Date : 29-04-2024 | **ANNUAL EXAM (2023-24)** | **Time : 3:00 hr.**

Max. Marks : 100 | **CHEMISTRY (GSEB)** | **Class : 11th**

PART – A

❖ **Write the answer of the following questions. [Each Question 1 Marks]** **[50]**

1. The most electronegative element..... oxygen

(A) oxygen (B) chlorine (C) fluorine (D) nitrogen

2. Which of the following is the smallest in size ?

(A) Na^- (B) O^{-2} (C) Na^+ (D) F^-

3. Which of the ions has largest ionic radius ?

(A) Be^{2+} (B) Mg^{2+} (C) Ca^{2+} (D) Sr^{2+}

4. An element with atomic no.20 will be placed in which period of the periodic table ?

(A) 4 (B) 3 (C) 2 (D) 1

5. The atomic nucleus always contains.....

(A) protons (B) neutrons (C) electrons (D) photons

6. The outermost electronic configuration of the element with highest value of electron affinity is.....

(A) ns^2np^3 (B) ns^2np^5 (C) ns^2np^4 (D) ns^2np^6

7. Ionisation potential is lowest for

(A) Halogens (B) Inert gases

(C) Alkaline earth metals (D) Alkali metals

8. What is the molecular type of T-shaped molecule ?

(A) AB_4E_2 (B) AB_2E_2 (C) AB_3E_2 (D) AB_4E

9. 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

10. Which of the following species has diamagnetic property ?

(A) O_2^{2+} (B) O_2^{1-} (C) O_2 (D) O_2^{1+}

11. The hydrogen bond is strongest in .....

(A) O – H----S (B) O – H----N (C) F – H----F (D) O – H----O

12. In which state of matter, hydrogen bond can exist ?

(A) Only solid (B) Only liquid (C) Only gas (D) Solid, Liquid, Gas

13. What is oxidation number of N in Li_3N ?

(A) –2 (B) –1 (C) –3 (D) +3

14. What is the oxidation number of phosphorous in calcium phosphide ?

(A) –5 (B) –3 (C) +5 (D) +3

15. Formula of iron (III) oxide according to stock notation nomenclature method is....

(A) FeO_2 (B) Fe_3O_4 (C) Fe_2O_3 (D) FeO

16. $CH_3CHO + Ag_2O \rightarrow CH_3COOH + 2Ag$. In this reaction, which is reductant (reducing agent) ?

(A) CH_3COOH (B) Ag_2O (C) Ag (D) CH_3CHO

17. In which of the following compound, oxydation number of oxygen is positive ?

(A) BaO_2 (B) KO_2 (C) FeO (D) F_2O

18. Which of the following carbocation is most stable ?

(A) $(CH_3)_3C\cdot\overset{+}{C}H_2$ (B) $(CH_3)_3\overset{+}{C}$ (C) $CH_3CH_2\overset{+}{C}H_2$ (D) $CH_3\overset{+}{C}HCH_2CH_3$

19. In the organic compound $CH_2 = CH - CH_2 - CH_2 - C \equiv CH$, the pair of hydridised orbitals involved in the formation of $C_2 - C_3$ bond is :

(A) $sp - sp^2$ (B) $sp - sp^3$ (C) $sp^2 - sp^3$ (D) $sp^3 - sp^3$

20. The hybridisation of carbon in alkane series is which type ?

(A) sp^2 (B) sp^3 (C) sp (D) dsp^2

21. How many no. of σ and π-bond are in ethene respectively ?

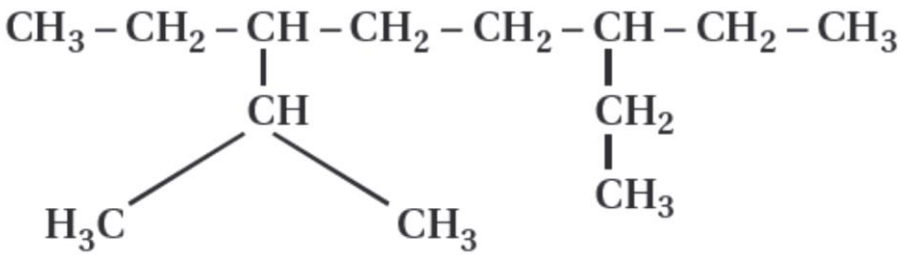
(A) 5 and 1 (B) 1 and 5 (C) 6 and 1 (D) 4 and 2

22. In IUPAC nomenclature method ..... is used instead of lowest sum rule.

(A) lowest substraction rule (B) lowest substituted position

(C) lowest position (D) none

23. The correct IUPAC name of the following alkane is…



(A) 3,6-Diethyl-2-methyloctane (B) 5-Isopropyl-3-ethyloctane

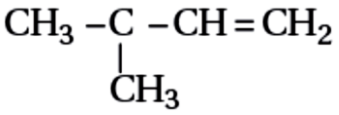
(C) 3-Ethyl-5-isopropyloctane (D) 3-Isopropyl-6-ethyloctane

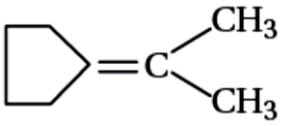
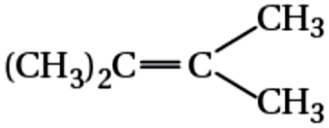
24. Arrange the halogens F_2, Cl_2, Br_2, I_2 in order of their increasing reactivity with alkanes.

(A) $I_2 < Br_2 < Cl_2 < F_2$ (B) $Br_2 < Cl_2 < F_2 < I_2$

(C) $F_2 < Cl_2 < Br_2 < I_2$ (D) $Br_2 < I_2 < Cl_2 < F_2$

25. Which of the following alkenes on ozonolysis give a mixture of ketones only ?

(A) $CH_3 - CH = CH - CH_3$ (B) 

(C)  (D) 

26. The kelvin is related to Celsius scale by

(A) $K = ℃ + 212$ (B) $K = ℃ + 100$

(C) $K = ℃ + 273.15$ (D) $K = ℃ + 32$

27. 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

28. 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)

29. Vapour density of a gas is 22. What is its molecular mass?

(A) 33 (B) 11 (C) 22 (D) 44

30. 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}

31. Mg^{2+} is isoelectronic with:

(A) Zn^{2+} (B) Cu^{2+} (C) Ca^{2+} (D) Na^{+}

32. 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

33. 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

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

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

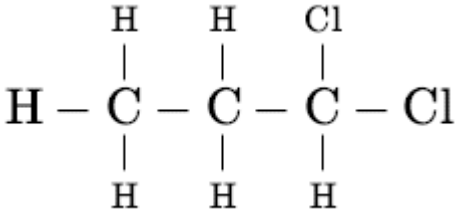
(C) -2 (D) -1

35. 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

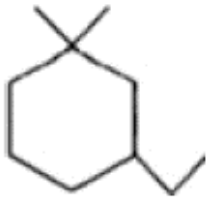
36. The IUPAC name of the compound is:



(A) 1,1-dichloropropane (B) dichloropropane

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

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



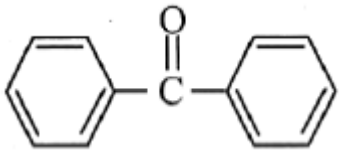
(A) 3-ethyl-1,1-dimethylcyclohexane (B)1,1-dimethyl-3-ethylcyclohexane

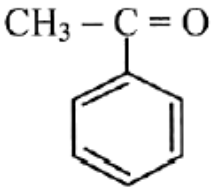
(C) 1-ethyl-3,3-dimethylcyclohexane (D) 2-ethyl-1,1-dimethylcyclohexane

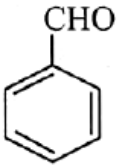
38. Which among the following is a nucleophile?

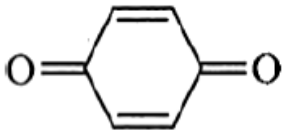
(A) $ZnCl_2$ (B) NH_3 (C) $FeCl_3$ (D) $AlCl_3$

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

(A) 

(B) 

(C) 

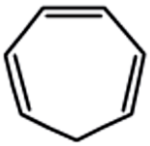
(D) 

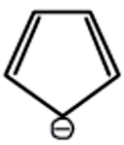
40. In a homologous series of organic compounds, successive members differ from each other by _____ group.

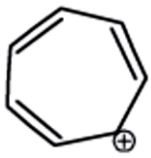
(A) $-CH-$ (B) $-H$ (C) $-CH_3$ (D) $-CH_2-$

41. Which compound amongst the following is not an aromatic compound?

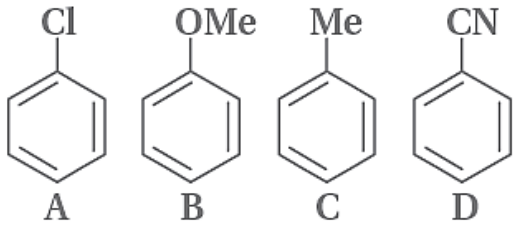
(A) 

(B) 

(C) 

(D) 

42. The increasing order of reactivity of the following compounds towards aromatic electrophilic substitution reaction is :



(A) D < B < A < C (B) A < B < C < D (C) D < A < C < B (D) B < C < A < D

43. Which of the following angle corresponds to sp^2 hybridization?

(A) 90° (B) 120° (C) 180° (D) 109°

44. Which of the following options represents the correct bond order?

(A) $O_2^- > O_2 > O_2^+$ (B) $O_2^- < O_2 < O_2^+$

(C) $O_2^- > O_2 < O_2^+$ (D) $O_2^- < O_2 > O_2^+$

45. The electronic configuration of the outer most shell of the most electronegative element is

(A) $2s^2\ 2p^5$ (B) $3s^2\ 3p^5$ (C) $4s^2\ 4p^5$ (D) $5s^2\ 5p^5$

46. Which one has strong H bonding from the following?

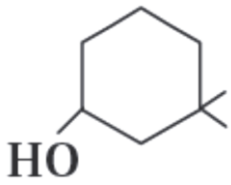
(A) F — H ····· F (B) O — H ····· Br (C) O — H ····· S (D) O — H ····· O

47. What is the bond length in O_3 molecule?

(A) equal to O = O (B) equal to O – O

(C) between O – O and O = O (D) All of these

48. The IUPAC name of the compound is .....

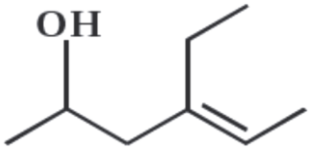


(A) 3, 3-dimethyl-1-hydroxycyclohexane (B) 1, 1-dimethyl-3-cyclohexanol

(C) 3, 3-dimethyl-1-cyclohexanol (D) 1, 1-dimethyl-3-hydroxy cyclohexane

49. The number of peroxy rings in CrO_5 is .....

(A) 2 (B) 3 (C) 4 (D) 1

50. The IUPAC name of the given compound 

..... .

(A) 2-ethylhex-4-en-2-ol (B) 4-ethylhex-2-en-2-ol

(C) 4-ethylhex-4-en-2-ol (D) 2-ethylhex-2-en-4-ol

PART – B

SECTION – A

❖ **Answer the following question. [Each Question carry 2 Marks]** **[14]**

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 $\sigma \; and \; \pi -$ 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.
7. Write down the difference between molarity and molality.

SECTION B

❖ **Answer the following question. [Each Question carry 3 Marks] [Any Seven]** **[21 M]**

1. If 4g of NaOH dissolves in 36 g of H_2O, calculate the mole fraction of each component in the solution. Aslo, 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 $H_2\underline{S}_4O_6$ elementand 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 reactin
   (2) Kolbe electrolysis
   (3) Corey-house synthesis

SECTION C

❖ **Answer the following question. [Each Question carry 3 Marks] [AnyThree]** **[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.

$Fe^{2+} + Cr_2O_7^{2-} \rightarrow Fe^{3+} + Cr^{3+}$

13. Write down any three preparations for alkane.

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