Sample Paper-02

Class 11th NEET (2024)

CHEMISTRY

SECTION-A

1. The weight of iron which will be converted into its oxide (Fe_3O_4) by the action of 18g of steam on it will be;
(1) 168 g (2) 42 g
(3) 8 g (4) 72 g

2. The correct order of acidic strength is;
(1) $Cl_2O_7 < SO_2 < P_4O_{10}$
(2) $CO_2 < N_2O_5 < SO_3$
(3) $Na_2O > MgO > Al_2O_3$
(4) $K_2O > CaO > MgO$

3. Which of the following species contains three bond pairs and two lone pairs around the central atom?
(1) NH_2^- (2) ClF_3
(3) H_2O (4) BF_3

4. The geometry of electron pairs around I in IF_5 is;
(1) octahedral
(2) trigonal bipyramidal
(3) square pyramidal
(4) pentagonal planar

5. Which of the following equation was suggested by de Broglie?
(1) $2\pi r = n\lambda$ (2) $\lambda = \frac{p}{n}$
(3) $\pi r^2 = n\lambda$ (4) $2\pi r = \frac{nh}{\lambda}$

6. The number of moles of $CaCl_2$ needed to react with excess of $AgNO_3$ to produce 4.31 gm of AgCl (Molecular mass of AgCl = 143.5 amu);
(1) 0.03 (2) 0.015
(3) 0.045 (4) 0.06

7. O_2^{2-} is isoelectronic with;
(1) H_2 (2) N_2
(3) F_2 (4) S

8. According to the molecular orbital theory, which of the following statements about magnetic character and bond order is **correct** regarding O_2^+?
(1) Paramagnetic and bond order < O_2
(2) Paramagnetic and bond order > O_2
(3) Diamagnetic and bond order < O_2
(4) Diamagnetic and bond order > O_2

9. In Bohr series of lines of hydrogen spectrum, which of the following inter-orbit jumps of the electron represents highest energy emission?
(1) $5 \rightarrow 1$ (2) $4 \rightarrow 1$
(3) $3 \rightarrow 1$ (4) $2 \rightarrow 1$

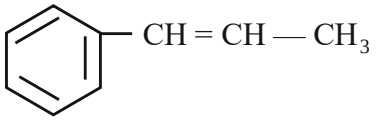
10. Which of the following is **correct** about the dipole moment (μ) of NH_3 and NF_3?
(1) $\mu(NH_3) < \mu(NF_3)$
(2) $\mu(NF_3) < \mu(NH_3)$
(3) $\mu(NF_3) = \mu(NH_3)$
(4) $\mu(NF_3) = 2\mu(NH_3)$

11. Which of the following species is paramagnetic?
(1) NO^- (2) O_2^{2-}
(3) CN^- (4) CO

12. A reversible reaction having two reactants in equilibrium if the concentration of reactants are doubled, the equilibrium constant will;
(1) Become 4 times.
(2) Become 1/4th time.
(3) Become 1/16th times.
(4) Remains the same.

13. In which molecule hybrid orbital have only 20% d- character?
(1) CCl_4 (2) SF_6
(3) SF_4 (4) Cl_2O

14. Number of carbon atoms present in sp^2 hybrid state of given molecule?



(1) 9 (2) 8
(3) 3 (4) 2

15. Which one of the following molecules contains no π bond?
(1) H_2O (2) SO_2
(3) NO_2 (4) CO_2

16. Bond energies of (H − H), (O = O) and (O − H) are 105, 120 and 220 kcal/mol, respectively then ΔH of the reaction, $2H_2(g) + O_2(g) \rightarrow 2H_2O(g)$;

(1) −115 kcal (2) −130 kcal
(3) −118 kcal (4) −550 kcal

17. The heat of combustion of methane is −880 kJ mol^{-1}. If 3.2 g of methane is burnt;

(1) 176 kJ of heat is absorbed.
(2) 176 kJ of heat is evolved.
(3) 88 kJ of heat is evolved.
(4) None of the above.

18. $S(s) + 3/2\ O_2(g) \rightarrow SO_3(g)$; x k cals
$SO_2(g) + ½\ O_2(g) \rightarrow SO_3(g)$; y k cals
What is the heat of formation of SO_2 (k cals)?

(1) x – y (2) 2x + y
(3) x + y (4) 2x/y

19. One mole of an ideal gas at 300 K is expanded isothermally from an initial volume of 1 litre to 10 litres. The ΔE for this process is;

(1) 16.7 cal
(2) 1381.1 cal
(3) 9 lit atm
(4) zero

20. Which salt undergoes hydrolysis?

(1) CH_3COONa (2) KNO_3
(3) NaCl (4) K_2SO_4

21. pH of an acidic buffer is 7 and pKa is 5 then the ratio of $\frac{[salt]}{[Acid]}$ is:-

(1) 10 (2) 100
(3) 50 (4) 20

22. The heat of formation of HCl(g) from the reaction $H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$; ΔH = –44 kcal is;

(1) +88 kcal (2) +22 kcal
(3) –44 kcal (4) –22 kcal

23. The first ionization potentials (eV) of N and O respectively are

(1) 8.29, 8.29 (2) 11.32, 11.32
(3) 8.29, 11.32 (4) 11.32, 8.21

24. When Al is added to sodium hydroxide solution:

(1) no reaction takes place.
(2) oxygen is evolved.
(3) water is produced.
(4) hydrogen is evolved.

25. Identify the **incorrect** statement about the structure of diborane.

(1) The four terminal hydrogen atoms and the two boron atoms lie in one plane.
(2) There are two bridging hydrogen atoms.
(3) All six B – H bond are regular two centre two electron bonds.
(4) The hybridisations of both the boron atoms are same and sp^3.

26. The element with highest electronegativity will belong to;

(1) Period 2, group 17
(2) Period 3, group 17
(3) Period 2, group 18
(4) Period 2, group 1

27. In the following reversible reaction
$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g) + Q$ cal
Most suitable condition for the higher production of SO_3 is;

(1) high temperature and high pressure.
(2) high temperature and low pressure.
(3) low temperature and high pressure.
(4) low temperature and low pressure.

28. The gas used in the hydrogenation of oils presence of nickel as a catalyst is;

(1) methane (2) ethane
(3) ozone (4) hydrogen

29. The electronic configuration of elements A, B and C are $[He]2s^1$, $[Ne]3s^1$ and $[Ar]4s^1$ respectively. Which one of the following order is **correct** for IE_1 (in kJ mol^{-1}) of A, B and C?

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

30. Ostwald's dilution law gives satisfactory results with the solution of which electrolyte?

(1) HCl (2) HNO_3
(3) CH_3COOH (4) NaOH

31. On adding 0.04 g solid NaOH to a 100 mL, M/200 $Ba(OH)_2$ solution, determine change in pH;

(1) 0 (2) +0.3

(3) –0.3 (4) +0.7

32. Zeolites are extensively used in;

(1) softening of water and catalyst.

(2) preparing heavy water.

(3) increasing the hardness of water.

(4) Mond's process.

33. Identify the amphoteric species from the following?

(I) H_2O

(II) NH_3

(III) $H_2PO_4^-$

(IV) HCO_3^-

(1) I, II (2) III, IV

(3) I, II, III (4) I, II, III, IV

34. **Statement I:** ClO_3^- and SO_3^{2-} has three bond pair so according to VSEPR theory it has tetrahedral geometry and sp^3 hybridization.

Statement II: ClO_3^- and SO_3^{2-} has tetrahedral shape.

(1) Statement I and Statement II both are correct.

(2) Statement I is correct, but Statement II is incorrect.

(3) Statement I is incorrect, but Statement II is correct.

(4) Statement I and Statement II both are incorrect.

35. **Statement I:** Boiling point of alkanes increase with decrease in branching.

Statement II: The decreasing order of boiling points of n- Pentane, iso-Pentane, neo-Pentane is n-Pentane > iso-Pentane > neo-Pentane.

(1) Statement I and Statement II both are correct.

(2) Statement I is correct, but Statement II is incorrect.

(3) Statement I is incorrect, but Statement II is correct.

(4) Statement I and Statement II both are incorrect.

SECTION-B

36. **Statement I:** According to molecular orbital theory C_2 molecules exist with bond order 2.

Statement II: C_2 molecule has 8 electrons in bonding molecular orbitals and 2 pair of electrons in anti-bonding molecular orbitals.

(1) Statement I and Statement II both are correct.

(2) Statement I is correct, but Statement II is incorrect.

(3) Statement I is incorrect, but Statement II is correct.

(4) Statement I and Statement II both are incorrect.

37. Compounds with $C_4H_{11}N$ as molecular formula can exhibit;

(1) position isomerism

(2) metamerism

(3) functional isomerism

(4) all of these

38. For the reaction, $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$, the standard free energy of $\Delta G° = 0$. The equilibrium constant (K) would be _____.

(1) K = 0

(2) K > 1

(3) K = 1

(4) K < 1

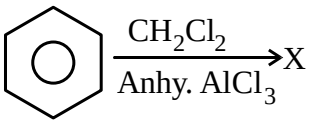
39. Equal volumes of two solutions, one having pH = 6 and other having pH = 4 are mixed. The pH of the resulting solution would be:

(1) 5.7

(2) 4.3

(3) 5.0

(4) 5.5

40. 

The product X is:

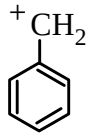
(1) Benzyl chloride

(2) Benzal chloride

(3) Benzo chloride

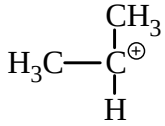
(4) Diphenyl methane

41. Which of the following carbocation is least stable?

(1) 

(2) $\overset{+}{C}H = CH_2$

(3) $CH_2 = CH - \overset{+}{C}H_2$

(4) 

42. The most suitable reagent among the following to distinguish compound (III) from rest of the compounds is;

(I) $CH_3 - C \equiv C - CH_3$

(II) $CH_3 - CH_2 - CH_2 - CH_3$

(III) $CH_3 - CH_2 - C \equiv CH$

(IV) $CH_3 - CH = CH_2$

(1) Br_2/CCl_4

(2) Br_2/CH_3COOH

(3) alk.$KMnO_4$

(4) ammoniacal $AgNO_3$

43. The most suitable method of separation of 1 : 1 mixture of ortho and para-nitrophenols is;

(1) chromatography

(2) crystallisation

(3) steam distillation

(4) sublimation

44. The salt of which of the following four weak acids will be most hydrolysed;

(1) HA ; $Ka = 1 \times 10^{-8}$

(2) HB ; $Ka = 2 \times 10^{-6}$

(3) HC ; $Ka = 3 \times 10^{-8}$

(4) HD ; $Ka = 4 \times 10^{-10}$

45. **Assertion (A)**: Hybrid orbital shows more electronegative character with increase in s-character of hybrid orbitals.

Reason (R): As s-character increase in sp^3, sp^2 and sp hybrid orbitals electronegativity increases because s-orbitals are close to nucleus.

(1) Both **Assertion (A)** and **Reason (R)** are the true, and **Reason (R)** is a correct explanation of **Assertion (A)**.

(2) Both **Assertion (A)** and **Reason (R)** are the true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.

(3) **Assertion (A)** is true, and **Reason (R)** is false.

(4) **Assertion (A)** is false, and **Reason (R)** is true.

46. **Assertion:** In Neon, the atoms are held together by covalent bond.

Reason: Noble gases like Neon only have Vander waals force between the atoms.

(1) Both **Assertion (A)** and **Reason (R)** are the true, and **Reason (R)** is a correct explanation of **Assertion (A)**.

(2) Both **Assertion (A)** and **Reason (R)** are the true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.

(3) **Assertion (A)** is true, and **Reason (R)** is false.

(4) **Assertion (A)** is false, and **Reason (R)** is true.

47. Match **List-I** with **List-II** to find out the **correct** option.

List I (Species)		**List II (Conjugate acid)**	
(A)	H_2O	(I)	H_2CO_3
(B)	HCO_3^-	(II)	H_2SO_4
(C)	HSO_4^-	(III)	H_3O^+
(D)	NH_3	(IV)	NH_4^+

(1) (A) $\rightarrow$ I; (B) $\rightarrow$ IV; (C) $\rightarrow$ III; (D) $\rightarrow$ II

(2) (A) $\rightarrow$ II; (B) $\rightarrow$ III; (C) $\rightarrow$ IV; (D) $\rightarrow$ I

(3) (A) $\rightarrow$ III; (B) $\rightarrow$ I; (C) $\rightarrow$ II; (D) $\rightarrow$ IV

(4) (A) $\rightarrow$ IV; (B) $\rightarrow$ II; (C) $\rightarrow$ I; (D) $\rightarrow$ III

48. Match **List-I** with **List-II** to find out the **correct** option.

List I (Molecules)		**List II (Shape)**	
(A)	PCl_5	(I)	Square planar
(B)	SF_4	(II)	Trigonal planar
(C)	XeF_4	(III)	See saw
(D)	BF_3	(IV)	Trigonal bipyramidal

(1) (A) – (III), (B) – (I), (C) – (IV), (D) – (II)

(2) (A) – (IV), (B) – (III), (C) – (II), (D) – (I)

(3) (A) – (IV), (B) – (III), (C) – (I), (D) – (II)

(4) (A) – (II), (B) – (III), (C) – IV), (D) – (I)

49. Which of the following have higher Z_{eff}?

(1) F^- (2) Al

(3) Al^{+3} (4) N

50. In $_{17}Cl^{35}$ and $_{17}Cl^{37}$, which of the following is **false**?

(1) both have 17 protons.

(2) both have 17 electrons.

(3) both have 18 neutrons.

(4) both show same chemical properties.

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