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SUBJECT : CHEMISTRY

QUESTION BANK FOR SENIOR TWO

Q1. Using dot (**.**) and cross (**x**) diagrams show how the following atoms combine to form compounds:

a) Al (2:8:3) and F (2:7)
b) C (2:4) and H (1)

Q2. Given three oxides of Period 3 of the periodic table: Na_2O, Al_2O_3 and SO_3

a) From this list choose and write down the formula of an oxide which is :
(i)Acidic
(ii) Basic
(iii) Amphoteric

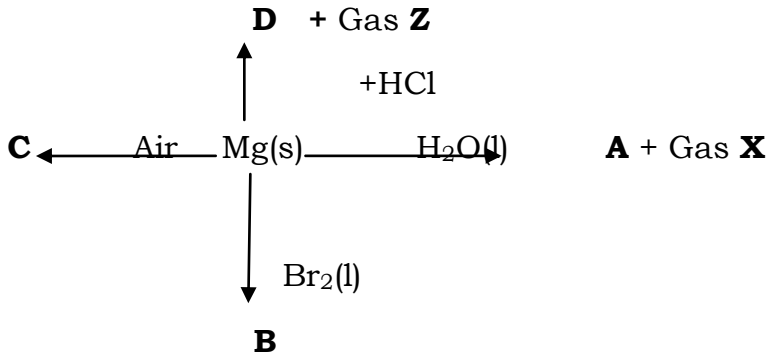
b) Write a balanced equation to show the reaction between the basic oxide and water.

Q3. a) Define the following terms:

(i)Chemical bonding (ii) Electronegativity

b) Differentiate using at least three elements i) covalent bond from an ionic bond ii) covalent compound and ionic compound

Q4. The scheme below shows some reactions starting with magnesium:



a) Give the name or formula of compound **A** and the gas **X.**
b) Give the name or formula of solid **B**
c) Give the name or formula of solid **C**
d) State the name or formula of **D** and the gas **Z.**

Q5. a) Define the term" metallic bond" and use an appropriate diagram for illustration

b) Why metals are known to be good electrical and thermal conductors?

c) Differentiate the malleability from ductility as part of properties of metals

d) State other 3 properties of matals

Q6. The elements **X** and **Y** with the respective atomic numbers 12 and 17 react to form a compound **Z.**

a) Write the electronic configuration of:
(i) **X** (ii) **Y**
b) Write the compound **Z**
c) State whether **Z** is a solid. liquid or gas
d) State whether **Z** is covalent or ionic and give three of its properties

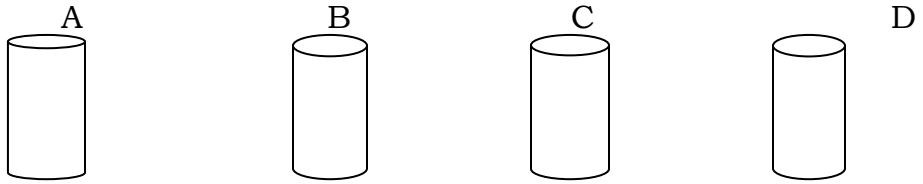
Q7. a) Oxygen can be prepared by thermal decomposition of some salts. Complete and balance the reaction equation below:

$$KClO_{3(s)} \xrightarrow{\text{Heat}}$$

b) Give two uses of Oxygen.

c) Give the necessary conditions for iron or steel to rust.

d) Using the answer in (c), observe the content of the four test tubes below and complete the table with YES or NO. Note that each test tube contains Iron nails in contact with other substances.



Test Tube	**Nails in contact with:**	**Did the nails rust?**
A	Oil+ hot boiled water	
B	Tap water	
C	Anhydrous calcium chloride + cotton wool+air	
D	Oil	

(i)What is the use of anhydrous calcium chloride in tube C?

(ii)What is the role of oil in tube D?)

(iii)In which way is rusting similar to respiration?

(iv) In which way is rusting similar to respiration

(v) State two ways of preventing against iron rusting

Q8. Hydrogen peroxide was mixed with manganese (IV) oxide, to produce oxygen gas.

a) Draw a well labeled set up of a diagram used in this experiment/2marks

b)What is the role of manganese (IV) oxide in this experiment?

c) Write an equation for this reaction

d) How is oxygen tested? Describe the test and the expected observation

e) The elements sodium and sulphur were burned separately in oxygen. The product of each gas was mixed with water and the mixture shaken.The resulting solution was tested with litmus paper. Write a balanced equation to show:

(i) How each element react with oxygen

(ii)How each each product in (i) reacts with water.

d)State the observation made when the product of burning sulphur in oxygen was shaken with water and tested with blue litmus paper

Q9. **a)** Define the term (i) acid **(ii)** Base

b)What is the difference between a strong acid and a weak acid?

a) Design a simple laboratory test to differentiate a weak acid and a strong acid

Q10. Explain the following statement in terms of bond and structures.

i) Sodium chloride conducts electricity in molten state but not in solid state
ii) Water has unexpected high boiling point than other group six hydride
iii) Silicon Tetrachloride ($SiCl_4$) does not conduct electricity in molten state
iv) Diamond is hard and bad conductor of electricity
v) Graphite is soft and good conductors of electricity

Q11. a What is the name given to the reaction between an acid and base**?**

b) Write a balanced equation for the reaction between
i) Calcium carbonate and hydrogen chloride)
ii) Sodium hydroxide and sulphuric acid

iii)Copper (II) oxide and sulphuric acid

iv)Zinc metal and hydrochloric acid

v) Calcium hydroxide and nitric acid (hydrogen nitrate)

Q12. a) How does the reactivity of group I element compared to that of group II element?

b)Explain why alkaline metals kept under kerosene (paraffine)
c) Calcium and magnesium are all located in group two of the periodic table
i) The atomic number of calcium is 20, write its electronic configuration then state the its period of the periodic table
ii) compare the reactivity of both calcium and Magnesium with water. Use equations to support your answer.

Q13. a) Explain why Cl forms Cl^-

b) Write the formula of an ion of Magnesium

c) Write the formula of the compound formed between an ion of chlorine and an ion of Magnesium. Then name the bond formed between them.

d) State at least 3properties shown by the product in (c)

Q14. When sodium was reacted with water an alkaline solution was formed and an hydrogen gas was formed.

i) Write a balanced equation for the reaction
ii) How an hydrogen gas was tested
iii) Explain the observation made when two drops of phenolphthalein indicator were in the added in alkaline solution in (i)

Q15. a) State and explain how the reactivity of halogens changes down the group (from the top to bottom)

b) Write an equation of the reaction observed when chlorine gas (Cl_2) is passed in solution of potassium iodide then state the color change during this reaction.

State the type of reactions in(b)

Q16.. Study the table below and answer the related questions:

Atom	Electrons	Protons	Neutrons	RAM
A	8	8	8	16
B	X	13	14	27
C	16	16	17	?
D	11	Y	12	23
E	8	8	Z	18

a) Work out the values of X,Y and Z.

b) Work out the relative atomic mass of C.

c) Write the electronic configuration of the ions and atoms:

(i)D (ii) A^{2-} (iii) B^{3+} (iv) C

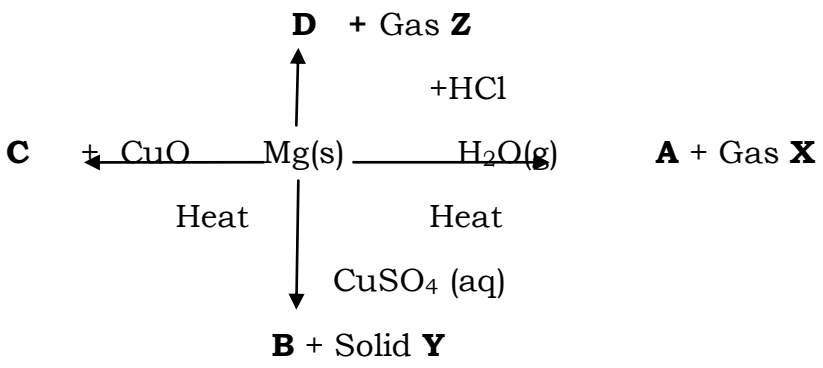
d) Which atoms in the table above:

(i)Are isotopes?

(ii)Belong to the same group in the Periodic Table?

c) Belong to the same Period in the Periodic Table?

Q17. The scheme below shows some reactions starting with magnesium:



e) State the name of compound **A** and the name of the gas **X.**
f) Give the name of solution **B** and the name of the solid **Y.**
g) **C** is a mixture of two solids. Identify the two solids.

State the name of solution **D** and the name of gas **Z.**

Q18. Compounds of N,P and K are often used as inorganic fertilizers.

a) Explain what is meant by a fertilizer.

b) Why is it necessary to apply fertilizers to soil?

c) Give two compounds that could be used to prepare potassium nitrate fertilizer.

Q19 .What is the nature of solution with the following pH?

a) pH=7 b) pH=13

Q20. Write the balanced chemical equations for the reactions below (Use chemical symbols):

a)Sodium hydroxide + hydrochloric acid →

b)Zinc oxide +nitric acid →

. Q21`.a) Complete and balance the chemical equations below:

(i)$Ca(s) + O_2(g) \rightarrow$

(ii)$K(s) + H_2O(l) \rightarrow$

Q22 .The following list shows the chemical formulae of some ions: Na^+, Zn^{2+}, Al^{3+},Br^-, PO_4^{3-} and O^{2-}.Use the list to write down the chemical formula of:

Zinc phosphate b) Aluminium oxide c) Zinc oxide. .

Q23.a) State the Law of matter conservation. (Lavoisier's Law). →

b) The law above consists of two parts. Precise the two parts thereby using $SO_3 + H_2O \longrightarrow H_2SO_4$ as example to explain each one of the parts stated above. (Mass: S=32, O=16,H=1).

Q24 a) Hydrogen is placed in group I of the Periodic Table and has a double behavior:

(i)Give one reason that makes Hydrogen to behave as alkali metals (Group I elements).

(ii)State two reasons that make Hydrogen to behave as halogens (Group VII elements).

b) (i) Write and balance the chemical equation illustrating the reaction between chlorine (Cl_2) and Sodium hydroxide(NaOH).

(ii)Referring to the equation b (i), state the commonly known use of aqueous solution of halogens.

Q25 . a) Balance the chemical equations below using any method of your choice:

(i) $PCl_5(s) + H_2O(l) \rightarrow H_3PO_4 + HCl(g)$
(ii) $Li(s) + CO_2(g) + H_2O(l) \rightarrow LiHCO_3(s) + H_2(g)$
(iii) $ZnS(s) + HBr(aq) \rightarrow ZnBr_2(aq) + H_2S(g)$

b) Using chemical symbols write balanced equations from the given word equations:

(i)Magnesium + Nitrogen → Magnesium nitride

(ii)Barium +Oxygen → Barium oxide

Q26. . It has been found by mass spectrometric analysis that the relative abundance of the various isotopic atoms of silicon in nature are: 92, 21% of Si-28; 4.70% of Si-29 and 3.09% of Si-30

(a)define the term isotope
(b) calculate the average atomic mass of silicon
(C)calculate the number of neutrons and electrons in the isotopes of $^{28}Si_{16}$

(d)expain why all isotope of silicon have similar chemical properties

Q27. .State if the following changes are chemical or physical:

a) melting of the ice
b) burning of woods
c) photosynthesis
d) corrosion of metals

Q28. Hydrogen gas can be prepared by reacting dilute hydrochloric acid and zinc metals

a) Draw a well labeled set up used in this experiment

b)Write equation for the reaction/

c) Assuming that the preparation was perfomed by 2 different students(SOGOKURU and SANDRA):
SANDRA reacted zinc powder with an excess of hydrochloric acid while SOGOKURU reacted zinc granules with an excess of dilute hydrochloric acid

i. State with explanation the one between the two students prepared hydrogen gas at high rate /
ii. State other 3 factors to increase the rate of production of hydrogen gas
iii. How each student will test that the gas prepared is hydrogen .
iv. Hydrogen gas is collected by down ward displacement of air (upward delivery),explain.
v. State 2 uses of hydrogen

d.) hydrogen gas was passed over copper (ii) oxide

Write a balanced equation for this reaction and use oxidation number to show the reducing agent and the oxidizing agent

Q29. . a)State the general trends in the following properties down the group and across the period of periodic table

si. Atomic radius(size)
i. Electropositivity
ii. Electronegativity
iii. Reactivity of metals
iv. reactivity of non-metals)

b) compare the reactivities of sodium and potassium with water .use a chemical equation to support your answer/

c) Briefly explain why alkaline metals are kept under paraffine (kerosene)

Q30. write one term or word used to describe:
a .A reaction between acid and base
b .A method used to separate different dyes in ink
c. A method used to separate the components of air
d .A mixture of metals
e) A reaction which releases heat
f) A method to separate the insoluble solid(precipitate) from the solution)
g) A method used to get pure water from the sea water
Q31. Calcium z=20 and fluorine z=9 combine to form calcium fluoride

a.Give the electronic configuration of Ca^{2+} and F^{-} ions.
b.Explain the type of bonding in calcium fluoride
c.Mg z=12,is in the same group of the periodic table as calcium
i.in which group of the periodic table are the two metals found
ii.compare the reactivities of the two metals with water and give reason for your answer.

Q32. Oxygen can be prepared by adding a liquid M in Sodium peroxide

i. Name the liquid M

II. Draw a well labeled diagram for a set up used and Write a balanced equation for the reaction

Q33 (a) An element X is in Group II of the Periodic Table.

(i) State the type of bond that exists in the chloride of X.

.....

(ii) Write the formula of the ion formed by X.

.....

Q34. An atom of element X contains 15 electrons and 16 neutrons.

(a) (i) State the mass number of X.

(ii) Write the electronic structure of X.

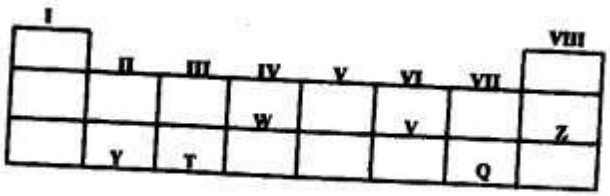
(b) (i) Write the formula of a chloride of X.

(ii) State the type of bond that exists in the chloride of *X*

(c) Suggest how an aqueous solution of the oxide of X would

affect litmus paper

Q35.Part of the Periodic Table is shown below. I



(a) State:

(i) the most reactive metal.....

(ii) the most reactive non-metal.....

(ii) the atom that forms the largest anion.

.....
...

(iv) the most non-reactive element

.....
...

(b) Write the formulae of the compounds formed between the following pairs of elements and in each case state the type of bonding.

(i) W and Q .....

(ii) T and V .....

Q36. Draw diagrams to show how the following elements use their outermost electrons to form the following compounds

[Atomic numbers: C = 6, O = 8, CI =17, Ca = 20]

(a) Carbon and hydrogen to form methane.

(b) Hydrogen and oxygen to form water.

.....

.....

.....

.....

(a) Calcium and chlorine to form calcium chloride.

Q37. An element M has electronic structure 2:8:8:2.

(a) State the group to which this element belongs in the periodic table.

.....

(b) Element M was put in warm water.

(i) State what was observed.

.....

.....

(i) Write equation for the reaction that took place.

.....

.....

(c) Name one use of element M

Q38. 12. An atom X of an element, atomic mass 31 contains 15 protons.

(a) (i) State the number of neutrons in X.

.....

(ii) Write the electronic configuration of X,

.....

(b) State the group in the periodic table the element belongs.

.....

(c) (i) Write the formula of a compound that can be formed between X and chlorine.

.....

.....

(ii) State the bond type in the compound in (c) (i).

.....

(d) An atom Y contains 17 neutrons and 15 protons. What word is used to describe the relationship between X and Y ?

Q39 Which one of the following is a basic oxide?

A. SO_2

B. ZnO

C. P_2O_5

D. CaO

Q40. Beginning with the least reactive, the order of reactivity of the following metals with dilute hydrochloric acid is

A. iron, aluminium lead, zinc

B. zinc, lead, aluminium, iron

C. lead, iron, zinc, aluminium

D. aluminium, zinc, iron, lead

Q41 The atomic number of an element is

A. the number of electrons and protons

B. the number of protons and neutrons

C. the number of neutrons

D. the number of protons

Q42. The atomic numbers of elements X and Y are 7 and 9 respectively. The formula of the compound formed between X and Y is

A. XY_3

B. XY_2

C. X_3Y

D. X_2Y

Q43. Isotopes are different atoms of the same element with the

A. same number of protons, neutrons and electrons.

B. same number of electrons and neutrons but different number of protons.

C. same number of protons and neutrons but different number of protons.

D. same number of protons and electrons but different number of neutrons.

Q44. Which one of the following substances conducts electricity?

A. Zinc

B. Neon

C. Chlorine

D. Sulphur

Q45. How many electrons are there in oxygen (O^{2-}) ion?

(The atomic number of oxygen is 8)

A. 6

B. 8

C. 10

D. 16

Q46. Which one of the following gases will reduce copper (II) oxide to copper?

A. Hydrogen

B. Water vapour

C. Chlorine

D. Oxygen

Q47. An atom of an element X has 19 electrons. In the Periodic Table X belongs to

A. group I

B. group II

C. group III

D. group IV

Q48 An atom 41 M forms a chloride of the formula MCI_2. Which one of the following

20

atoms forms a chloride with a similar formula?

A. 25R

12

B. 25T

13

C. 21Y

10

D. 22Z

11

Q49 In the order of the reactivity of the elements K, Na, Mg, AI, C, Zn and Cu, potassium is the most reactive and is copper e least reactive. Which one of the following reactions is possible?

A. $2Na_2O_{(s)} + C_{(s)} \xrightarrow{heat} 4Na_{(s)} + CO_{2(s)}$

B. $2MgO(s) + C(s) \xrightarrow{heat} 2Mg(s) + CO2(g)$

C. $Mg_{(s)} + CuO_{(s)} \xrightarrow{heat} MgO_{(s)} + Cu_{(s)}$

D. $2AI_{(s)} + 3K_2O_{(s)} \longrightarrow AI_2O_{3(s)} + 6K_{(s)}$

Q50. A separating funnel can be used to separate a mixture of water and petrol because the two liquids.

A. are miscible

B. are immiscible.

C. have different densities.

D. have different boiling points.

51. When sodium nitrate is heated it gives

A. nitrogen dioxide

B. sodium oxide and nitric oxide.

C. oxygen and sodium nitrite

D. oxygen and nitrogen dioxide

52. Which one of the following properties is NOT shown by group VII elements? They

A. are all non-metals

B. are all gases at room temperature

C. all form ionic compounds with group I elements.

D. all form diatomic molecules.

53. The process by which water vapour is changed into dew is called

A. distillation

B. efflorescence

C. condensation

D. evaporation

54. Atoms of elements in the same group in the periodic table have the same number of

A. outer shell electrons

B. electrons outside the nucleus

C. protons in the nucleus

D. neutron in the nucleus

55. A metal normally reacts with dilute mineral acids to give

A. the oxide of the metal and hydrogen

B. a salt of the metal and water

C. the hydroxide of the metal and hydrogen

D. a salt of the metal and hydrogen

56. An atom of an element has the structure 20X. The element

10

A. forms covalent bonds readily with non-metals.

B. forms ionic bonds with non-metals

C. belongs to group II of the periodic table.

D. has full shells of electrons.

57. The ion formed by the element X of atomic number 13 is

A. X^{3+}

B. X^{2+}

C. X^{2-}

D. X^{3-}

58. Which of the following mixtures is best separated by chromatography?

A. Ink

B. Crude petroleum

C. Water and oil

D. Water and ethanol

59. Which one of the following is an electronic configuration of an atom of an inert gas?

A. 2:8:8

B. 2:8:7

C. 2:8:6

D. 2:8:8:1

60. The number of neutrons in the nucleus of an atom, $X^{37}{}_{17}$ is

A. 17

B. 20

C. 37

D. 54

61 An oxide of metal Z reacts with magnesium when heated but it does not react with copper. The order of reactivity of Z, magnesium and copper starting with the most reactive is

A. Cu, Z, Mg

B. Z, Mg, Cu

C. Mg, Cu, Z.

D. Mg, Z, Cu

62. Which one of the following substances sublimes when heated?

A. ZnO

B. $CaCI_2$

C. I_2

D. P

63. The atomic numbers of elements Q, R, S, and T are 8,9,13 and 17 respectively. Which one of the following pairs of elements belongs to the same group in the periodic table?

A. Q and R

B. Q and S

C. R and T

D. S and T

64 The red brown coating formed when iron nail is left in moist air for a long time is

A. hydrated iron (II) oxide

B. hydrated iron (III) oxide

C. anhydrous iron (II) oxide

D. anhydrous iron (III) oxide

64. Which one of the following methods is normally used to prepare hydrogen in the laboratory?

A. Electrolysis of water.

B. Action of water on magnesium

C. Action of dilute hydrochloric acid on zinc.

D. Action of steam on zinc.

65. A carbonate of an element Y has the formula $Y_2 (CO_3)_3$.

To which group in the Periodic Table does Y belong?

A. 1

B. 2

C. 3

D. 4

66 The alloy solder consists of

A. zinc and lead

B. copper and lead

C. copper and aluminium

D. tin and lead.

67 Which one of the following metals will not displace lead from its salt in solution?

A. Aluminium

B. Calcium

C. Silver

D. Zinc

68. Define the terms
(i) Solute

(ii) Saturated solution
(b)The solubilities of Potassium chloride and potassium nitrate at a certain temperature are shown in the table below.

T in 0^{oc}	0	11	15	30	40	50	57
Solubility of KCl per 100g of water	27.7	31.0	32,0	36.5	40	43	45
Solubilty of KNO3 per 100g of water	14	21.5	25.0	43.0	63.0	84.0	102.0

i) Plot a graph on the same axes. A graph of solubility against temperature for the solubilities of potassium chloride and potassium nitrate.

(ii) State which one of the two salts has solubility which increases less rapidly with increase in temperature.

(iii) Determine the temperature at which the solubilities of the two salts are equal.

(ii) A saturated solution of potassium Nitrate at 30^{0C} was cooled to 5^{0C}.Calculate the number of moles of potassium nitrate crystals formed.

69. Use the data in the table below to answer the questions that follow.

substance	Mp(OC)	Bp(OC)	Solubilty in water	Conductance		Density at room temperature g/cm^3
				Solid form	Molten form	
A	714	1418	Very good	none	good	2.3
B	-95	56	Very good	none	none	0.8
C	1083	2580	insoluble	good	good	8.9
D	-101	-34	verygood	none	none	2.55
E	-23	77	Insoluble	none	none	1.6
F	-219	-11	Sligltly soluble	none	none	1.33

(a) (i) Name two substance that are liquid at room temperature.

.....

.....

(ii) Which of the two is more volatile?

.....

(b) Which substances) would dissolve in water and could be separated from the solution by

(i) fractional distillation?

.....

(ii) by evaporation of the water ?

.....

(c) Which of the substances A to F,

(i) has a structure consisting of ions ?

.....

(ii) is a metal ?

.....

(i) is a liquid which would form separate layer with water?

(ii)

.....

would the water be above or below ?

.....

(d) Which substance is a gas which

(i) would not be collected efficiently over water.

.....

(ii) would be collected efficiently over water.

70 A gaseous hydrocarbon contains 82.8% carbon and 17.2% hydrogen by mass only.
(a) (i)Calculate the empirical formulae of the hydro carbon

(ii)The molecular formula of hydrocarbon given that its formula mass is 58

(b) The hydrocarbon shows isomerism.

71. (a) Describe briefly how copper (II) sulphate crystals can be prepared

from copper(Il) oxide. Write an equation for the reaction that takes place.

72.a) Describe how you would prepare pure crystals of lead (II) nitrate in

the

laboratory starting from lead (II) oxide. Write an equation for the

reaction that takes place.

(c) State what happens when lead (II) nitrate is strongly heated.

73. Oxygen can be prepared in the laboratory by dropping substance M onto sodium

peroxide.

a) Name substance M and give its formula.

b) Explain why M is put in thistle funnel and not sodium peroxide?

c) Give the conditions that are required for the reaction to occur.

d) Write the equation for the reaction.

e) Name one possible drying agent for oxygen gas

f) How will the gas be collected after being dried?

g) Describe the chemical test for oxygen gas.

h) Give any three uses of oxygen gas.

74. (a). Define and give one example of each of the following;

I. Water of crystallization

II. Efflorescence

III. Hydroscopic substance

IV. Deliquescence

(b) Explain what would happen if blue Copper II sulphate crystals were left in a

desiccators.

b)

75.Give the name of a metallic oxide (different in each case) which?

(i) On heating yields oxygen and a lower oxide of the same metal.

(ii) Is yellow when hot and white when cold.

(iii) Is easily converted to a metal on heating.

(iv) Does not dissolve in water but a base.

(v) Dissolve in water to form an alkali.

76. Where is the competition for oxygen reaction applied industrially?

77 (a) Name a gas that will reduce copper II Oxide.

(b) Describe what you would see when the reaction occurs.

(c) Write an equation for the reaction.

(d) Will this gas reduce magnesium oxide?

Explain your answer

78. Below are the main sources of water pollution. Explain how each of them affects the environment?

(i) Sewage

(ii) Fertilisers

(iii) Chemicals/Pesticides

(iv) Oil and detergents

79 (i) Define an acid.

(ii) Define a base.

(iii) State how you can determine the strength of acids and alkalis.

(iv) Give the names of the following substances specify whether strong or weak.

(i) Acids

- HCl

- H_2SO_4

- H_2CO_3

- HNO_3

#

(ii) Alkaline solutions

- NH_4OH

- NaOH

- $Ca(OH)_2$

- KOH

(b) State the uses of the following alkaline solutions.

- Ammonia solution

- Calcium hydroxide

- Magnesium hydroxide

- Sodium hydroxide

80(i) What is neutralisation?

(ii) Describe one practical importance of acid-base neutralisation

81 (i) List three methods used to prepare salts in the laboratory regardless of whether the salts are soluble or insoluble.

(ii) What is basicity of an acid?

(iii) Define the following terms.

(a) Normal salt

(b) Acid salt.

82. In water treatment:

(i) Aluminium sulphate (Alum) is used in the sedimentation chamber B. Explain the action of aluminium sulphate.

(ii) Explain the importance of aeration

(iii) Explain why chlorination is necessary?

(iv) Explain the importance of fluoridation.

(v) Water pollution which can be a health hazard may be divided into four categories depending on their cause. List them down and briefly state the causes and their remedies.

83. Against each mixture write down suitable methods of separation.

(a) Coloured extracts of grass dissolved in ethanol.

(b) Kerosene from Crude oil.

(c) Paraffin from water.

(d) Iron filings from Sulphur powder.

(e) Ammonium chloride from Sodium chloride.

(f) Seawater to obtain salt.

(g) Blue Copper Sulphate crystals from aqueous copper sulphate.

84 Explain why fractional distillation is suitable for separating crude oil constituents?

85. When magnesium metal was burned in air, there was an increase in mass. Explain why there is an increase when a metal like magnesium is burned in air?

122. (i) What is rust?

(ii) State the conditions necessary for rusting to occur.

(iii) List seven methods used to prevent rusting.

(iv) On what basis are the methods used above designed?

123. (a) Give the names of the common oxides of:

(i) sulphur

(ii) aluminium

(iii) Iron

(iv) Copper

(v) Lead

(vi) Zinc

(b) State the physical state and colour(s) of each of the oxides given in

(a) above.

(c) State the class to which each of the oxides given in (a) above

belongs.

86 Define the following terms

i) Acid ii) base iii) pH

ii) The following table gives pH of some solutions.

Solution	A	B	C	D	E	F
PH	2	7	13	6	10	9

A) Identify the substances that are acids and those that are bases

B) Which solution:

i) Is the most basic?

ii) Is the most acidic?

iii) Will not affect universal indicators?

iv) Is likely to be found in human stomach?

C) Give the missing information in the table below

Indicator	Colour in base	Colour in acid
		Red
Litmus paper		
	Pink	

87. a) Suppose you find an unlabelled container with a liquid in the laboratory. How would you show that a liquid inside is water.

b) State three properties that show that water is a pure substance.

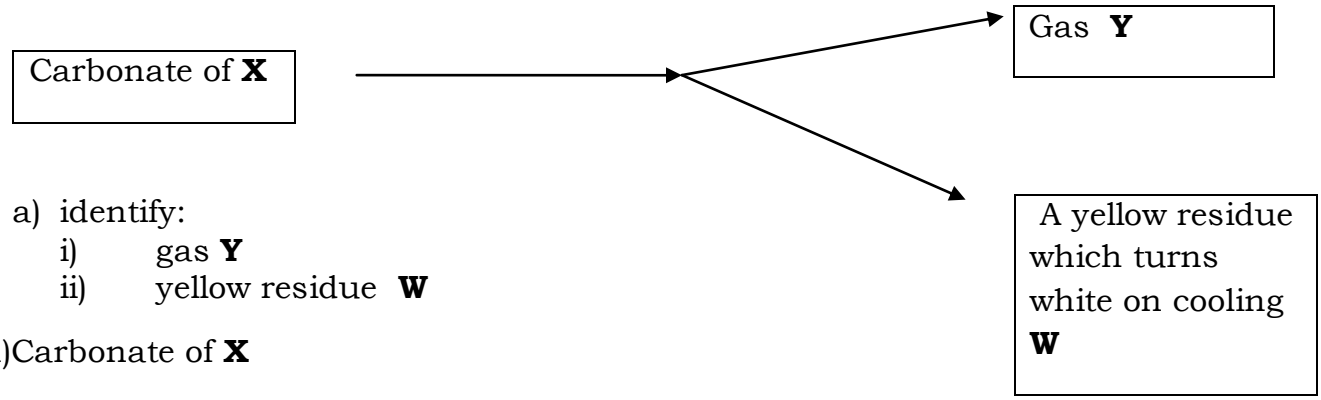
c) Explain the main sources of water.

d) With a well labeled diagram draw water cycle

88. a) Define the term salt.

b) Name two metal carbonates, which do not decompose when are heated

c) The following flow diagram shows what happens when a certain carbonate of metal **X** is strongly heated.



a) identify:
   i) gas **Y**
   ii) yellow residue **W**

iii)Carbonate of **X**

89. A) i) Write the molecular formula of ozone

ii) Ozone is the best sunscreen. Explain

iii) Name one component of CFC that causes ozone depletion

B) i) Name the product of burning sulphur in oxygen.

ii) account for the effects of the product formed in 7(a) above on the environment .

100. Below are the main sources of water pollution. Explain how each of them affects the environment?

(i) Sewage

(ii) Fertilisers

(iii) Chemicals/Pesticides

(iv)Oil and detergents

101. Explain the following statement in terms of bond and structures.

vi) Sodium chloride conducts electricity in molten state but not in solid state
vii) Water has unexpected high boiling point than other group six hydride
viii) Silicon Tetrachloride ($SiCl_4$) does not conduct electricity in molten state
ix) Diamond is hard and bad conductor of electricity
x) Graphite is soft and good conductors of electricity

102. . a) How does the reactivity of group I element compared to that of group II element?

b)Explain why alkaline metals kept under kerosene (paraffine)

c) Calcium and magnesium are all located in group two of the periodic table

i) The atomic number of calcium is 20, write its electronic configuration then state the its period of the periodic table

ii) compare the reactivity of both calcium and Magnesium with water. Use equations to support your answer.

103. When sodium was reacted with water an alkaline solution was formed and an hydrogen gas was formed.

iv) Write a balanced equation for the reaction

v) How an hydrogen gas was tested /

vi) Explain the observation made when two drops of phenolphthalein indicator were in the added in alkaline solution in (i)

104. a) State and explain how the reactivity of halogens changes down the group (from the top to bottom)

b) Write an equation of the reaction observed when chlorine gas (Cl_2) is passed in solution of potassium iodide then state the color change during this reaction.

State the type of reactions in(b)

105. Study the table below and answer the related questions:

Atom	Electrons	Protons	Neutrons	RAM
A	8	8	8	16
B	X	13	14	27
C	16	16	17	?
D	11	Y	12	23
E	8	8	Z	18

a) Work out the values of X,Y and Z.

b) Work out the relative atomic mass of C.

c) Write the electronic configuration of the ions and atoms:

(i)D (ii) A^{2-} (iii) B^{3+} (iv) C

d) Which atoms in the table above:

(i)Are isotopes?

(ii)Belong to the same group in the Periodic Table?

d) Belong to the same Period in the Periodic Table?

106. Compounds of N,P and K are often used as inorganic fertilizers.

a) Explain what is meant by a fertilizer.

b) Why is it necessary to apply fertilizers to soil?

c) Give two compounds that could be used to prepare

i. potassium nitrate fertilizer. ii.Ammonium nitrate fertilizer iii.ammonium sulphate fertilizer

d) Explain why liquid fertilizers are more preferable than solid fertilizers

e) Explain why the use of substandard fertilizers is not sustainable

1O7. In the experiment to determine the volume of oxygen produced when hydrogen peroxide was decomposed ,the volume of oxygen produced was measured at different intervals of time .The following result were obtained .

Time (secondes)	0	10	15	20	25	30	50	70
Volume of H_2 (cm^3)	0	30	45	60	75	90	90	90

a) Write down the equation for the reaction and name the catalyst used in this experiment

b) Describe a chemical test for oxygen
c) Plot a graph of volume of O_2 produced (on y-axis) versus time (x-axis)
d) Why is the volume of O_2 constant in the last three time results ?
e) Why is the volume of O_2 = $0cm^3$ when the time = 0 seconds ?
f) State two large scale uses of oxygen
g) Explain how the following factors affect the rate of chemical reaction
i. particle size (surface area) ii. Temperature iii. Catalyst iv.concentration of reacting molecules

Q108 The table below shows the reactivity of some metals with water and dilute sulphuric acid .Study the table very carefully and answer the question that follow .

Metal	**Reaction with water**	**Reaction with dilute sulphuric acid**
Calcium	Hydrogen formed fast	Not advisable
Copper	No reaction	No reaction
Iron	Rust was formed	Hydrogen formed slowly
Magnesium	Hydrogen formed slowly	Hydrogen formed slowly

a) Which the above substances is the most reactive ?
b) Which the above substances is the least reactive ?

c) Why is not advisable to react calcium with dilute sulphuric acid ?
d) How would you show (by chemical test) that hydrogen is evolved when magnesium reacts with dilute sulphuric acid ?

109.. a) Write the equation for thermal decomposition of calcium nitrate then show how it is different to that of sodium nitrate in terms of the products formed .

110. A metal M reduce the oxide of zinc by removing an oxygen from zinc oxide , but copper has no effect on the oxide of zinc , when magnesium is added to the oxide of M ,the oxygen of the oxide of M is removed by magnesium .
i. Use the information from this passage to put these metals(copper , magnesium, zinc and M in increasing order of reactivity**.**
b. Write a balanced equation for the reaction between the oxide of M and magnesium , in your equation show the reducing agent and the oxidizing agent. (assume M is a divalent metal)
111. Describe with experimental detail , how you can prepare the pure samples of the following salts using the appropriate reagents

a. Copper (II) sulphate
b. Lead(II) nitrate
c. sodium sulphate
d. calcium carbonate
e. Lead (II) Chloride
f. silver chloride
g. sodium chloride
112. Write the balanced equations for the thermal decomposition reactions of the following compounds
a. Ammonium chloride
b . zinc carbonate
c. lead(II)nitrate
d.Sodium hydrogenocarbonate
e. limestone
f. Copper(II) nitrate
g. Calcium nitrate
h. sodium nitrate
g. copper(II) hydroxide
i. Silver nitrate
j. Calcium hydrogenocarbonate
k. Ammonium nitrate
l. Iron(II) sulphate
113.a) State Grahm's law of diffusion

b) Use the law in a) to compare the rate of diffusion of ammonia with that of carbon dioxide

c) A gaseous hydrocarbon is diffuses 1.2 faster than carbon dioxide. Find the molecular mass of the hydrocarbon

114. 5.7 g of an hydrate sodium carbonate , $Na_2CO_3.nH_2O$,was heated to a constant mass. 2.12g of the anhydrous salt remained. Calculate the value of n. Na (23,O=16, H=1)

115. When vaporized at 760 mm Hg and 400K, 0.225g of M occupied 100 Cm^3.

Calculate the molecular mass of M by using ideal gas equation

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