass (R.A.M) = 2 x vapour density **(01%)**

= 2x45

=90

90=n(12+1+16X2) **(01%)**

90=nx45

90/45=45n/45

2=n **(01%)**

:. Molecular formula =C2H204 **(01%)**

b) element 11X and 9Y

i) Formula of compound =

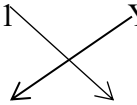
Electronic configuration of 11X (2:8:1) and 9Y(1:7) **(01%)**

STEP 1. X Y

Step 2. X+ Y-

STE 3. X1 Y1

STEP 4. X1 Y1



1 1

Formula= XY

i) Type of bond = Electrovalent (ionic) bond **(01%)**

6. a) i. Energy from thesun can be tapped in various ways as
   - using photovoltanic solar cells or photocells
   - Using concentrated solar power or solar panels

ii. Water polles energy I the form of kinetic energy due to motion or thermal energy resulting from temperature differences example hydroelectric energy, tidal stream energy wave and ocean thermal energy.

iii. A bicycle wheel motion contains mechanical energy when rotating, then to electrical energy **(2 marks @)**

b) **solution**

mass of water used=density x volume

=1000kg/m³ x 0.012m³

=12Kg

Change in temperature(ΔT)=Ti-To

= (341.5-297.7)K

=43.8K

$Q=Mc\Delta T$

But m=12Kg, C=4.18kJ·kg^{-1}·K^{-1}, T=43.8K

Therefore

Q=12Kg x 4.18kJ·kg^{-1}·K^{-1} x 43.8K

=2197Kj

Thus; 0.056Kg of biodiesel given 2197 kJ·kg^{-1}·K^{-1}of heat

1Kg=2197/0.056

=39,232kJ·kg^{-1}·K^{-1}

OR

=39.23Kjg^-1

:. Heat value of biodiesel is 39.23kJg^-1 **(04 marks)**

7. a)i. Calcium (Ca)
   ii. the product in aqueous solutions on red litmus paper turns Blue
   iii. White solid, Calcium oxide **(021/2 marks @)**
   b) – using a chemical test
   It re-lights up a glowing wooden split when lowered into a gas jar contain oxygen.
   - It also, when a lit candle is lowered into a gas jar containing oxygen gas it burns more brightly while air can not.
8. a) i. chemical change
   ii. physical change
   iii. chemical change
   iv. physical change
   v. physical change **(11/2 mark @)**
   b) It form under the principle of refrigeration.
   It use refrigerants (chemicals) whose change in state involve change in energy the change of state from liquid to vapour absorb energy from surrounding then cause cooling effect. **(021/2 mark)**
9. a) vi) Turn on the gas fully to ensure the plenty of the gas enter the burner

   v)Adjust the gas tap until supply of gas is enough for a flame

   iii) Turn the collar to close the air hole completely.

   ii)Light the gas at the top of the barrel with a lighted match stick.

   iv)Keep your face away from the top of the barrel

   i)To distinguish the flame, turn off the gas to stop the gas flow**.** **(01 mark @)**

   b) Spirit burner, Bunsen burner, gas store, kerosene store. **(01 mark @)**

SECTION C

10. (a) i. class B

-Use dry powder

-Foam or carbon dioxide extinguisher **(03 marks)**

ii. –water extinguisher

-Foam extinguisher

-Powder extinguisher **(03 marks)**

b) Blanket cover the fire and reduce the supply of oxygen to support fire **(02 marks)**

(c) Silica gel used to absorb any moisture that cause rusting. **(03 marks)**

(d) The reddish (brown) colour is called rust that occur on the surface of iron sheet.**(03 marks)**

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