



ISARADDI'S CLASSES

SSLC study material

June - 2021

PART - B

CHEMISTRY

UNITS :

- Acids , bases and salts
- Metals and non-metals
- Carbon and its compounds
- Periodic classification of elements

TOTAL = 25 Marks

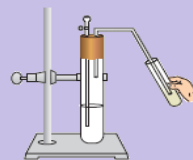
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CHAPTER 2

Acids, Bases and Salts



ISARADDI'S CLASSES

Previous questions from SSLC Board

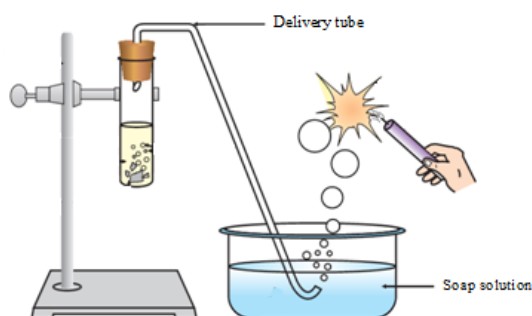
April 2019

1. Name the acid present in the stinging hair of nettle leaves. (1Mark)

Ans : Methanoic acid (Formic acid)

2. Draw the diagram of arrangement of apparatus used to show the reaction of zinc granules with dilute sulphuric acid and testing hydrogen gas by burning. Label the following parts. (2 Marks)

- (i) Soap solution
- (ii) Delivery tube.



June 2019

1. Name the gas liberated when an acid reacts with metallic carbonate. Write the chemical equation of the reaction when this gas is passed through lime water. What is the colour of the precipitate obtained in this reaction ? (2 Marks)

Ans :

- Carbon dioxide (or CO_2)
- $\text{Ca}(\text{OH})_2(aq) + \text{CO}_2(g) \rightarrow \text{CaCO}_3(s) + \text{H}_2\text{O}(l)$
- White precipitate.

2. Give scientific reason :

While diluting an acid, the acid should be added to water. (1Marks)

Ans :

- If water is added to concentrated acid the heat generated may cause the mixture to splash out and cause burns.
- The glass container may also break due to excessive heat.

3. What is neutralisation reaction ? (1Marks)

Ans : The reaction between an acid and a base to give a salt and water is known as a neutralisation reaction.

April 2020

1. As the pH value of a neutral solution increases (1Marks)

- (A) basic property decreases and number of OH^- ions increases
- (B) acidic property increases and number of H^+ ions decreases
- (C) basic property increases and number of OH^- ions increases
- (D) acidic property decreases and number of H^+ ions increases.

Ans. :

(C) basic property increases and number of OH^- ions increases

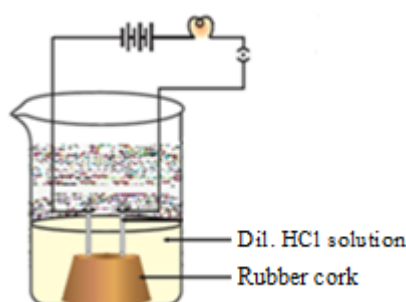
2. Agricultural scientists have suggested to add a certain amount of lime powder to an agricultural field. What may be the reasons for this ? Explain. (2Marks)

Ans. :

- Plants require a specific pH range for their healthy growth.
- Soil of his land is acidic.
- Lime powder is a base.
- So adding lime powder to the soil, decreases the acidic property /soil is neutralised.

3. Draw the diagram of the apparatus to show that acid solution in water conducts electricity. Label the following parts : (2Marks)

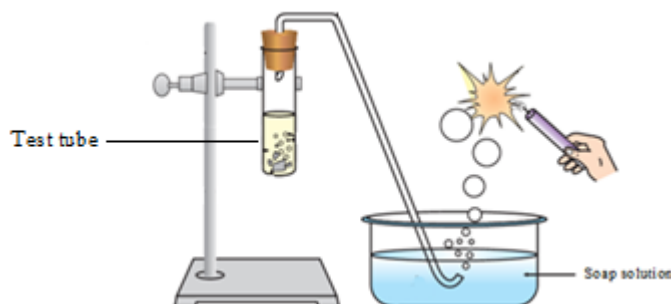
- i) Dil. HCl solution
- ii) Rubber cork.



OR

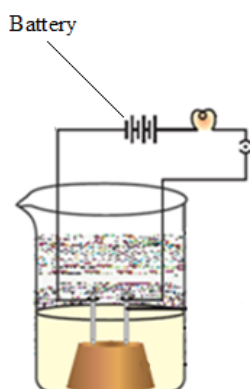
4. Draw the diagram of arrangement of the apparatus to show the reaction of zinc granules with dilute sulphuric acid and testing hydrogen gas by burning. Label the following parts : (2Marks)

- i) Test tube
- ii) Soap solution.



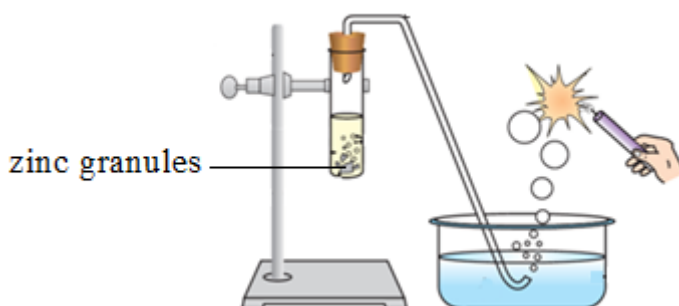
Sept 2020

1. Draw the diagram of the arrangement of apparatus to show that acid solution in water conducts electricity and label the battery. (2Marks)



OR

Draw the diagram of the arrangement of apparatus showing the reaction of zinc granules with dilute sulphuric acid and testing hydrogen gas by burning and label the zinc granules.



2. What is a strong acid ? Explain how tooth decay is caused. How can it be prevented ? (3Marks)

Ans :

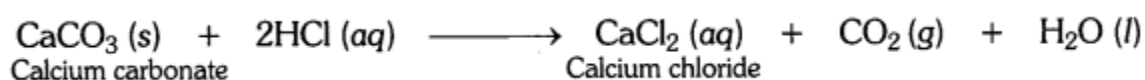
- Acid that gives rise to more H^+ ions is said to be strong acid.
- Bacteria present in the mouth produce acids by degradation of sugar and food particles remaining in the mouth after eating. So the pH in the mouth decreases and the tooth enamel gets corroded.
- Using toothpastes which are generally basic, for cleaning the teeth.

MOST LIKELY QUESTIONS FOR 2021(Including previous year questions)

1. Why does dry HCl gas not change the colour of the dry litmus paper?

Ans : Dry HCl gas does not give H^+ ions and therefore does not change the colour of dry litmus paper.

2. Metal compound A reacts with dilute hydrochloric acid to produce effervescence. The gas evolved extinguishes a burning candle. Write a balanced chemical equation for the reaction if one of the compounds formed is calcium chloride.



3. Why do HCl, HNO₃, etc., show acidic characters in aqueous solutions while solutions of compounds like alcohol and glucose do not show acidic character?

Ans :

- H⁺ ions in aqueous solution are responsible for acidic character.
- HCl, HNO₃, etc. give H⁺ ions in water while alcohol and glucose do not give H⁺ ion in water.
- Therefore, alcohol and glucose do not show acidic character.

4. In two test tubes 'A' and 'B' an equal length of magnesium piece has taken. Hydrochloric acid (HCl) added to 'A' and acetic acid (CH₃COOH) to test tube 'B' of equal amount and concentration. In which test tube do you observe that air bubbles evolved more vigorously ? and Why ?

Ans : In test tube 'A' air bubbles evolved more vigorously.

Because , HCl is strong acid while acetic acid is weak.

5. You have been provided with three test tubes. One of them contains distilled water and the other two contain an acidic solution and a basic solution, respectively. If you are given only red litmus paper, how will you identify the contents of each test tube?

Ans :

- Put the red litmus paper in all the test tubes, turn by turn. The solution which turns red litmus to blue will be a basic solution. The blue litmus paper formed here can now be used to test the acidic solution.
- Put the blue litmus paper obtained above in the remaining two test-tubes, turn-by-turn. The solution which turns the blue litmus paper to red will be the acidic solution.
- The solution which has no effect on any litmus paper will be neutral and hence it will be distilled water.

6. How is the concentration of hydronium ions (H₃O⁺) affected when a solution of an acid is diluted ?

Ans: On dilution, the number of hydronium ions per volume decreases and concentration decreases.

7. You have two solutions, A and B. The pH of solution A is 6 and pH of solution B is 8. Which solution has more hydrogen ion concentration? Which of this is acidic and which one is basic?

Ans : Solution A has more hydrogen ion concentration.

Solution 'A' is acidic , and solution 'B' is basic in nature

8. A milkman adds a very small amount of baking soda to fresh milk.

(a) Why does he shift the pH of the fresh milk from 6 to slightly alkaline?

(b) Why does this milk take a long time to set as curd?

Ans :

(a) Milk is made slightly alkaline so that it may not get sour easily due to the formation of lactic acid in it.

(b) The alkaline milk takes a longer time to set into curd because the lactic acid being formed has to first neutralise the alkali present in it.

9. Why do we call Hydrochloric acid as strong acid and acetic acid as weak ?

Ans : Hydrochloric acid dissociates completely in water and give more H⁺ ions , while Acetic acid dissociates incompletely and give less H⁺ ions.

10. The gas liberated when sodium carbonate reacts with dilute hydrochloric acid is passed through lime water, a white precipitate is formed. But when the same gas is passed through lime water in excess, precipitate is not visible. Why?

Ans :

- Carbon dioxide gas is liberated when sodium carbonate reacts with dilute hydrochloric acid
- When this gas is passed through lime water, a white precipitate (Calcium carbonate) is formed.
- When the same gas is passed through lime water in excess, precipitate is not visible because , Calcium carbonate was converted in to calcium bicarbonate which is soluble in water.

Previous questions from SSLC Board**April 2019****1. What is roasting in metallurgy ?****Ans. :**

Heating of metallic ores strongly in the presence of excess air.

2. Give reasons :

(i) Ionic compounds in solid state do not conduct electricity, whereas in molten state are good conductors of electricity.

(ii) Silver articles when exposed to air gradually turn blackish.

(iii) Chemical reaction does not take place when copper is added to iron sulphate solution.

Ans :

(i) In the solid state ionic compounds do not conduct electricity because movement of ions in the solid is not possible due to their rigid structure,

In molten state, ions move freely and conduct electricity.

(ii) Silver reacts with sulphur in the air to form a coating of silver sulphide.

(iii) Reactivity of copper is less than that of iron.

OR**Give reasons :**

(i) "Alloys of iron are more useful when compared to pure iron."

(ii) Copper loses its brown layer gradually when exposed to air.

(iii) Aluminium oxide is called amphoteric oxide.

Ans :

(i) Pure iron is very soft , Alloys are hard

The properties of iron can be changed if it is mixed with other substances.

(ii) Copper reacts with moist carbon dioxide in the air and slowly loses its shiny brown surface and gains a green coat.

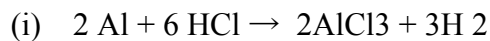
(iii) Aluminium oxide (Al_2O_3) reacts with both acids as well as bases to produce salt and water.

June 2019

1. (i) Write the balanced chemical equation for the reaction taking place when aluminium reacts with dilute hydrochloric acid.

(ii) Hydrogen gas is not liberated when a metal reacts with concentrated nitric acid. Give reason.

Ans :



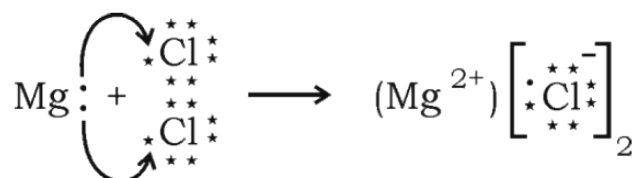
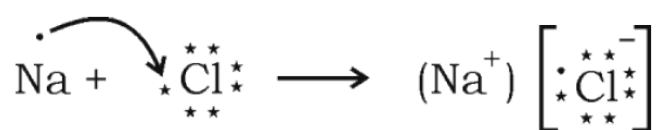
(ii) Nitric acid is a strong oxidising agent.

It oxidises hydrogen produced to water and itself gets reduced to any of the nitrogen oxides.

OR

Show the formation of NaCl and MgCl₂ with the help of electron dot structure.

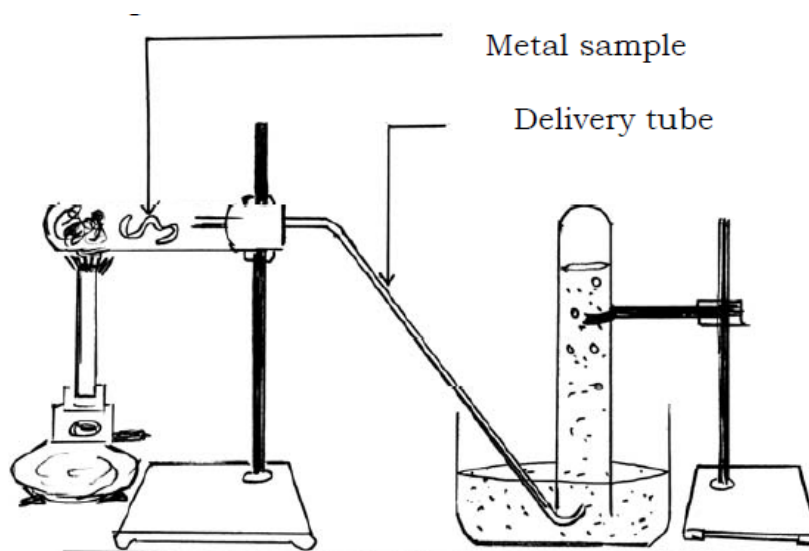
Ans :



2. Draw the diagram of the arrangement of apparatus to show the action of steam on a metal. Label the following parts :

(i) Metal sample

(ii) Delivery tube.



April 2020

1. An iron ring is to be coated with copper. How can we do this without using electricity ?

Ans. :

Iron ring should be dipped in copper sulphate solution. Iron displaces copper from copper sulphate solution and copper is coated on iron ring.

2. Which physical properties are used in the following situations ?

- i) Gold is used to make ornaments
- ii) Nickel is used in strings of guitar.

Ans. :

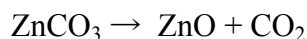
i) Shining surface / Metallic lustre , Ductility and Malleability (Any two)

ii) Sonorous and Ductility.

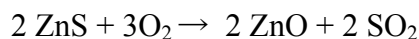
3. Mention the difference between calcination and roasting. How these processes are used in the extraction of zinc ? Explain with the help of chemical equations. After these processes is reduction necessary to obtain zinc ? Why ?

Ans. :

- Carbonate ores are converted into oxides by heating strongly in *limited* air. This process is known as calcination.
- Sulphide ores are converted into oxides by heating strongly in the presence of excess of air. This process is known as roasting.
- When ZnCO_3 undergoes calcination ZnO is formed.



- When ZnS undergoes roasting, ZnO is formed.



- After these processes reduction is necessary.
- Because zinc oxide is then reduced to zinc using suitable reducing agent.

September 2020

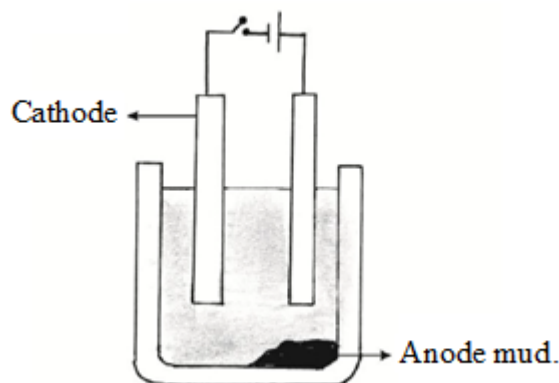
1. What are amphoteric oxides ?

Ans. :

Metallic oxides that show both acidic and basic behaviour are called amphoteric oxides.

2. Draw the diagram of the apparatus used in refining of copper from copper sulphate solution. Label the following parts :

- i) Cathode
- ii) Anode mud.



3. Strips of zinc, iron, magnesium and copper are taken in the test tubes *A, B, C* and *D* respectively. Same quantity of ferrous sulphate solution is added to these test tubes. In which test tubes chemical reaction will occur ? Why ? Write the chemical equations for the reactions taking place here.

Ans. :

- Chemical reaction occurs in test tubes *A* and *C*.
- Because zinc and magnesium are more reactive than iron.
- $\text{Zn} + \text{FeSO}_4 \rightarrow \text{ZnSO}_4 + \text{Fe}$

MOST LIKELY QUESTIONS FOR 2021(Including previous year questions)

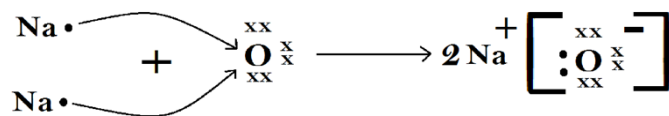
1. What is Galvanisation ?

Ans : Galvanisation is a method of protecting steel and iron from rusting by coating them with a thin layer of zinc.

2. Show the formation of Na_2O and MgO by the transfer of electrons.

Ans :

Na_2O



MgO



3. What are the general properties for ionic compounds

Ans

- Ionic compounds are solids and are somewhat hard
- Ionic compounds have high melting and boiling points
- compounds are generally soluble in water and insoluble in organic solvents
- ionic compounds conduct electricity in the molten state

4. What is thermit reaction ? Mention its application.

Ans : The reaction between Iron oxide (Fe_2O_3) with Aluminium is called thermit reaction. It is highly exothermic reaction. This reaction is used to join railway tracks or cracked machine parts.

5. What are the constituents of solder alloy ? Which property of this alloy made it to be used for welding electric wires together ?

Ans :

- Constituents of solder : Lead and Tin
- It has low melting point

6. Name any two metals those displaces hydrogen from the dilute acids and two metals those does not displaces hydrogen from the dilute acids.

Ans :

Metals those are more reactive than hydrogen displaces it from the dilute acids

Example : Sodium , Potassium , Zinc , Iron

Metals those are less reactive than hydrogen does not displaces it from the dilute acids

Example : Copper , Silver

7. Give reasons -

(a) Platinum , Gold , Silver are used in making ornaments

Ans - Shining surface / Metallic lustre , Ductility and Malleability , Less reactivity

(b) Sodium , Potassium are stored in kerosene

Ans : These metals are highly reactive with air and water. So they are kept in kerosene.

(c) Aluminium is used in utensils even it is more reactive.

Ans : Aluminium is lighter and good conductor

Aluminium forms oxide layer to prevent itself from further corrosion

(d) Prior to reduction, Carbonate and sulphide ores are to be converted in to oxide forms

Ans : It is easier to obtain a metal from its oxide, as compared to its sulphides and carbonates.

8. Define the following terms :

(a) Mineral (b) Ore (c) Gangue

Ans :

(a) Mineral : The elements or compounds, which occur naturally in the earth's crust, are known as minerals.

(b) Ore : The mineral which contain a very high percentage of a particular metal and the metal can be profitably extracted from it is called ore.

(c) Gangue : The impurities present in the ore are called gangue

CHAPTER 4

Carbon and its Compounds



Previous questions from SSLC Board

April 2019

1. The functional groups present in propanol and propanal respectively are

- (A) — OH and — CHO (B) — OH and — COOH
(C) — CHO and — COOH (D) — CHO and — CO

Ans. : (A) — OH and — CHO

2. What are structural isomers ? Name the first member of alkanes that shows structural isomerism.

Ans. :

- Compounds with identical molecular formula but different structures are called structural isomers
- Butane or C_4H_{10}

3. (i) Write the differences between saturated and unsaturated hydrocarbons.

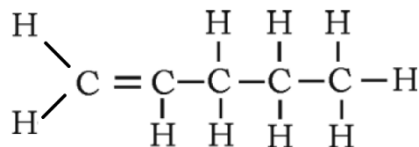
(ii) Write the molecular formula and structural formula of an alkene having five carbon atoms.

Ans : (i) Differences between saturated and unsaturated hydrocarbons.

Saturated hydrocarbons	Unsaturated hydrocarbons
Single bond between carbon atoms	Double or triple bond between carbon atoms
Less reactive	More reactive
Generally gives clean blue flame	Burns with yellow sooty flame

(ii) Molecular formula of an alkene having five carbon atoms = C_5H_{10}

Structural formula =



OR

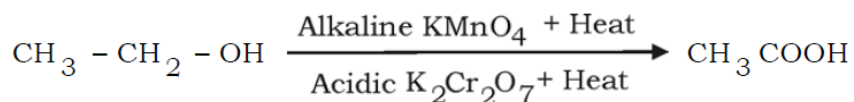
(i) Carbon atom does not form C^{4-} anion and C^{4+} cation. Why ?

(ii) How can ethanol be converted into ethanoic acid ?

Ans : (i) Carbon can gain four electrons. But it would be difficult for the nucleus with six protons to hold on to ten electrons, that is four extra electrons.

It can lose four electrons but it would require a large amount of energy to remove four electrons leaving behind a carbon cation with six protons in its nucleus holding on to just two electrons.

(ii) Alkaline potassium permanganate or acidified potassium dichromate is added to ethyl alcohol. When it is heated it oxidises to form ethanoic acid.



June 2019

1. What is a covalent bond ?

Ans. :

Chemical bond which is formed by the sharing of electrons between two atoms is known as covalent bond.

2. Name the first member of alkynes and write its molecular formula.

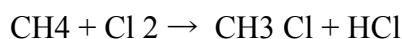
Ans. :

Name : Ethyne (or Acetylene)

Molecular formula : C_2H_2

3. Explain substitution reaction in hydrocarbons with an example.

Ans : Saturated hydrocarbons are fairly unreactive but undergo substitution reactions in the presence of sunlight. Chlorine can replace the hydrogen atoms one by one.



OR

Explain the mechanism of cleaning action of soaps.

Ans :

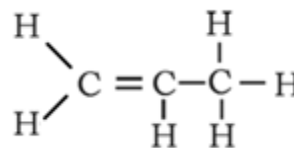
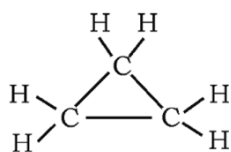
- The soap molecules form structures called micelles,
- The ionic end of soap interacts with water while the carbon chain interacts with oil (dirt).
- Then an emulsion forms in water.
- The soap micelles help in pulling out the dirt in water and thus cleans clothes.

4. The general formula of two specific groups of saturated and unsaturated hydrocarbons is $\text{C}_n \text{H}_{2n}$. Write the structures of the member of each group when $n = 3$.

Ans :

Saturated hydrocarbon = Cyclo-propane

Unsaturated hydrocarbon = Propene



April 2020

1. An example for saturated hydrocarbon is

- (A) C_2H_6 (B) C_3H_4
(C) C_2H_2 (D) C_2H_4 .

Ans. :

(A) C_2H_6

2. The molecular formula of three carbon compounds which are in homologous series are C_2H_6 , C_3H_8 , C_4H_{10} . The suitable general formula for these compounds is

- (A) $C_n H_{2n}$ (B) $C_n H_{2n - 1}$
(C) $C_n H_{2n - 2}$ (D) $C_n H_{2n + 2}$

Ans. :

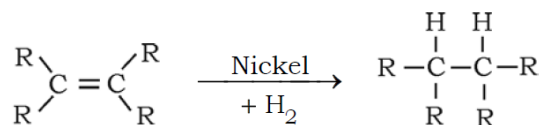
(D) $C_n H_{2n + 2}$

3. Explain the addition and substitution reaction with the help of examples. C_2H_6 undergoes substitution reaction but not addition reaction. Why ?

Ans :

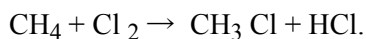
Addition reaction : Unsaturated hydrocarbons combine with hydrogen atoms in the presence of catalysts to give saturated hydrocarbons.

- Example : Hydrogenation of vegetable oil.



Substitution reaction : In the presence of sunlight other group of atoms can replace hydrogen atoms one by one from carbon compounds.

- Example : In the presence of sunlight Chlorine replaces hydrogen atoms one by one from methane.



C_2H_6 is saturated compound , only unsaturated compound undergoes addition reaction.

OR

Explain how soap cleans clothes. More amount of soap is required to clean the clothes in hard water. Why ?

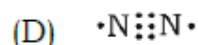
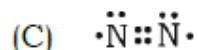
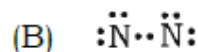
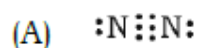
Ans :

- The soap molecules form structures called micelles,
- The ionic end of soap interacts with water while the carbon chain interacts with oil (dirt).
- Then an emulsion forms in water.
- The soap micelles help in pulling out the dirt in water and thus cleans clothes.

The reaction of soap with calcium and magnesium salts in hard water develop scum (precipitation, insoluble substance). Hence we need large amount of soap to clean clothes in hard water.

September 2020

1. Identify the correct electron dot structure of nitrogen molecule in the following :



Ans. : (A) $\text{:N}::\text{N:}$

2. The name and the molecular formula of the unsaturated hydrocarbon having general formula $\text{C}_n \text{H}_{2n}$ and containing 3 carbon atoms is



Ans. :



3. Can detergent be used to test hardness of water ? Give reason.

Ans. : No

Detergents give foam / lather with both hard water and soft water and do not form scum.

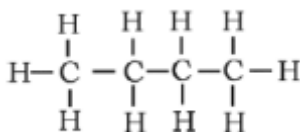
4. a) What are structural isomers ? Write two structures of butane molecule.

b) How would you distinguish experimentally between an alcohol and a carboxylic acid ?

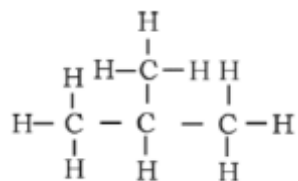
Ans. :

a) Carbon compounds with identical molecular formula but different structures are called structural isomers.

- Isomers of Butane :



n - butane



iso - butane

b) Carboxylic acid reacts with carbonates and hydrogen carbonates to give rise to a salt, carbon dioxide and water.

Alcohol will not react with carbonates and hydrogen carbonates.

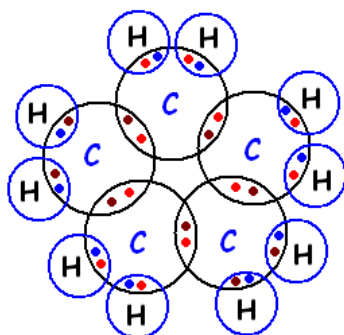
MOST LIKELY QUESTIONS FOR 2021(Including previous year questions)

1. Write the molecular formula and electron dot structure of cyclopentane?

Ans :

Molecular formula : C_5H_{10}

Electron dot structure :



2. Most of the carbon compounds are used as fuels. Why ?

Ans :

- Carbon compounds produce more amount of heat and light on burning.
- Generally they give a clean flame
- In presence of oxygen they undergo complete combustion and produce less pollutants.

3. What is hydrogenation of oils ? Mention its industrial application ?

Ans : Conversion of unsaturated fatty acids to saturated fatty acids by adding hydrogen in presence of catalyst is called hydrogenation of oils

Generally oils are in liquid forms and they are converted into solid forms. It is easy to store and transport.

4. Which of the following undergo addition reaction ? Give reason.

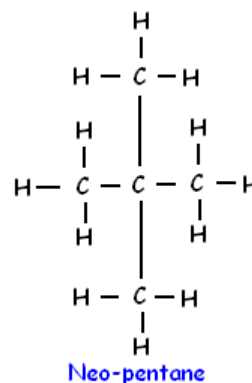
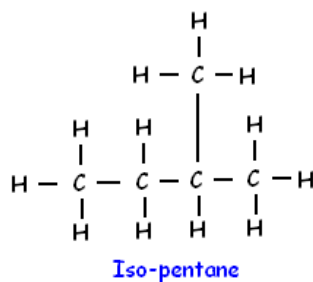
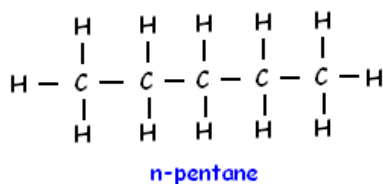
C_2H_6 , C_3H_8 , C_3H_6 , C_2H_2 and CH_4

Ans : C_3H_6 and C_2H_2 undergo addition reaction

Because , only unsaturated hydrocarbons undergo addition reaction.

5. How many structural isomers can you draw for pentane? Write their structural formula.

Ans : Pentane shows three isomers.

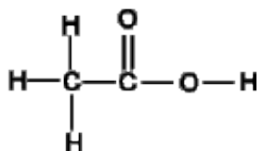


6. Write the structural formula for the followings -

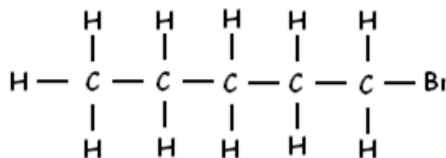
i) Ethanoic acid ii) Bromopentane iii) Butanone iv) Hexanal

Ans :

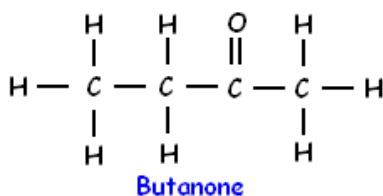
i) Ethanoic acid



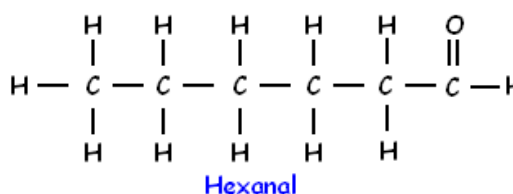
ii) Bromopentane



iii) Butanone



iv) Hexanal



7. Ethanol have 2 carbon atoms and Hexanal have 6 carbon atoms. Both have same chemical properties. Give reason .

Ans :

Chemical properties of carbon compounds does not depend on the number of carbon atoms they have. It depends on functional group.

Ethanol and Hexanol have same functional group (alcohol)

8. On the basis of molecular formula and molecular mass prove that propane and butane are in homologous series.

Ans :

	Molecular formula	Molecular mass
Propane	C_3H_8	44 u
Butane	C_4H_{10}	58 u
Difference	CH_2	14 u

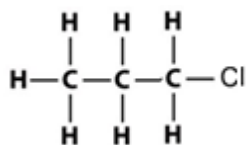
These compounds differ by - CH_2 unit and 14 u. Hence they are said to be in homologous series.

9. Write the structural formula for the followings -

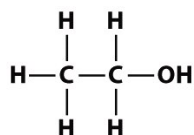
i) Chloropropane ii) Ethanol iii) Butanoic acid iv) Propanal

Ans :

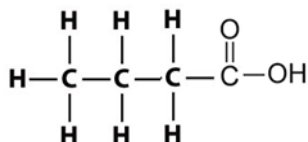
i) Chloropropane



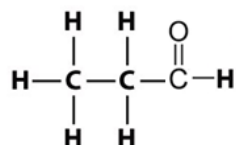
ii) Ethanol



iii) Butanoic acid



iv) Propanal



10. Write the electron dot structure for the followings -

i) Methane

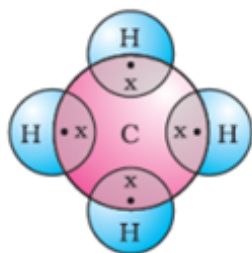
ii) Ethane

iii) Eathene

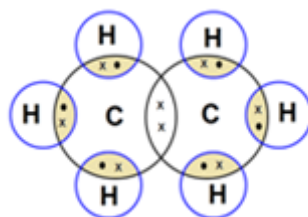
iv) Eathyne

Ans :

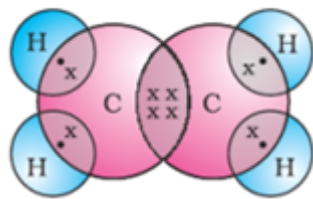
i) Methane



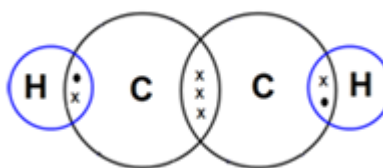
ii) Ethane



iii) Eathene



iv) Eathyne

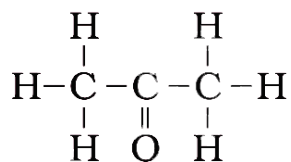
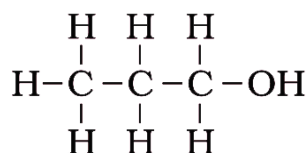


11. Name the members belongs to alcohol , aldehyd and ketone having three carbon atoms and write their structural formula .

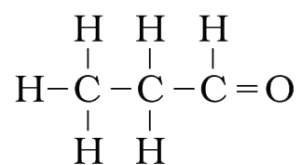
Ans :

Alcohol : Propanol

Aldehyde : Propanal



Ketone : Propanone



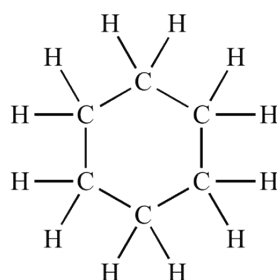
12. Write the molecular and structural formula of a saturated and unsaturated hydrocarbon in which 6 carbon atoms arranged in the form of a ring.

Ans :

Saturated hydrocarbon :

Molecular formula : **C₆H₁₂**

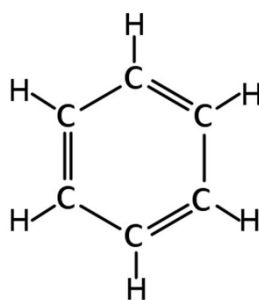
Structural formula :



Unsaturated hydrocarbon :

Molecular formula : **C₆H₆**

Structural formula :



CHAPTER 5

Periodic Classification of Elements



Previous questions from SSLC Board

April 2019

1. Observe the given table and answer the following question : (3 Marks)

Elements	A	B	C	D	E
Atomic number	11	4	2	7	19

Identify the two elements that belong to the same period and the two elements that belong to the same group. Give reason for your conclusion.

Ans :

Electronic configurations of elements

A (11) = 2 , 8 , 1

B(4) = 2 , 2

C(2) = 2 ,

D(7) = 2 , 5

E(19) = 2 , 8 , 8 , 1

- Element B and element D are in same period because their atoms have two shells.
- Element A and element E are in the same group because their outermost shell has one electron.

June 2019

1. The number of groups and periods in the modern periodic table respectively, are (1 Mark)

(A) 7 and 9

(B) 18 and 7

(C) 7 and 18

(D) 9 and 7.

Ans. :

(B) — 18 and 7

2. The position of elements A, B, C, D in the modern periodic table is given in the following table. Answer the following questions by observing the table : (2Marks)

	Group 1	Group 2
Period 3	A	B
Period 4	C	D

(i) Which element has the highest atomic size ? Why ?

(ii) Which element has the least metallic property ? Why ?

Ans. :

- (i) *C* : New shells are added down the group (OR down the group, electrons enter the new shell)
(ii) *B* : Across the period, the tendency to lose electrons decreases

April 2020

1. Sodium and potassium are placed in the same group of modern periodic table. If the molecular formula of sodium sulphate is Na_2SO_4 , then decide the molecular formula of potassium sulphate. Give reason for your answer. (1 Mark)

Ans. :

- Molecular formula of potassium sulphate is K_2SO_4 .
- Because both sodium and potassium have same number of valence electrons.

2. The atomic numbers of two elements are 8 and 16 respectively. Write the electronic configuration of these two elements. Do you keep these two elements in the same group of the modern periodic table? Justify your answer. Find out which of these two elements is more electronegative. Give reason for your answer. (3 Marks)

Ans. :

- Atomic number 8 — 2, 6
- Atomic number 16 — 2, 8, 6
- Yes, these two elements belong to the same group.
- Because in the outer most shell they have same number of electrons or both have same number of valence electrons
- Element with atomic number 8 is more electronegative than the element with atomic number 16.
- Electronegativity decreases down the group.

September 2020

1. The atomic numbers of elements *A*, *B*, *C* and *D* are 3, 9, 4 and 8 respectively. Elements having metallic nature among these are

(A) *B* and *D*

(B) *A* and *B*

(C) *A* and *C*

(D) *B* and *C*.

Ans. :

(C) *A* and *C*

2. How are the limitations of Mendeleev's periodic table rectified in the modern periodic table? (2Marks)

Ans. :

- Limitations of Mendeleev periodic table were rectified in the modern periodic table by arranging the elements in the increasing order of atomic number and also electronic configuration.
- The problem of isotopes was solved.

OR

How does the atomic size vary in groups and periods of the modern periodic table ? Why ?

Ans :

- Atomic size increases down the group
- Because new shells are being added as we go down the group, this increases the distance between the outermost electrons and the nucleus.
- The atomic size decreases on moving from left to right along a period.
- Because an increase in nuclear charge tends to pull the electrons closer to the nucleus.

MOST LIKELY QUESTIONS FOR 2021(Including previous year questions)

1. Molecular mass of Lithium , Sodium and Potassium are 6.9 , 23.0 and 39.0 respectively. Are they Dobereiner's triads ? Justify your statement.

Ans : According to Dobereiner , the atomic mass of the middle element was roughly the average of the atomic masses of the other two elements.

$$\frac{6.9 + 39.0}{2} = \frac{45.9}{2} = 22.95$$

The average is roughly equal to atomic mass of sodium= 23

Hence , they are said to be triads.

2. State the Newlands' Law of Octaves.

Ans : If the chemical elements are arranged according to increasing atomic weight, those with similar physical and chemical properties occur after each interval of seven elements.

3. What were the limitations of Newlands' Law of Octaves?

Ans :

- It was found that the Law of Octaves was applicable only up to calcium, as after calcium every eighth element did not possess properties similar to that of the first.
- It was assumed by Newlands that only 56 elements existed in nature and no more elements would be discovered in the future. But, later on, several new elements were discovered, whose properties did not fit into the Law of Octaves.
- In order to fit elements into his Table, Newlands adjusted two elements in the same slot, but also put some unlike elements under the same note. (Example : Nickel and Cobalt)

4. Name any two elements those Mendeleev kept vacant place in his periodic table which are discovered later.

Ans : Scandium , Gallium , Germanium

5. Electron configuration of an element decides its position in periodic table. Justify the statement.

Ans : Electronic configuration of an element shows number of shells it has and number of electrons in its outermost shell.

The number of shell indicates its period number and its valance electron number indicates its group number

Example : Na (11) = 2 , 8 , 1

So it belongs to Period - 3 and Group-1

6. F, Cl and Br are the elements each having seven valence electrons. Pick the element (i) with the largest atomic radius (ii) which is most reactive. Justify your answer.

Ans :

(i) Br has the largest atomic radius , because it has more shells than F and Cl

(ii) F is most reactive , because it easily gain electron (OR it has more electronegativity)

7. Nitrogen ($Z = 7$) and Phosphorus ($Z = 15$) belong to same group-15 of the periodic table. Write the electronic configuration of these two elements. Which of these two is more electronegative? Why?

Ans :

- Nitrogen (7) = 2 , 5
- Phosphorus (15) = 2 , 8 , 5
- Nitrogen is more electronegative
- Because , in a group electronegativity decreases

8. An element 'M' has atomic number 12.

(i) Write its electronic configuration.

(ii) State the group to which 'M' belongs.

(iii) Is 'M' a metal or a non-metal?

(iv) Write the formula of its chloride.

Ans :

(i) Electronic configuration = 2 , 8 , 2

(ii) 'M' belongs to group = 2

(iii) 'M' is a metal

(iv) Formula of its chloride. = MCl_2