

Date : 29-04-2024

ANNUAL EXAM (2023-24)

Time : 3:00 hr.

Max. Marks : 70

CHEMISTRY (CBSE)

Class : 11th

SECTION – A

Q1. MCQ

(16 M)

- The kelvin is related to Celsius scale by
(A) $K = ^\circ\text{C} + 212$ (B) $K = ^\circ\text{C} + 100$
(C) $K = ^\circ\text{C} + 273.15$ (D) $K = ^\circ\text{C} + 32$
- One mole of any substance contains 6.022×10^{23} atoms/molecules. Number of molecules of H_2SO_4 present in the 100 mL of 0.02M H_2SO_4 solution is _____.
(A) 6.022×10^{23} molecules (B) 12.044×10^{20} molecules
(C) 12.044×10^{23} molecules (D) 1×10^{23} molecules
- The number of moles of solute present in 1kg of a solvent is called _____.
(A) Molarity (M) (B) ppm (C) Normality (N) (D) Molality (m)
- Vapour density of a gas is 22. What is its molecular mass?
(A) 33 (B) 11 (C) 22 (D) 44
- General electronic configuration of s-block elements is:
(A) $3s^2 3p^4$ (B) $6s^2 4f^3$ (C) $3d^{10} 4s^2$ (D) ns^{1-2}
- Mg^{2+} is isoelectronic with:
(A) Zn^{2+} (B) Cu^{2+} (C) Ca^{2+} (D) Na^+
- A co-ordinate bond is formed by:
(A) Complete transfer of protons
(B) Complete transfer of electrons
(C) Sharing of electrons contributed by both the atoms
(D) Sharing of electrons contributed by one atom only
- The type of hybrid orbitals of nitrogen in NO_2^+ , NO_3^- and NH_4^+ respectively are expected to be
(A) sp , sp^2 and sp^3 (B) sp^2 , sp^3 and sp
(C) sp^2 , sp and sp^3 (D) sp , sp^3 and sp^2

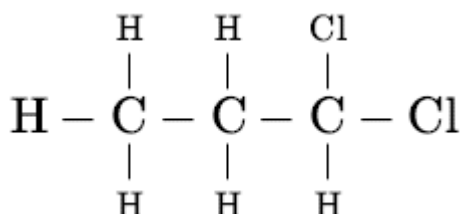
9. Chlorine, bromine, and iodine when combined with oxygen, have oxidation numbers:

- (A) +1 or any positive number (B) -1 or any negative number
(C) -2 (D) -1

10. The oxidation number of $-\frac{1}{2}$ is assigned to an Oxygen atom in :

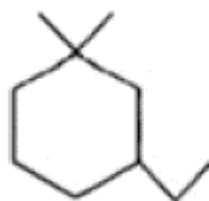
- (A) Peroxides (B) When oxygen is bonded to fluorine
(C) When oxygen is bonded to metals (D) Superoxides

11. The IUPAC name of the compound is:



- (A) 1,1-dichloropropane (B) dichloropropane
(C) 3,3-dichloropropane (D) 1,2-dichloropropane

12. What is the correct IUPAC name of the following ?

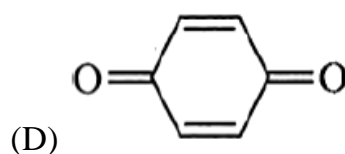
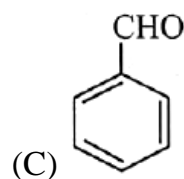
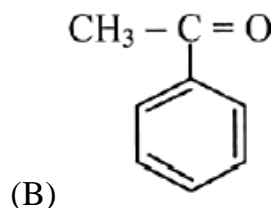
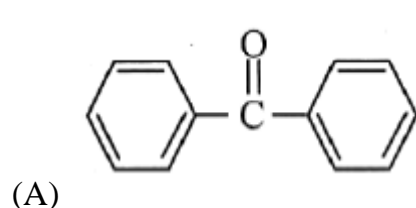


- (A) 3-ethyl-1,1-dimethylcyclohexane (B) 1,1-dimethyl-3-ethylcyclohexane
(C) 1-ethyl-3,3-dimethylcyclohexane (D) 2-ethyl-1,1-dimethylcyclohexane

13. Which among the following is a nucleophile?

- (A) $ZnCl_2$ (B) NH_3 (C) $FeCl_3$ (D) $AlCl_3$

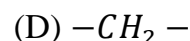
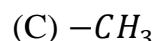
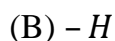
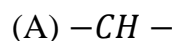
14. The following compounds do not show ketoenol tautomerism, except:



15. In which of the following compounds the rule of octet is not obeyed ?

- (A) H_2O (B) PCl_5 (C) NH_3 (D) CH_4

16. In a homologous series of organic compounds, successive members differ from each other by _____ group.



Section B

Q2. Attempt any 5

[10 M]

1. Calculate the molarity of NaOH in the solution prepared by dissolving its 4 g in enough water to form 250 mL of the solution.
2. Calculate the mass per cent of different elements present in sodium sulphate (Na_2SO_4)
3. How many elements can be accommodated in the present set up of the long form of the periodic table? Explain.
4. Balance the ionic equation : $MnO_4^- + H^+ + Br^- \rightarrow Mn^{2+} + Br_2 + H_2O$.
5. Indicate the σ and π – bonds in the following molecules:
 C_6H_6 , C_6H_{12} , CH_2Cl_2 , $CH_2 = C = CH_2$
6. Write down any two preparations for alkene.

Section C

Q3. Attempt any 7

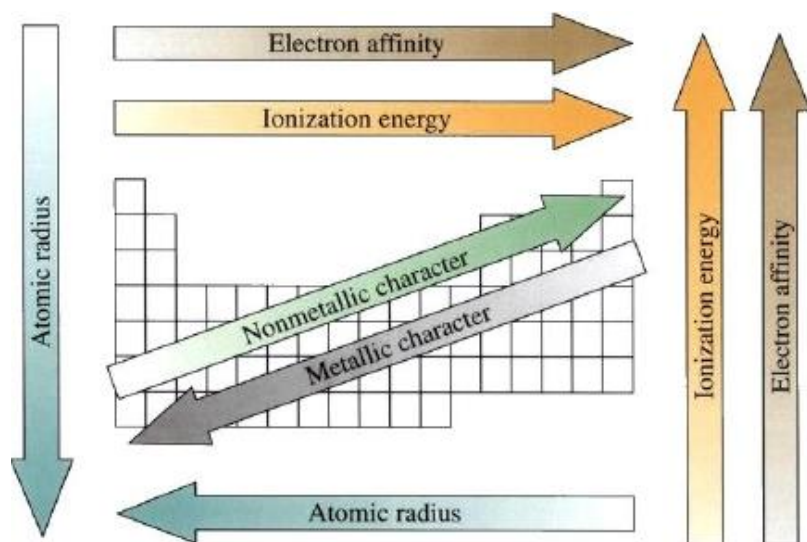
[21 M]

1. If 4g of NaOH dissolves in 36 g of H_2O , calculate the mole fraction of each component in the solution. Also, determine the molarity of solution (specific gravity of solution is $1g\ mL^{-1}$).
2. What are major differences between metals and non-metals?
3. Explain the structure of the CO_2 molecule.
4. Explain the disproportionation redox reaction with suitable example.
5. What are the oxidation number of the underlined $H_2\underline{S}_4O_6$ element and how do you rationalize your results?
6. Give three points of differences between inductive effect and resonance effect.
7. Explain hyperconjugation effect. How does hyperconjugation effect explain the stability of alkenes?
8. Discuss the shape of methane and ethane.
9. Write any two of the following name reaction with examples
 - (1) Wurtz reaction
 - (2) Kolbe electrolysis
 - (3) Corey-house synthesis

Section D

Q4. Question No. 1 to 4 are based on the given text. Read the text carefully and answer the questions: [4 M]

A qualitative measure of the ability of an atom in a chemical compound to attract shared electrons to itself is called electronegativity. Unlike ionization enthalpy and electron gain enthalpy, it is not a measurable quantity. However, a number of numerical scales of electronegativity of elements viz., Pauling scale, Mulliken-Jaffe scale, Allred-Rochow scale have been developed. In 1922 assigned arbitrarily a value of 4.0 to fluorine, the elements considered to have the greatest ability to attract electrons. The electronegativity of any given element is not constant; it varies depending on the element to which it is bound. Though it is not a measurable quantity, it does provide a means, strong tendency to gain electrons.



Therefore, electronegativity is directly related to the non-metallic properties of elements. It can be further extended to say that electronegativity is inversely related to the metallic properties of elements. Thus, the increase in electronegativities across a period is accompanied by an increase in non-metallic properties (or decrease in metallic properties) of elements

1. What is the increasing order of electronegativity in N, C, P, Si?
2. What is the Increasing order of atomic radii Li, Na, K, Rb, Cs?
3. Why oxygen has lower ionization enthalpy than nitrogen?
4. What happens to metallic character down the group?

Q5. Question No. 5 to 8 are based on the given text. Read the text carefully and answer the questions: **[4 M]**

IUPAC (International Union of Pure and Applied Chemistry) system of nomenclature. Common names are useful and in many cases indispensable, particularly when the alternative systematic names are lengthy and complicated. A systematic name of an organic compound is generally derived by identifying the parent hydrocarbon and the functional group(s) attached to it. By using prefixes and suffixes, the parent name can be modified to obtain the actual name. In a branched-chain compound, small chains of carbon atoms are attached at one or more carbon atoms of the parent chain. The small carbon chains (branches) are called alkyl groups. An alkyl group is derived from a saturated hydrocarbon by removing a hydrogen atom from carbon. Abbreviations are used for some alkyl groups. For example, methyl is abbreviated as Me, ethyl as Et, propyl as Pr and butyl as Bu.

5. Draw the structure of 3-Ethyl-4,4-dimethylheptane.
6. How is the numbering in branched chain hydrocarbon done?
7. Derive the structure of 2-Chlorohexane.
8. Why CH_4 after becoming -CH_3 called a methyl group?

Section D

Q6. Attempt any 3 **[15 M]**

10. How is molecular orbital different from atomic orbital? Give electronic configuration of
 - i. H_2^+
 - ii. Li_2
 - iii. B_2
 - iv. C_2 .
11. Addition of HBr to propene yields 2-bromopropane, while in presence of benzoyl peroxide, the same reaction yields 1-bromopropane. Explain and give mechanism.
12. Balance the following redox reactions by Half reaction method in acidic medium.
$$\text{Fe}^{2+} + \text{Cr}_2\text{O}_7^{2-} \rightarrow \text{Fe}^{3+} + \text{Cr}^{3+}$$
13. Write down any three preparations for alkane.

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