

MINISTRY OF EDUCATION AND HIGHER EDUCATION

GRADE 12 EXAMS, 2008

CHEMISTRY



P/LAND NATIONAL EXAMINATION BOARD



Name

School

Roll Number.....

Puntland State of Somalia

Ministry of Education

Puntland National Examination Board

Form 4

CHEMISTRY Examination

2008

Time 2 hours

Plus 10 minutes before the exam for reading through the paper

TOTAL TIME 2 hours 10 minutes

INSTRUCTIONS TO CANDIDATES

This paper consists of 17 printed pages

Count them now. If there are any missing, inform the invigilator

There are two parts:

SECTION A – Multiple Choice Questions	10 MARKS
SECTION B – Structured Questions	90 MARKS
TOTAL	100 MARKS

- Answer all questions
- All answers and working must be written on this paper in the spaces provided immediately after each question
- Rough work can be done on page 2. This will not be marked
- No extra paper is allowed
- **No calculators** are allowed
- If you make a mistake, cross out the incorrect answer and clearly write your correct answer

SECTION A: MULTIPLE CHOICE QUESTIONS (10 MARKS)

Instructions for this section: For each question in this section, **circle** the correct answer

1. What products are formed when an acid and a base react?
A. Water and Hydrogen B. Hydrogen and Oxygen
C. Salt and Water D. Base and Water
2. Which of the following methods is suitable for separation of ethanol and water
A. Evaporation B. Distillation
C. Sublimation D. Precipitation
3. Pick the formula that represents an alcohol
A. C_2H_6O B. $C_2H_4O_2$
C. $C_2H_4CL_2$ D. $C_2H_2O_4$
4. The following factors affect rate of a reversible reaction. Which one does not.
A. Temperature B. Pressure
C. Humidity D. Concentration
5. An element T with atomic number 13 belongs to?
A. Group 1, Period 3 B. Group 3, Period 1
C. Group 2, Period 3 D. Group 3, Period 3
6. Change of state from gas to liquid is called
A. Melting B. Freezing
C. Condensation D. Evaporation
7. When a blue litmus paper is dipped in an acidic solution
A. Turns red B. Turns pink
C. Turns colourless D. Remains blue

8. Which of the following is an allotrope of sulphur?

- A. Sulphur Dioxide B. Monoclinic
C. Graphite D. Diamond

9. Molarity is defined as

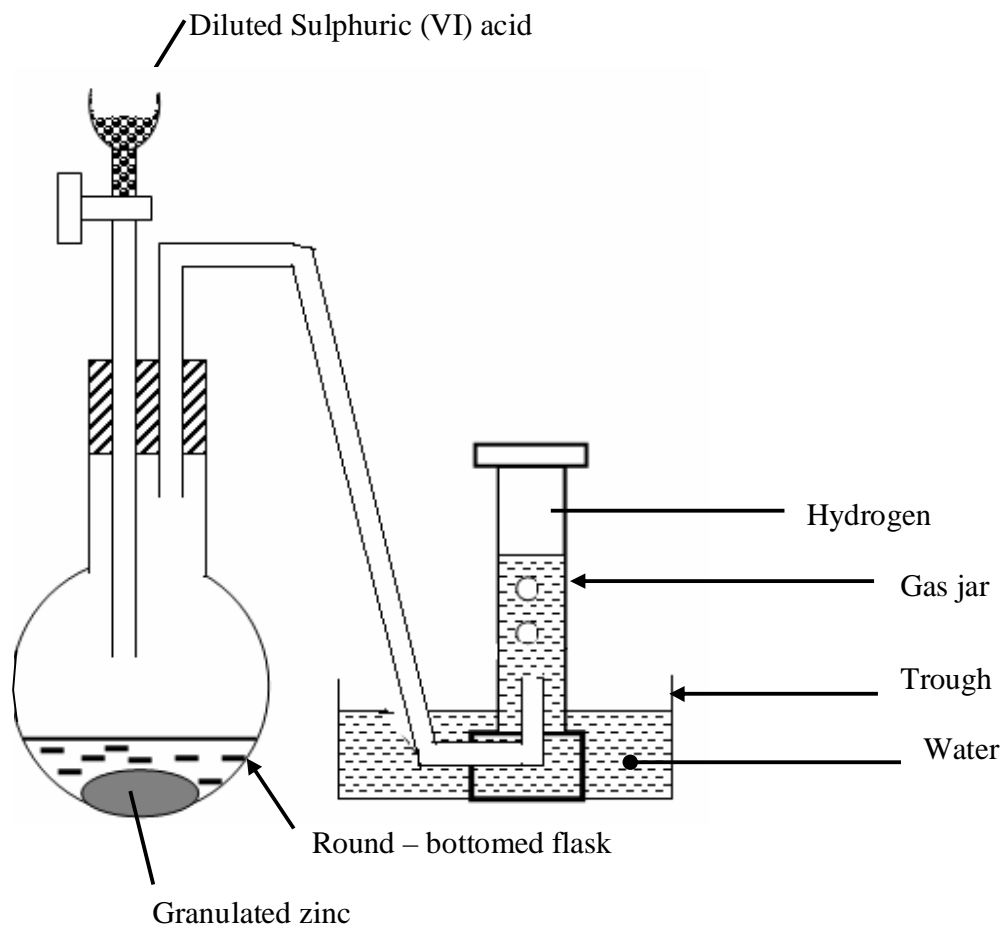
- A. Moles per litre B. Grams per litre
C. Mass divided by R.M.M D. Mass divided by volume

10. A certain solution recorded a pH of 9. This can be described as

- A. Neutral B. Basic
C. Acid D. Amphoteric

SECTION B: Answer ALL the Questions.

1. a) Study the figure below and answer the questions that follow



(i) What property of hydrogen made it possible to be collected as shown in the diagram

(1 mark)

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- (ii) Write down the chemical equation for the reaction taking place in the flask (3 marks)

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- (iii) Name TWO physical properties of Hydrogen gas (2 marks)

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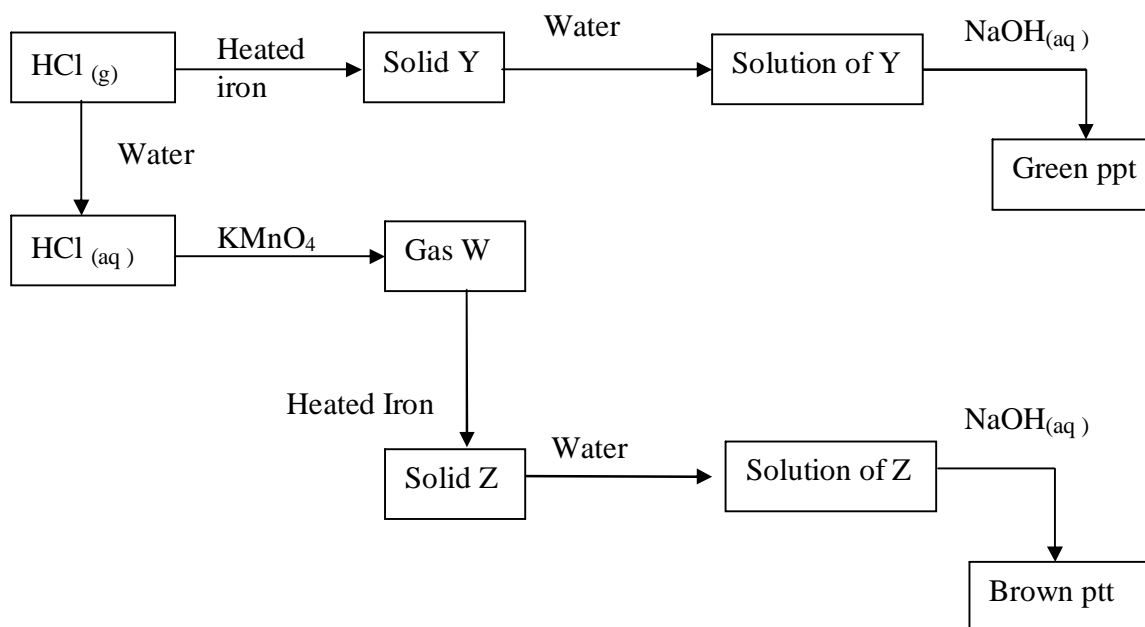
- (iv) Is the gas collected by upward or downward delivery method? Explain your answer (1mark)

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b) Study the following chart and answer the questions that follow



(i) Identify the substances

W..... (1 mark)

Y..... (1 mark)

Z..... (1 mark)

(ii) Write equations for the formation of the brown precipitate (3 marks)

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TOTAL 13 MARKS

2. (a) Draw and name the four structural isomers of the following C_4H_9OH
(8 marks)

(i)

(ii)

(iii)

(iv)

b) Hydrogen bromide was reacted with propene

(i) Draw the structure of the product

(1mark)

(ii) Give the name of the product

(1mark)

.....
TOTAL 10 MARKS

3. (a) The following are chemical species:

H_2O , H_2 , Mg , Ca^{2+} , O^{2-} and Cu

Classify them into;

(i) Atoms

(1mark)

(ii) Ions

(1mark)

(iii) Molecules

(1mark)

(b) The table below shows the structures of several particles. By using the information in the table, answer the questions that follow :-

Particle	Electrons	Protons	Neutrons
A	10	13	14
B	11	11	12
C	10	8	8
D	9	9	10

(i) Which two particles are neutral atoms? (2 marks)

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(ii) Which two particles are ions? (2 marks)

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(iii) Which particle is a positive ion? (1 mark)

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(iv) What charge is on this positive ion in (iii) above? (1 mark)

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(v) Which particle is a negative ion? (1 mark)

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(vi) What charge is on this negative ion in (v) above? (1 mark)

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TOTAL 11 MARKS

4. a) Below is a grid representing part of the Periodic Table. The letters are not the actual symbols of the elements

					D	E	F	
A	B				G		H	
C								

(i) Which is the element with the largest atom? (1 mark)

.....

(ii) Identify the most reactive non metal (1 mark)

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(iii) Give the electron arrangement of following elements

Element D (1 mark)

Element G (1 mark)

(iv) Write an equation for the reaction between element A and element E

.....

..... (2 marks)

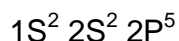
(b) Write down the electronic configuration in both quantum and orbital configuration for:

Potassium (atomic number 19, mass number 39) (2 marks)

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(c) An element Q has the following electronic orbital configuration



(i) Suggest the group and the period where element B is in the periodic table

Group..... (1mark)

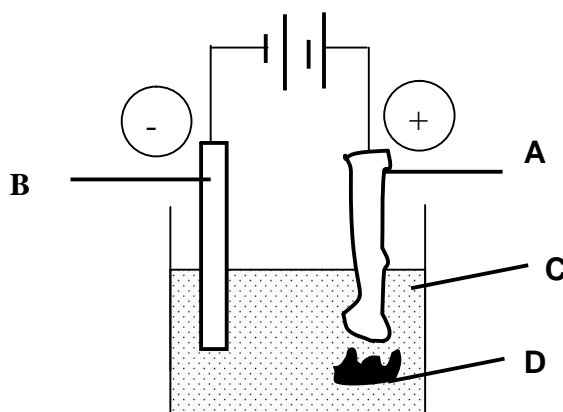
Period..... (1mark)

(d) Suggest TWO physical properties of elements A and C (2 marks)

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TOTAL 12 MARKS

5. The diagram below shows how impure copper is refined by electrolysis



(i) Give the materials that can be used to make electrodes A and B

Electrode A..... (1mark)

Electrode B..... (1mark)

(ii) Identify substance C and D

C..... (1mark)

D..... (1mark)

(iii) Write the ionic equation for the reaction taking place at the anode.....

..... (2 marks)

the cathode.....

..... (2 marks)

(iv) What is the economic importance of substance D

(1mark)

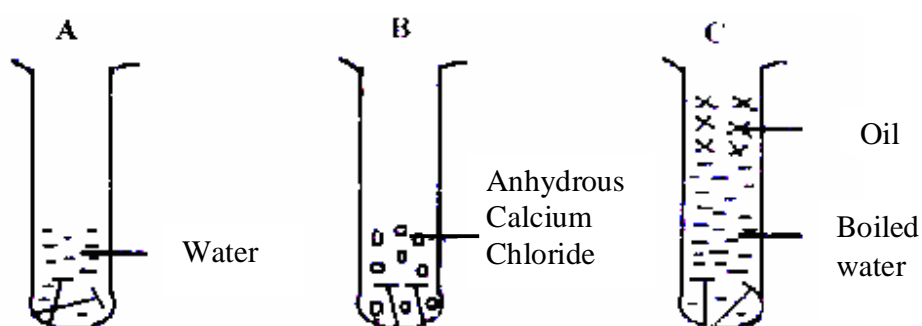
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TOTAL 9 MARKS

6. (a) The experiment below was set up by a student to determine the conditions under which iron nail will rust. Study it and answer the questions that follow:-



(i) State the purpose of the anhydrous calcium chloride in the tube B

(1 mark)

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(ii) Give a reason for using boiling water in tube C

(1mark)

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(iii) State and explain observations that would be in tube A after one week

(2marks)

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b) (i) State two observations that would be made when magnesium ribbon is burnt in air **(2 marks)**

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(ii) The product formed in b (i) above is dissolved in water. State whether the solution obtained is acidic or basic. **(2marks)**

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(c) One of the air pollutants is sulphur (IV) oxide. State its source and effect. **(2marks)**

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TOTAL 10 MARKS

7. (a) A student added dilute sodium hydroxide solution to a white solid M and the solid dissolved. He also added dilute hydrochloric acid to a sample of solid M and it also dissolved. What type of substance is solid M. Explain. **(2marks)**

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(b) Name one hydroxide that would dissolve in both dilute sodium hydroxide and aqueous ammonia. **(1mark)**

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(c) When air is bubbled through pure water of pH 7.0, the pH drops to 6.0.

explain this observation

(2 marks)

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TOTAL 5 MARKS

8. (a) During an experiment using Zinc powder and dilute HCl of different concentrations, the time required to evolve 100cm^3 of the gas for every experiment was recorded.

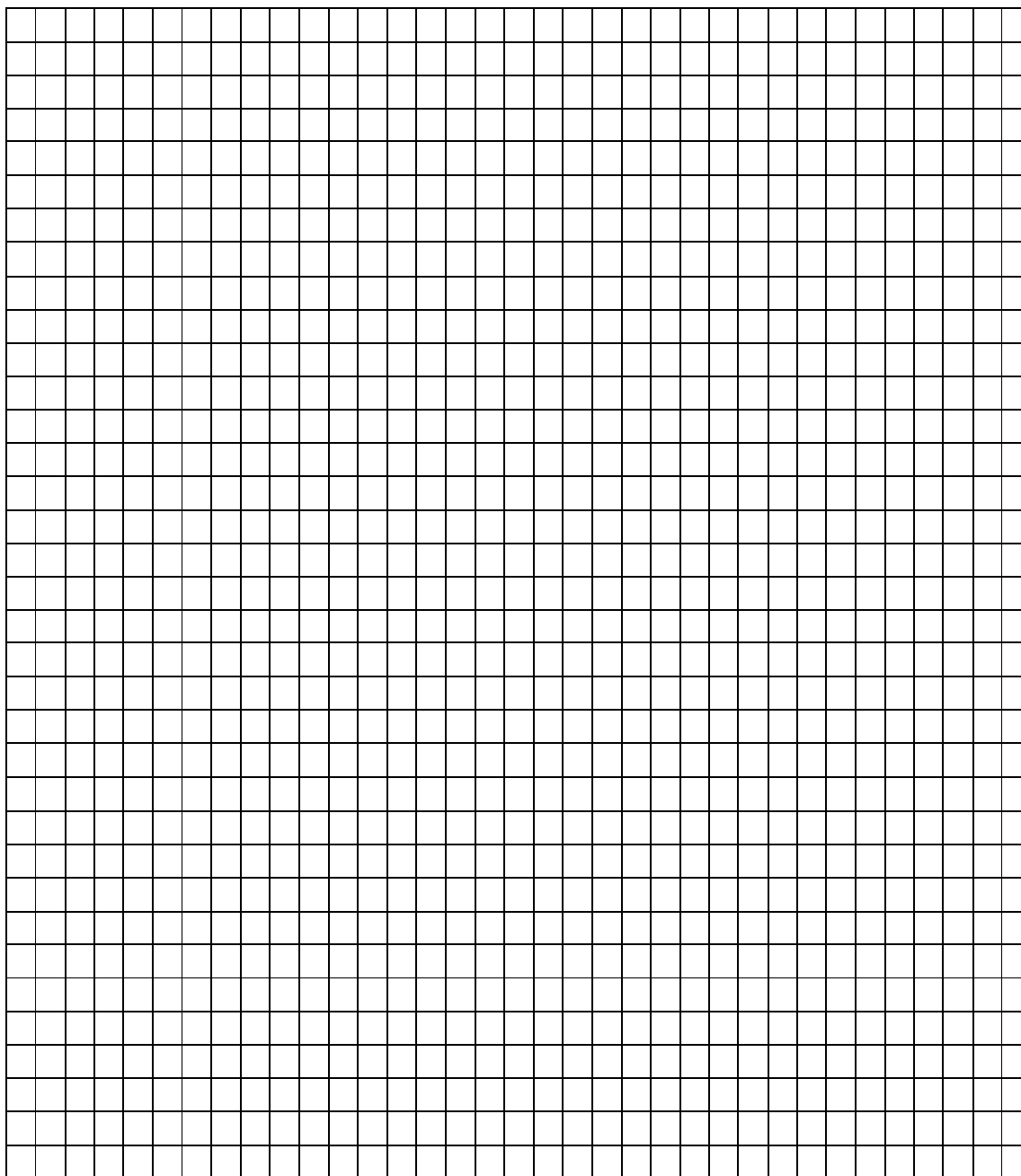
Concentration of HCl	1.5	1.25	1.00	0.75	0.50	0.25
Time (sec)	9.0	10.2	11.4	13	16.5	18
Rate (1 / t)	0.111		0.0878		0.0696	

(i) Complete the table

(3 marks)

(ii) On the grid provided below, plot a graph rate (vertical axis) against concentration (horizontal axis).

(3 marks)



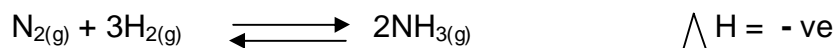
(iii) From the graph, determine the concentration needed to produce 100cm³ of Hydrogen when time is 12.0 seconds. **(1 mark)**

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(iv) From your graph, comment on the relationship between rate of reaction and concentration. **(2 marks)**

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(b) A dynamic equilibrium was obtained for the following reaction



(i) Define the term dynamic equilibrium **(1 mark)**

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(ii) How will the yield of ammonia be affected with increase in temperature? Explain your answer. **(2 marks)**

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TOTAL 12 MARKS

9. (a) 1.5 grams of pure sodium chloride is dissolved in water to make 250cm³ of solution. Calculate the molarity of the solution.

(Na = 23, Cl = 35.4) **(3 marks)**

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(b) Analysis of a compound gave 92.3% carbon and 7.7% hydrogen. Its relative molecular mass was found to be 78. Calculate its empirical and molecular formula. (**C = 12, H = 1**)

(5 marks)

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TOTAL 8 MARKS

END