

MASENO SCHOOL
Kenya Certificate of Secondary Education 2021

CHEMISTRY- Paper 1

DEC. 2021 - 2 hours

THE MASENO SCHOOL MOCK

Name..... Index No...../.....

INSTRUCTION TO CANDIDATES:

- 1) Write your **Name** and **Admission Number** in spaces provided **above**.
- 2) **Sign** and write the date of examination in spaces provided **above**.
- 3) Answer **ALL** the questions in spaces provided.
- 4) Mathematical table and electronic calculators **may be** used.
- 5) All working **must be** clearly shown where necessary.

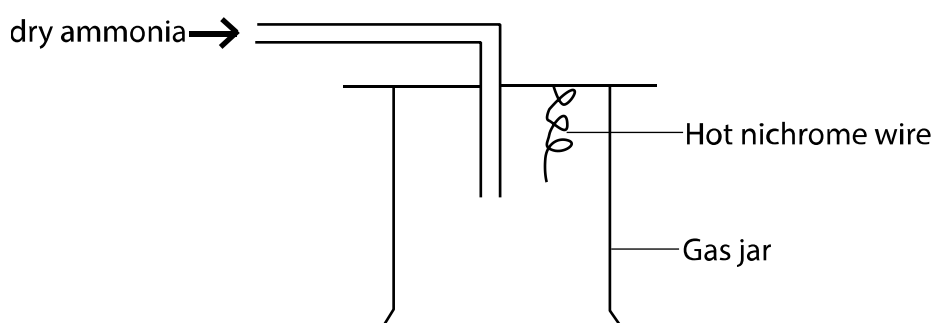
FOR EXAMINER'S USE ONLY:

Question	Maximum Score	Candidate's Score
1 - 28	80	

Turnover

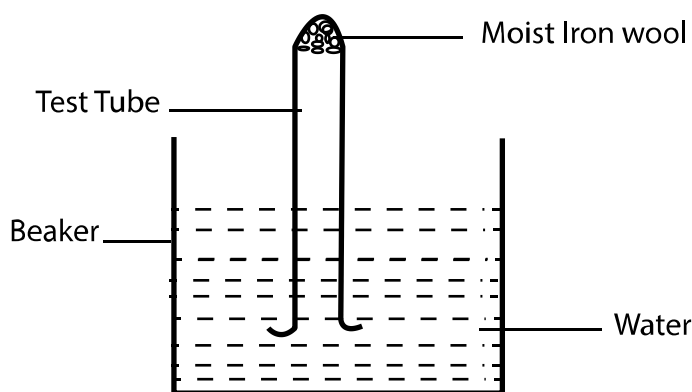
1. Name the process which takes place when:-
- (i) Iodine changes directly from gas to solid. (1mk)
-
- (ii) $\text{Fe}^{2+}_{(\text{aq})}$ changes to $\text{Fe}^{3+}_{(\text{aq})}$ (1mk)
-
- (iii) White sugar changes to black solid when mixed with excess concentrated sulphuric (IV) acid. (1mk)
-

2. The apparatus below was set up for the reaction of catalytic oxidation of ammonia. Study it and answer the questions that follow.



- (i) Write an equation for the reaction that take place in the gas jar. (1mk)
-
- (ii) What is the role of hot nichrome wire. (1mk)
-
- (iii) Write the formula of the complex ion formed when excess ammonia gas is passed through a solution containing Zn^{2+} ions. (1mk)
-
3. 9.12g of a gaseous compound contains 8g of silicon while the rest is hydrogen. Determine expirical formula of the compound. (Si = 28, H = 1) (3mks)
-
-
-

4. The set-up below was used to study some properties of air.

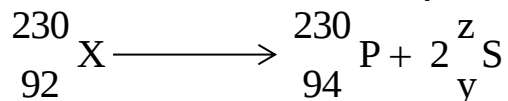


- a) Draw a well labeled diagram showing the observation made after five days. (3mks)

5. 16g of ethanol ($\text{C}_2\text{H}_5\text{OH}$) were completely burnt in air. The heat evolved caused the temperature of 600cm^3 of water to change from 20°C to 85°C . Calculate the molar enthalpy of combustion of ethanol. ($\text{H} = 1$, $\text{C} = 12$, $\text{O} = 16$, $\text{S.H.C} = 4.2\text{Kj/Kg/k}$) (3mks)

6. Calculate the volume of oxygen produced when 10g of silver nitrate was completely decomposed by heating at s.t.p. ($\text{Ag} = 108$, $\text{N} = 14$, $\text{O} = 16$, $\text{M.G.V. at s.t.p} = 22.4\text{dm}^3$) (3mks)

7. A radioactive substance underwent decay as shown below.



(i) Identify particle S (1mk)

(ii) List two properties of particle S (2mks)

8. a) What is fractional crystallization? (1mk)
-
-

b) The table below gives the solubility of X and Y at 0°C and at 45°C.

Salt	Solubility in g/100g of water	
	0°C	45°C
X	53	73
Y	10	11

A solution containing 57g of X and 8g of Y in 100g of water at 70°C was cooled to 0°C. Some crystals were observed.

i) Identify the crystals formed. (1mk)

ii) Calculate the mass of the crystals formed. (1mk)

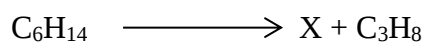
9. Complete the table below.

Metal	Aluminium	Lead	Sodium
Chief Ore	Bauxite	i) _____	Rock Salt
Chemical formula	ii) _____	iii) _____	iv) _____
Method of extraction	v) _____	Reduction	vi) _____

i) _____ (1/2mk) ii) _____ (1/2mk) iii) _____ (1/2mk)

iv) _____ (1/2mk) v) _____ (1/2mk) vi) _____ (1/2mk)

10. The molecular formula of a hydrocarbon is C₆H₁₄. It can be converted into two smaller hydrocarbons as shown below.



a) Name the process through which C₆H₁₄ is converted to X and C₃H₈. (1mk)

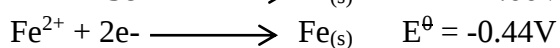
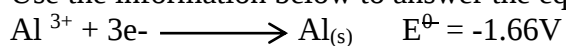
b) Name X and draw the structural formula.

(1mk)

c) Write the chemical equation for the complete combustion of C_3H_8 .

(1mk)

11. Use the information below to answer the equations that follow.



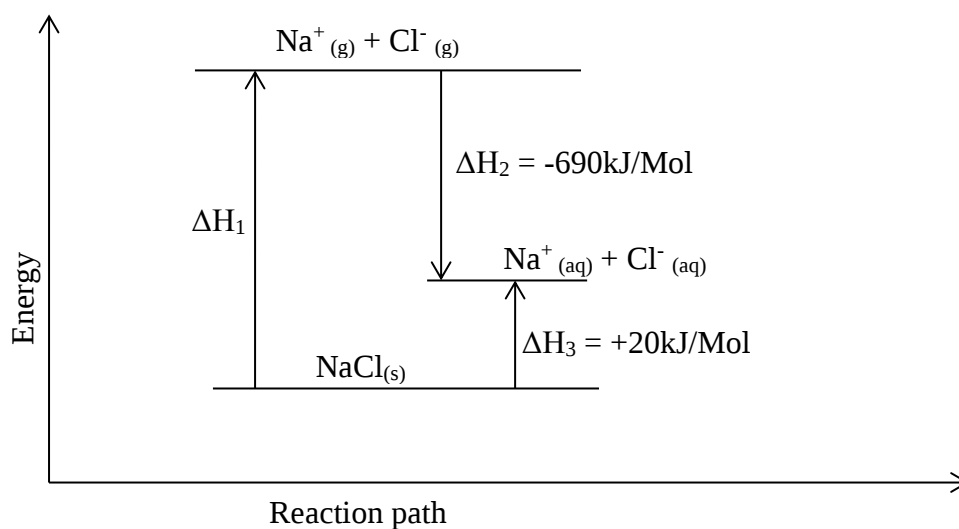
a) Calculate the e.m.f. of the cell formed by combining the two half cells.

(1mk)

b) Why is it not advisable to keep a solution of iron (II) nitrate in a container made of Aluminium?

(2mks)

12. Study the diagram below which shows energy level diagram.



(i) Name enthalpy

(2mks)

ΔH_1 _____

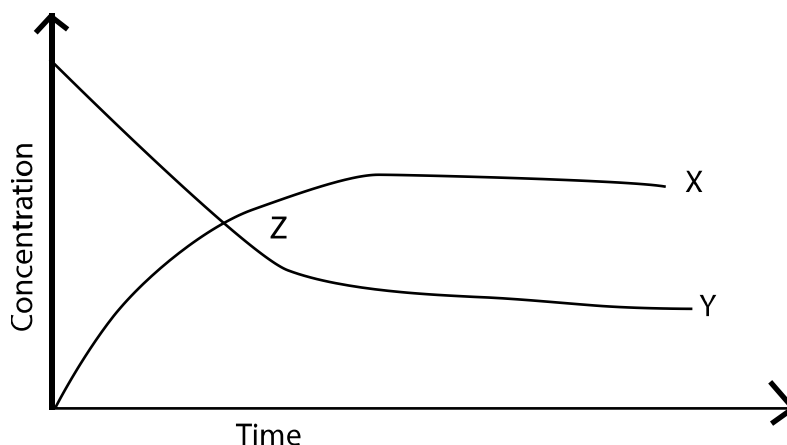
ΔH_2 _____

(ii) Calculate the ΔH_1 from the energy level diagram.

(1mk)

13. Starting with copper powder describe how pure copper (II) carbonate can be prepared. (3mks)

14. The graph below is a plot of concentration against time for a given reaction.



- i) What is represented by curve X? Explain. (1mk)

- ii) Explain why curve Y drops fast initially. (1mk)

- iii) What does point Z represent on the curve? (1mk)

15. The table below gives some of properties of the three elements in Group (VII) in the periodic table. The letters do not represent the actual symbols of elements. Study it and answer the questions that follow.

Element	Melting point $^{\circ}\text{C}$	Boiling point $^{\circ}\text{C}$
W	-101	-34.7
P	-7	58.8
S	114	184

- a) Which element is a gas at room temperature? Give a reason. (1mk)

b) Explain why the boiling point of P is higher than that of W? (1mk)

c) In which chemical family do W, P, S belong to? (1mk)

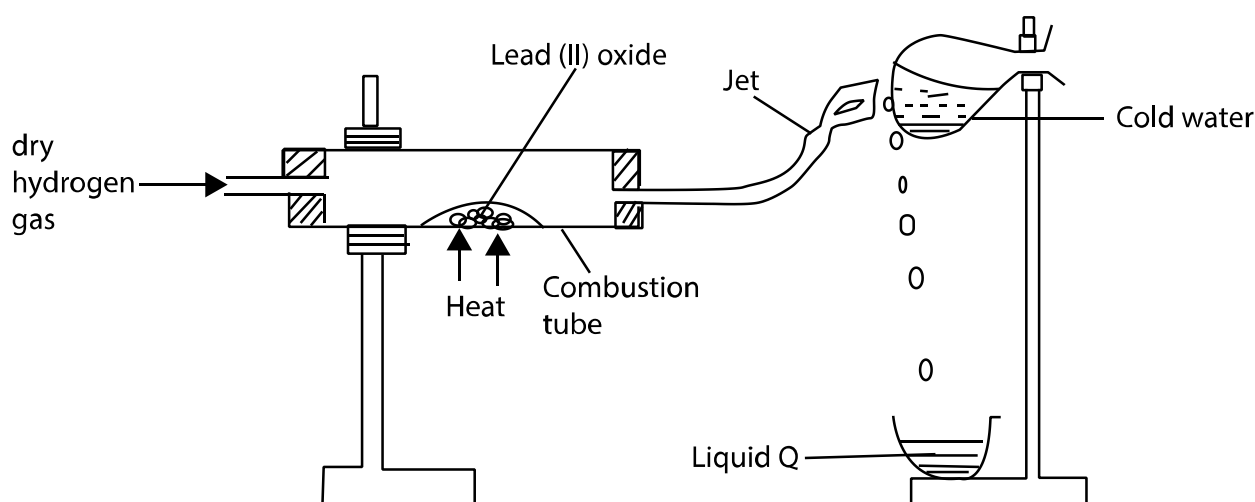
16. (a) State the product of electrolysis of molten copper (II) chloride at the cathode. (1mk)

b) Explain why the solid copper (II) chloride does not conduct electric current but does it in molten form. (1mk)

c) Explain why mercury is not an electrolyte? (1mk)

17. Describe how to prepare crystals of potassium sulphate starting with 50cm³ of 1M potassium hydroxide. (3mks)

18. In an experiment dry hydrogen gas was passed over heated lead (II) oxide as shown in the diagram below.



a) Name liquid Q (1mk)

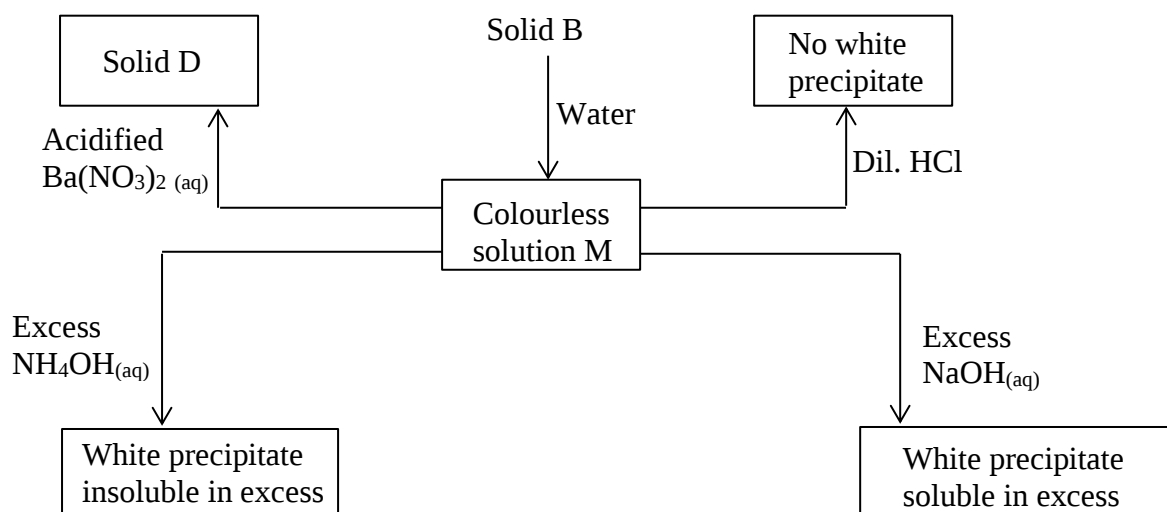
b) State the observation made at the jet. (1mk)

c) Write an equation for the reaction that takes place in the combustion tube. (1mk)

19. State **two** differences between non-luminous and luminous flames. (2mks)

Non-luminous	Luminous
i)	i)
ii)	ii)

20. Study the scheme below and answer the questions that follow.

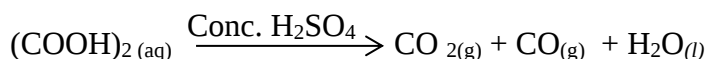


(a) Identify solution M and solid D.
i) Solution M (1mk)

ii) Solid D (1mk)

b) Write an ionic equation for the reaction between solution M and excess of ammonia $\text{NH}_4\text{OH}_{(aq)}$ (1mk)

21. Carbon (II) oxide gas can be prepared in the laboratory by the process shown below.



a) State the function of con. H_2SO_4 in the equation above. (1mk)

b) How would you remove carbon (IV) oxide from the mixture of carbon (IV) oxide and carbon (II) oxide. (1mk)

c) State one industrial use of carbon (II) oxide. (1mk)

22. State observation made when sulphur (IV) oxide is bubbled through.
- a) acidified potassium manganate (VII) solution. (1mk)
-
- b) acidified potassium chromate (VI) solution. (1mk)
-
- c) Which property of sulphur (IV) oxide is demonstrated by (a) and (b) above. (1mk)
-

23. Study the information in the table below and answer the questions that follow.

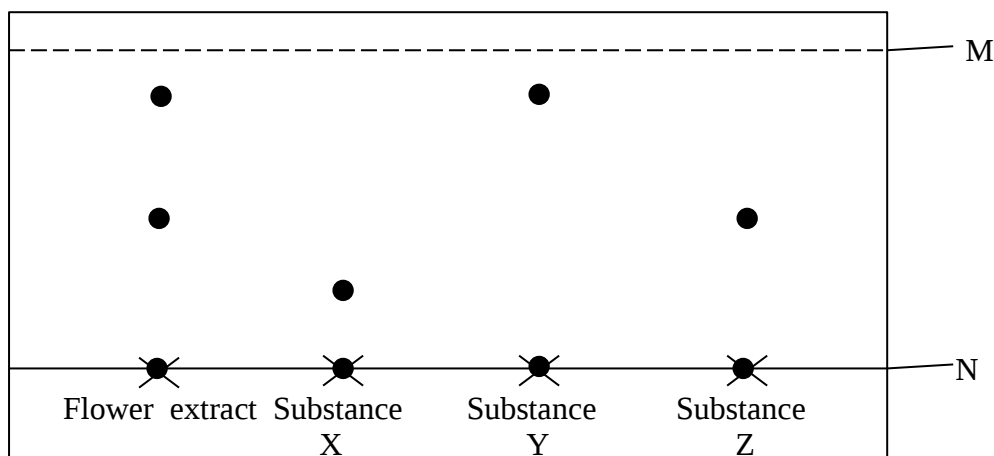
Hydrocarbon	Number of carbon atoms	Relative molecular mass of the hydrocarbon
A	2	28
B	3	42
C	4	56

- i) What is a hydrocarbon? (1mk)
-
- ii) Predict the relative molecular mass of the hydrocarbon with 5 carbon atoms and draw its structural formula.
- RMM = _____ (1mk)
- Structural formula (1mk)

24. Define the following terms

- i) Isomerism (1mk)
-
- ii) Vulcanisation (1mk)
-

25. The diagram below shows a chromatogram obtained when flower extracts of a given plant were subjected to chromatography.



a) Name the parts labeled

M _____ (1mk)

N _____ (1mk)

b) Which substances make up the flower extract? (1mk)

26. Use the information in the table below to answer the questions that follow. The letters do not represent the actual symbols of the elements.

Element	I	II	III	IV	V
Atomic number	18	5	3	5	20
Mass number	40	10	7	11	40

a) Which two elements represent isotopes?

Give a reason. (2mks)

b) Calculate the number of neutrons in an atom of element I. (1mk)

27. a) State the Charles's law. (1mk)

b) The volume of a sample of hydrogen gas at a temperature of 18°C and 2.0×10^5 pascals was $4.5 \times 10^{-2} \text{ m}^3$. Calculate the temperature at which the volume of the gas would be $2.8 \times 10^{-2} \text{ m}^3$ at 2.0×10^5 pascals. (2mks)

28. What is an atom? (1mk)

