MURANG'A SOUTH SUB-COUNTY MULTILATERAL EXAMINATION 2016
Kenya National Examination Council

233/2
CHEMISTRY
PAPER 2 (THEORY)
TIME: 2 HOURS

1. Study the periodic table below and answer the questions that follow. The letters do not represent the actual symbols of the elements.

A								B
C		Transition		D		X	E	F
G	H	Elements	I	J	K	L	M	N
●	P			●			R	S

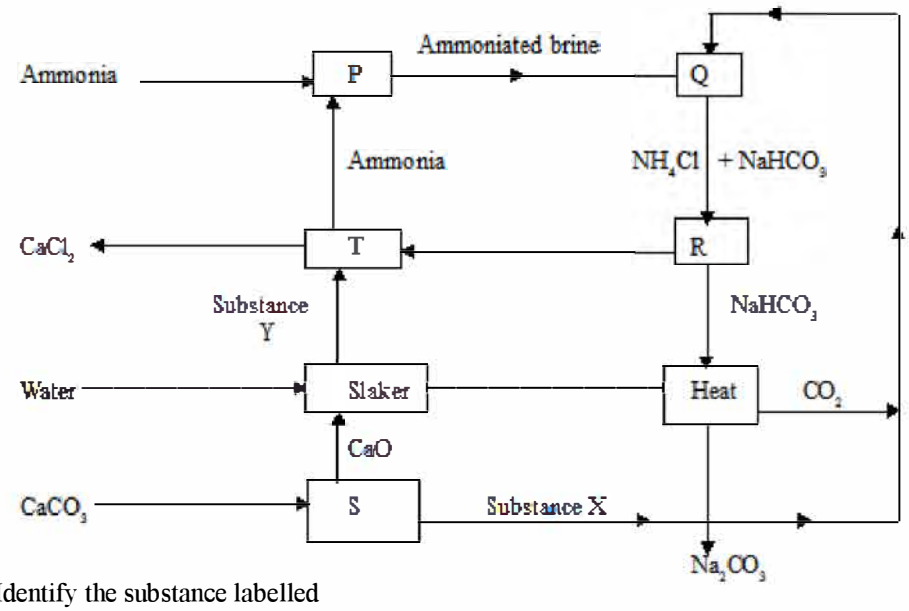
a) Name the chemical family to which the following elements belong
i) C, G, O (½ mk)
ii) B, F, N, S (½ mk)
b) Classify elements H and M as either metals or non-metals.
H - (½ mk)
M - (½ mk)
c) State one use of element.
A (1mk)
N - (1mk)
d) Compare the atomic radius of G and H. (2mks)
e) Ionic radius of R is larger than its atomic radius. Explain. (2mks)
f) Write down the formula of the compound formed when element I reacts with element X. (1mk)
g) Identify the strongest oxidising agent. Explain. (2mks)
h) Write down the electron arrangement of:-
i) Element P (½ mk)
ii) Ion of E
i) Identify an element with a charge of +2. (½ mk)
j) Compare the first and second ionisation energies of element H. (2mks)

2. i) Define a binary electrolyte. (1mk)
ii) The following are half-cell equations for some elements. The letters do not represent the actual symbols. Use the information to answer the questions that follow.

			$E^{\ominus}V$
$M^{2+}_{(aq)} + 2e^-$	→	M(s)	+0.34
$L^{2+}_{(aq)} + 2e^-$	→	L(s)	+0.84
$K^{2+}_{(aq)} + 2e^-$	→	K(s)	-0.13
$J^{2+}_{(aq)} + 2e^-$	→	J(s)	-0.76
$2V^{+}_{(aq)} + 2e^-$	→	$V_{2(g)}$	0.000

a) Write down the E^{θ} value of the strongest reducing agent. (1mk)
b) Select two half-cells that would produce the highest emf of a cell. (1mk)
c) Calculate the emf of the cell in (b) above. (1mk)
d) Give the cell diagram notation for the cell in (c) above. (1mk)
e) What is element V? Explain. (2mks)
f) State two functions of a salt bridge. (2mks)

3. Use the flow chart below to answer the questions that follow.



a) Identify the substance labelled
X - (1mk)
Y - (1mk)

b) Name two substances being recycled in the process represented by the flow chart. (2mks)

c) Name the process that take place in
S- (1mk)
R - (1mk)

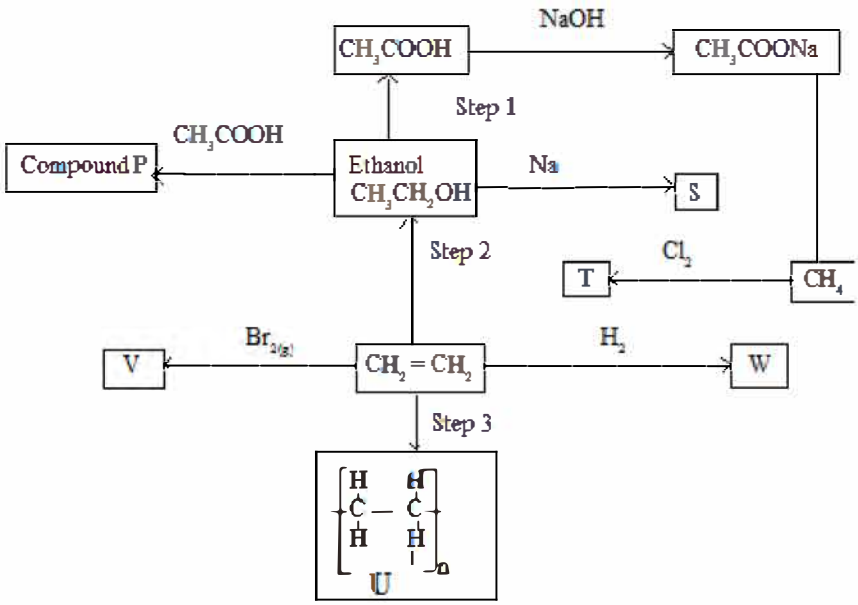
d) Give one uses of calcium chloride. (1mk)

e) Write down balanced chemical equations for the reactions that takes place in chambers
Q - (1mk)
T - (1mk)

f) Using ionic equations, explain how sodium carbonate can be used to soften hard water. (2mks)

g) Other than softening of hard water, give one other use of sodium carbonate. (1mk)

4. The flow chart below shows some chemical reactions.
i) Use it to answer the questions that follow.



a) Write the name and formula of the organic compounds P, V and W

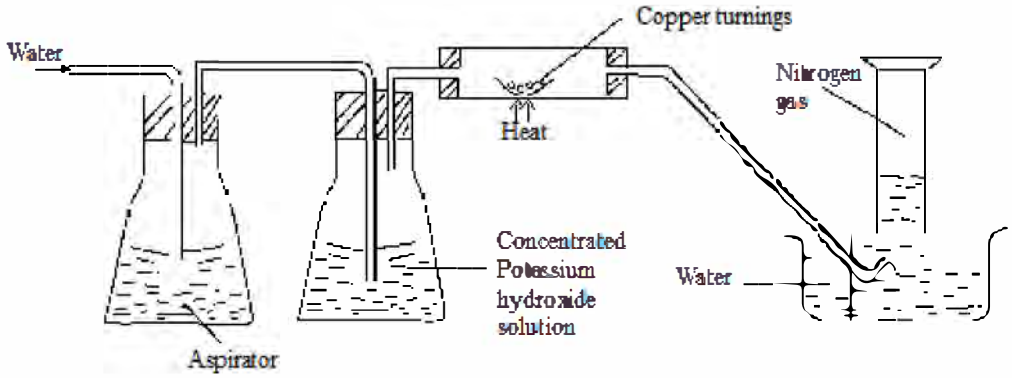
i) Name P (½ mk)
Formula (½ mk)

ii) Name V (½ mk)
Formula (½ mk)

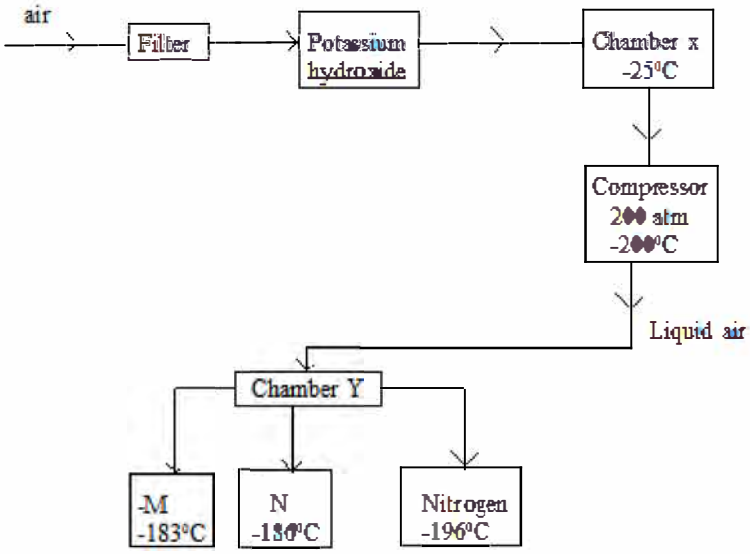
iii) Name W (½ mk)
Formula (½ mk)

b) Write the name of the process that leads to the formation of substance (s) V, T, P (½ mk)
c) Give one necessary condition for the formation of compound P. (1mk)
d) If the relative molecular mass of compound U is 84,000 units, determine the value of n.
C = 12 O = 1.0 (2mks)
e) Write the equation for the reaction leading to the formation of substance S. (1mk)
f) State and explain the observation made when substance W and C_2H_4 are burnt in excess air. (2mks)
g) Explain why an organic compound with formula C_3H_6 burns with a more sooty flame than C_3H_8. (2mks)

5. Nitrogen gas can be obtained from air as shown below.

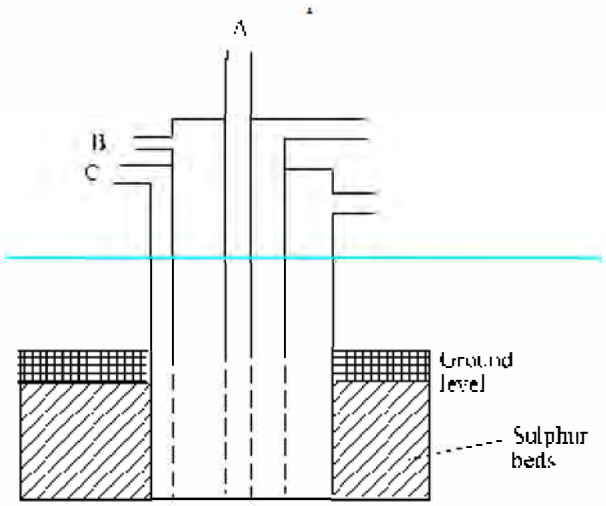


a) What is the purpose of the following
i) Potassium hydroxide solution? (1mk)
ii) Copper turnings?
(1mk)
b) Why should water be pumped into the aspirator? (1mk)
c) Name another substance that can be used in place of potassium hydroxide. (1mk)
d) The nitrogen gas obtained above is not pure. Identify one gaseous impurity in the gas. (1mk)
e) The flow chart below shows how pure nitrogen gas is obtained.



i) What is the functions of the following chambers?
Filter (1mk)
Chamber X (1mk)
ii) Name the process that takes place in chamber Y. (1mk)
iii) Identify
M - (½ mk))
N (½ mk)
g) State two uses of nitrogen gas. (2mks)

6. The diagram below shows the extraction of sulphur.



a) i) What name is given to the process above. (1mk)
ii) State the uses of the pipes
A (1mk)
B (1mk)
C (1mk)
b) Give two crystalline allotropes of sulphur. (1mk)
c) Write an equation for the combustion of sulphur. (1mk)
d) Name the product formed when a mixture of sulphur and iron dust is heated. (1mk)
e) Give two uses of sulphur. (2mks)
f) 6.0dm^3 of sulphur (IV) oxide were oxidised by oxygen to sulphur (VI) oxide. (2mks)
Write the equation for the reaction. (1mk)

7. 0.6g of Manganese (IV) oxide was placed in a flask and 25cm^3 of hydrogen peroxide added. The volume of oxygen gas produced was recorded after every 10 seconds. The results obtained were recorded in the table below.

Time (s)	0	10	20	30	40	50	60	70	80
Volume (cm^3)	0	13.5	25	34.5	42.5	49	53	55	55

a) Plot a graph of volume (cm^3) against time (sec). (3mks)
b) From the graph, determine the volume of oxygen gas produced. (1mk)
c) The experiment was repeated using more concentrated hydrogen peroxide.
On the same axis; sketch the curve that was obtained. (2mks)
d) Write an equation for catalytic decomposition of hydrogen peroxide. (1mk)
e) Give the test for oxygen gas. (1 mk)
f) State two uses of oxygen gas. (2 mk)