

S.3 CHEMISTRY HOLIDAY WORK, JANUARY- 2016

(READ, RESEARCH AND REMEMBER)

1. (a) Explain what is meant by the terms
 - (i) 'mass number'
 - (ii) 'atomic number'
- (b) An atom of an element is represented by the symbol

$$\begin{array}{c} 80\text{X} \\ 15 \end{array}$$
 - (i) State the mass number of the atom
 - (ii) What is the atomic number of the atom?
 - (iii) How many neutrons are present in the atom?
2. The positions of the elements A, B, C, D, E and F are shown in the Periodic Table below. These letters are not the usual symbols for the elements.

	I	II											III	IV	V	VI	VII
2	A																
3	F													E		C	D
4		B															
5																	
6																	

- (a) State the type of bonding in the compound formed between
 - (i) B and D
 - (ii) E and C
- (b) (i) Which one of the elements A and B reacts vigorously with cold water?
- (ii) Write equation for the reaction between water and the element you have named in (b) (i).

- (c) From the table select two elements that can oxidize F.
3. Part of the Periodic Table indicating the positions of elements W, X, is shown below.

1	I	II	III	IV	V	VI	VII	VIII
2								
3								
4	W		X				Z	

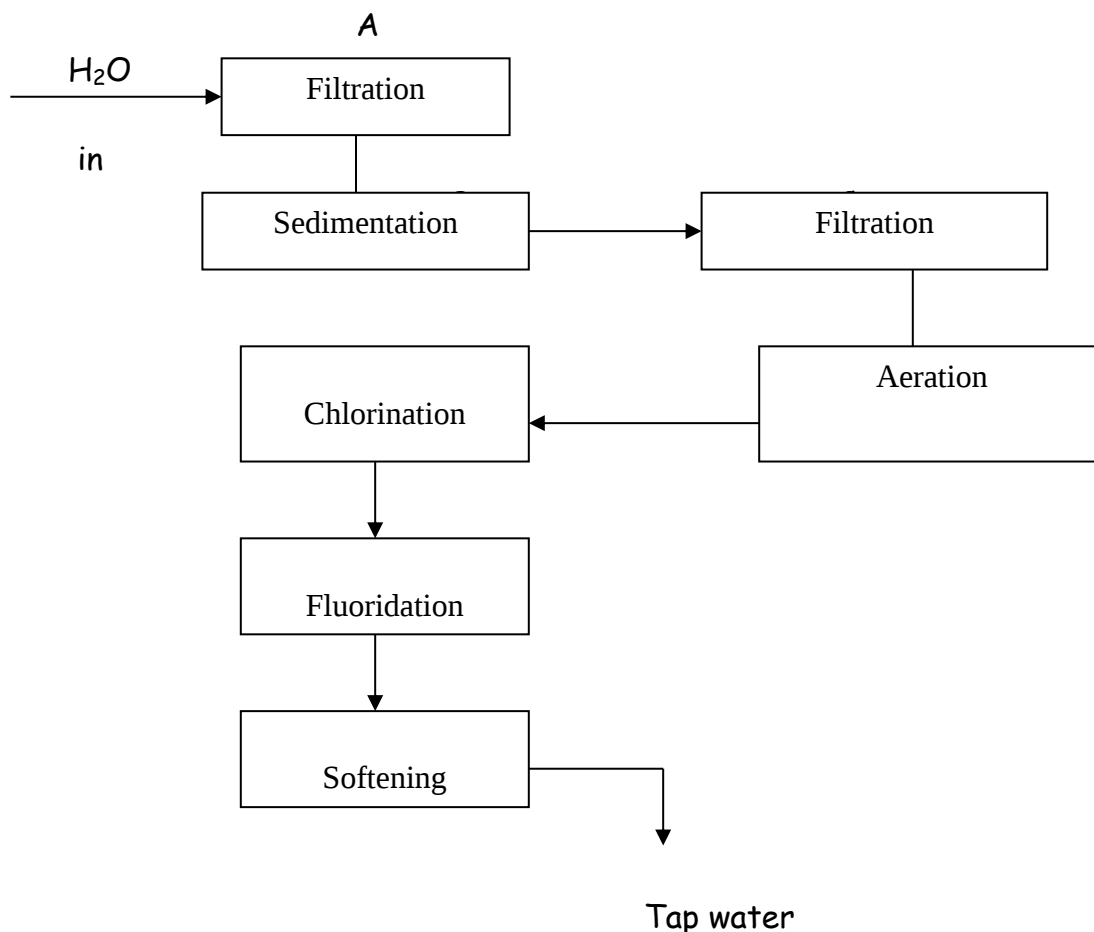
- (a) (i) Write the formula of the oxide of W.
- (ii) The oxide of W was dissolved in water.
State whether the resultant solution is acidic, neutral or alkaline. Explain your answer.
- (b) Write the formula of the compound formed between X and Z.
- (c) Which one of the atoms W, X and Z has the largest atomic radius?
4. The number of electrons, protons and neutrons in atoms A, B, C and D are shown in the table below.

Atom	Electrons	Protons	Neutrons
A	8	8	8
B	16	16	16
C	13	13	14
D	x	3	4

- (a) Determine
- (i) the value of x
- (ii) the approximate relative atomic mass of C.
- (b) Write the electronic configurations of the following atoms and ions.
- (i) A^{2-}
- (ii) A
- (i) C
- (ii) C^{3+}

- (c) State two atoms that are of elements in the same group in the periodic table.
5. The atomic number of element Q is 13
- (a) Write the electronic configuration of an atom of Q
- (b) To which group in the Periodic Table does Q belong?
- (c) State whether Q would conduct electricity or not.
- (d) (i) Write the formula of the oxide of Q.
(ii) State the type of bonding in the oxide of Q.
6. (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.
- (b) State what happens when lead (II) nitrate is strongly heated.
7. (a) Describe briefly how copper (II) sulphate crystals can be prepared from copper(II) oxide. Write an equation for the reaction that takes place.
8. 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.

9. The flow chart below shows the treatment of water in water supply systems.



(i) Suggest any three substances that can be used in filtration chambers A and C.

(ii) Aluminium sulphate (Alum) is used in the sedimentation chamber B.

Explain the action of aluminium sulphate.

(iii) Explain the importance of aeration

(iv) Explain why chlorination is necessary?

(v) Explain the importance of fluoridation.

(vi) 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.

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

- I. Water of crystallization
- II. Efflorescence
- III. Hygroscopic substance

IV. Deliquescence

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

11. 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.

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

13. (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

14. 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

15 (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
- $\text{Ca}(\text{OH})_2$
- KOH

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

- Ammonia solution
- Calcium hydroxide
- Magnesium hydroxide
- Sodium hydroxide

16(i) What is neutralisation?

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

17 (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.

END