Full Test | Science-X| Carbon and its Compounds I Time: 1.5h I Marks- 27

Q.1. Write the number of valence electrons present in a nitrogen atom. **(1 Mark)**

Q.2. Lead nitrate solution is added to a test tube containing potassium iodide solution.

(a) Write the name and colour of the compound precipitated.

(b) Write the balanced chemical equation for the reaction involved.

(c) Name the type of this reaction justifying your answer. **(3 Marks)**

Q.3. What happens when food materials containing fats and oils are left for a long time/ List two observable changes and suggest three ways by which this phenomenon can be prevented. **(3 Marks)**

Q.4. Compare in tabular form the reactivities of the following metals with cold and hot water:

(a) Sodium

(b) Calcium

(c) Magnesium. **(3 Marks)**

Q.5. Carbon, a member of group14, forms a large number of carbon compounds estimated to be about three million. Why is this property not exhibited by other elements of this group? **(2 Marks)**

Q.6. A cloth strip dipped in onion juice is used for testing a liquid 'X'. The liquid 'X' changes its odour. Which type of an indicator is onion juice? 'The liquid 'X' turns blue litmus red. List the observations the liquid 'X' will show on reacting with the following:

(a) Zinc granules

(b) Solid sodium carbonate

Write the chemical equations for the **(5 Marks)**

Q.7. Define water of crystallization. Give the chemical formula for two compounds as examples. How can it be proved that the water of crystallization makes a difference in the state and colour of the compounds? **(5 Marks)**

Q.8. (i) Write two properties of gold which make it the most suitable metal for ornaments.

(ii) Name two metals which are the best conductors of heat.

(iii) Name two metals which melt when you keep them on your palm

(b) Explain the formation of ionic compound CaO with electron-dot structure. Atomic numbers of calcium and oxygen are 20 and 8 respectively. **(3 Marks)**

Q.9. Explain the formation of ionic compound CaO with electron-dot structure. Atomic numbers of calcium and oxygen are 20 and 8 respectively. **(2 Marks)**

Q.10. People use a variety of methods to wash clothes. Usually after adding the soap, they 'beat' the clothes on a stone, or beat it with a paddle, scrub with a brush or the mixture is agitated in a washing machine. Why is agitation necessary to get clean clothes ?

Solution:

1. 5
2. (a). Name of compound precipitated: Lead iodide Colour of the compound precipitated: Yellow

(b) $2K1(s) + Pb(NO)_2(aq) \rightarrow 2KNO,(aq) + PbI_2(s)$

(c) This is a double displacement reaction because in the reaction two compounds exchange their ions to form two new compounds. Here both lead nitrate and potassium iodide are exchanging their ions.

3. When food materials containing fats and oils are left for a long time they undergo oxidation and their taste and smell change.

This can be prevented by-

1. Using airtight and light protecting packing

2. Using antioxidants like vitamin A and C

3. Filling nitrogen gas in chips container

4.

Metal	Reactivity	Reactions
Sodium (Na)	It reacts vigorously with cold water.	$2Na(s)+2H_2O(l) \longrightarrow 2NaOH(aq)+H_2(g)$
Calcium (Ca)	It reacts slowly with cold water and moderately with hot water.	$Ca(s)+2H_2O(l) \longrightarrow Ca(OH)_2+H_2(g)$ (Hot)
Magnesium (Mg)	Magnesium does not react with cold water. It reacts slowly with hot water and vigorously with steam.	$Mg(s)+2H_2O(l) \longrightarrow Mg(OH)_2+H_2(g)$ (Hot); $Mg(s)+H_2O(l) \longrightarrow MgO+H_2(g)$ (Steam)

5. 1. Tetravalency: Carbon can easily form four covalent bonds to other atoms.

2. Catenation: Carbon can easily form covalent bonds to other carbon atoms and the carbon? carbon bonds are more stable than the other element to same element bonds formed by other

member of group 14.

3. Formation of multiple bonds: Carbon can form not only a single bond but also it can form

double or single bonds with same or different elements. Since these properties are not exhibited by other elements of this group, therefore, the number of carbon compounds is very large as compared to the other elements of group 14.

6. Onion juice is an olfactory indicator. Since the liquid 'X' turns blue litmus red, therefore, it is an

acid.

(a) When liquid 'X' (an acid like HCl) reacts with zinc granules, bubbles of hydrogen will be formed.

$2HCl(aq) + Zn(s) \rightarrow ZnCl_2(s) + H_2(g)$

(b) When liquid 'X' (an acid like HCl) reacts with sodium carbonate, carbon dioxide gas will be

liberated.

$2HCl(aq) + Na_2CO_3(aq) \rightarrow 2NaCl(aq) + H_2O(l) + CO_2(g)$

7. Water of crystallisation is the number of molecules of water which are loosely bonded to one

molecule of salt.

For example:

(1) $BaCl_2.2H_2O$

(2) $CuSO_4.5H2O$

We can prove that by heating the compound containing water of crystallisation, its colour or state

change due to the removal of water of crystallisation.

For example

(1) Copper sulphate crystals containing water of crystallisation are blue but on heating they turn

white.

(2) Similarly plaster of Paris is a white powder and on mixing with water it changes to gypsum which forms a hard solid mass.

8. (i) Gold is inert metal and it has shiny surface. It is also malleable and ductile. Therefore, it

is used for making ornaments.

(ii) Copper and aluminium

(iii) Cesium and gallium

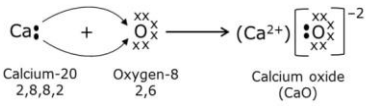
9.The atomic number of calcium and oxygen is 20 and 8 respectively. The electronic configuration of calcium will be 2, 8, 8, 2 thus, it has 2 electrons in its outermost shell.

On the other hand, oxygen (2, 6) has 6 electrons in its outermost shell. By losing two electrons, calcium atom forms a calcium ion (Ca^{2+}) while by gaining 2

electrons; oxygen atom forms an oxide ion (O^{2-}).

Calcium reacts with oxygen to form an ionic compound calcium oxide (CaO).

The electron dot representation for the formation of calcium oxide is given below.



10. It is necessary to agitate to get clean clothes because the soap micelles which entrap oily or greasy particles on the surface of dirty cloth have to be removed from its surface. When the cloth wetted in soap solution is agitated or beaten, the micelles containing oily or greasy dirt get removed from the surface of dirty cloth and go into water and the dirty cloth gets cleaned.