Sample Paper-01

Class 11th NEET (2024)

# CHEMISTRY

## ANSWER KEY

| | | | |
|---|---|---|---|
| 1. | (2) | 26. | (2) |
| 2. | (4) | 27. | (4) |
| 3. | (4) | 28. | (3) |
| 4. | (1) | 29. | (1) |
| 5. | (1) | 30. | (1) |
| 6. | (1) | 31. | (1) |
| 7. | (4) | 32. | (1) |
| 8. | (2) | 33. | (2) |
| 9. | (4) | 34. | (1) |
| 10. | (3) | 35. | (1) |
| 11. | (3) | 36. | (4) |
| 12. | (2) | 37. | (3) |
| 13. | (4) | 38. | (1) |
| 14. | (1) | 39. | (2) |
| 15. | (4) | 40. | (3) |
| 16. | (2) | 41. | (4) |
| 17. | (2) | 42. | (4) |
| 18. | (2) | 43. | (2) |
| 19. | (1) | 44. | (2) |
| 20. | (2) | 45. | (2) |
| 21. | (1) | 46. | (2) |
| 22. | (3) | 47. | (4) |
| 23. | (1) | 48. | (2) |
| 24. | (2) | 49. | (1) |
| 25. | (3) | 50. | (4) |

## HINTS AND SOLUTION

**1. (2)**

Let 100 g of hydrogen and 400 g of oxygen are present.

The molar masses of hydrogen and oxygen are 2 g/mol and 32 g/mol respectively.

The number of moles of hydrogen present are

$$\frac{100}{2} = 50\,\text{mol.}$$

The number of moles of oxygen present are

$$\frac{400}{32} = 12.5\,\text{mol.}$$

The molar ratio of the two gases in the mixture is 50 :12.5 or 4:1

**2. (4)**

1 mole of a gas at STP occupies a volume of 22.4L.

15 L of gas corresponds to 15 L /22.4L

= 0.67moles.

**3. (4)**

$$\text{Ionic radius of cations} \propto \frac{1}{\text{charge}}$$

And Ar have vander waal radius in it which is largest in its period.

$$\text{size of cation} \propto \frac{1}{\text{charge}}$$

**4. (1)**

$$3SrCl_2 + 2K_3PO_4 \rightarrow 6KCl + Sr_3(PO_4)_2$$

| **Given** | **0.3** | **0.2** | **-** | **-** |
|---|---|---|---|---|
| **mole** | | | | |

For $SrCl_2$

$$\frac{\text{Given mole}}{\text{Stoichemetry coefficient}} = \frac{\cancel{0.3}^{0.1}}{\cancel{3}} = 0.1$$

For $K_3PO_4$

$$\frac{\text{Given mole}}{\text{Stoichemetry coefficient}} = \frac{\cancel{0.2}^{0.1}}{\cancel{2}} = 0.1$$

So, 2 moles of $K_3PO_4$ formed = 6 mole of KCl

$\therefore$ 1 mole of $K_3PO_4$ formed $= \frac{6}{2}$ mole of KCl

$\therefore$ 0.2 mole of $K_3PO_4$ formed $= \frac{6}{2} \times 0.2$

= 0.6 mole of KCl

**5. (1)**

$_{17}Cl$ ($1s^2 2s^2 2p^6 3s^2 3p^5$) has the highest electron affinity.

**6. (1)**

$Cs^+$ has biggest radius as ionic radius increases down the group.

**7. (4)**

Radius of n = 2 orbit

$= r_1 \times n^2 = 0.53\ \text{Å} \times 2^2 = 2.12\ \text{Å}$

**8. (2)**

Radial nodes = $n - l - 1 = 4 - 1 - 1 = 2$

nodal planes = $l = 1$

**9. (4)**

$Na_2SO_4.nH_2O$

molar mass = (142 + 18n)

$$\text{mass of water} = \frac{12.6}{26.8} \times (142 + 18n)$$

$$18n = \frac{12.6}{26.8} \times (142 + 18n)$$

n = 7

**10. (3)**

$NO_2^+$

$H = \frac{1}{2}[V + M - C + A]$

$= \frac{1}{2}[5 + 0 - 1 + 0]$

$= 2 \Rightarrow sp \Rightarrow$ linear

**11. (3)**

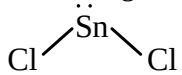
Basic nature of oxides is directly proportional to metallic nature of elements.

**12. (2)**

Graphite is the purest and thermodynamically the most stable form of carbon.

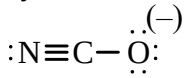
**13. (4)**

The state of hybridisation of Sn in $SnCl_2$ is $sp^2$. Therefore, $SnCl_2$ has angular or bent shape.




The C atom of $NCO^-$ has undergoes sp hybridisation giving $NCO^-$ a linear structure

$CS_2$ also has a linear structure due to sp hybridisation of C atom, S = C = S.



**14.** **(1)**

According to Fajan's rule - Greater the charge on the cation, the greater the covalent character of the ionic bond.

$AlCl_3$ — $Al^{3+}$, smallest size and highest charge density.

**15.** **(4)**

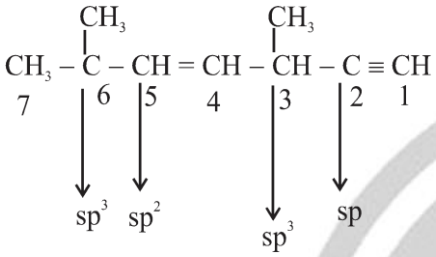
$CH_4$ : $sp^3$ (25% s character)

$XeO_3$: $sp^3$ (25% s character)

$BCl_3$: $sp^2$ (33.33% s character)

$NO_2^+$ : sp (50% s character)

**16.** **(2)**




**17.** **(2)**

Dipole moment is a vector quantity it's direction is from lower electronegative element to higher electronegative element.

**18.** **(2)**

Between Cl and F, Cl has higher electron gain enthalpy then the F. Since the incoming electron experiences a greater force of repulsion because of small size of F-atom. Similar is true in case of O and S, i.e. the electron gain enthalpy of S is higher as compared to O due to its small size. Thus, the correct order of electron gain enthalpy of given elements is O < S < F < Cl

**19.** **(1)**

$2C_6H_6(l) + 15O_2(g) \rightarrow 12CO_2(g) + 6H_2O(l)$

$\Delta ng = -3$

$\Delta H - \Delta E = -3RT$

$= \dfrac{-3 \times 8.314 \times 298}{1000} = -7.432$ kJ

**20.** **(2)**

(–393.5) (–110.5) (–241.8)

$CO_2(g) + H_2(g) \rightarrow CO(g) + H_2O(g)$ is standard enthalpy change $\Delta H^\circ$

$= -110.5 - 241.8 + 393.5$

$= 41.2$kJ

**21.** **(1)**

$\Delta G^\circ = \sum_f G^\circ(\text{products}) - \sum_f G^\circ(\text{reactants})$

$= 2 \times (1.3) - (0 + 0)$

$= 2.6 - 0 = 2.6$ k J $mol^{-1}$

**22.** **(3)**

$H_2O \rightarrow$ Neutral

$Na_2O \rightarrow$ Basic

$ZnO \rightarrow$ Amphoteric

$SO_3 \rightarrow$ Acidic

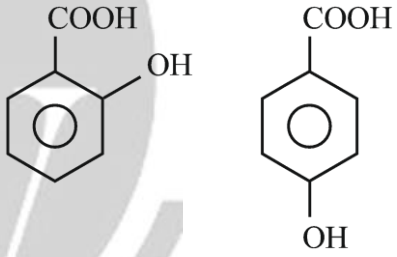
**23.** **(1)**

In $BF_3$, boron is $sp^2$ hybridised, so it is trigonal planar. In $NF_3$, nitrogen is $sp^3$ hybridised due to the presence of one lone pair which distorts the structure slightly and becomes pyramidal from tetrahedral.

**24.** **(2)**

Only helium is inert gas.

**25.** **(3)**




o-hydroxy benzoic acid p-hydroxybenzoic acid

p-hydroxy benzoic acid contains intermolecular H-bonding while o-hydroxy benzoic acid contains intramolecular H-bonding.

**26.** **(2)**

$Na_2B_4O_7 + 5H_2O + H_2SO_4 \rightarrow Na_2SO_4 + 4H_3BO_3$

**27.** **(4)**

Self-ionization of water is an endothermic reaction- $H_2O(l) \rightleftharpoons H^+(aq) + OH^-(aq)$ $\Delta H > 0$ Thus Reason is correct.

$pH = -\log[H^+] = -\log\sqrt{Kw}$ As forward reaction is endothermic; values of Kw will increase on increasing the temperature. Hence pH will decrease. Thus, Assertion is false.

**28.** **(3)**

Correct statement; In case of noble gases atomic radii are expressed in terms of Vander Waal's radii.

Melting point decreases down the group.

**29.** **(1)**

Glass is soluble in HF and formed $H_2SiF_6$ and $H_2O$.

$SiO_2 + 6HF \rightarrow H_2SiF_6 + 2H_2O$.

**30.** **(1)**

At equilibrium, all properties of solution (i.e. chemical composition of eq. mixture) becomes constant.

**31.** **(1)**

| | $PCl_5(g) \rightleftharpoons$ | $PCl_3(g)$ + | $Cl_2(g)$ |
|---|---|---|---|
| Initial mole | 1 | 0 | 0 |
| Conc. at equilibrium | 1-x | x | x |

Total mole of $PCl_3 = 0.7$

$$\text{Concentration} = \frac{0.7}{5} = 0.14$$

$$K_c = \frac{x^2}{(1-x)V} = \frac{0.7 \times 0.7}{0.3 \times 5} = \frac{49}{150}$$

**32.** **(1)**

With increase in temperature, value of $K_c$ increases so, the reaction is endothermic.

$T \uparrow K_c \uparrow \Rightarrow$ Endothermic

**33.** **(2)**

The oxidation number of O in $H_2O_2$ is $-1$. It can either increases to zero in $O_2$ or decreases to $-2$ in $H_2O$. Therefore, $H_2O_2$ can act both as an oxidizing as well as a reducing agent.

**34.** **(1)**

$$\underset{+5}{BrO_3^-} \longrightarrow \underset{0}{Br_2}$$

$$\therefore \quad (V.f.)BrO_3^- = 5$$

$$\therefore \quad \text{Eq wt} = \frac{M}{5}$$

**35** **(1)**

$$\underset{S}{AgCl} \rightleftharpoons \underset{S}{Ag^+} + \underset{S}{Cl^-}$$

$$Ksp = S^2 \Rightarrow S = \sqrt{K_{sp}} \Rightarrow S = \sqrt{10^{-10}} = 10^{-5}$$

**36.** **(4)**

Internal energy includes translation, rotational, vibrational, electronic, and nuclear energy. But it does not include gravitational pull.

**37.** **(3)**

$CH_2 = CH - C = N$

$(sp^2)\ (sp^2)\ \ (sp)$

**38.** **(1)**

$R - I > R - Br > R - Cl$

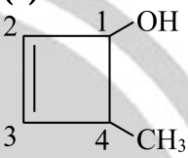
Bond length $\uparrow$

Bond energy $\downarrow$

Reactivity $\uparrow$

With increase in atomic size of halide group, bond length increases however, bond energy get decreases and reactivity increases.

**39.** **(2)**



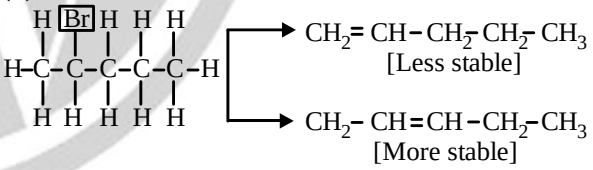

4-Methylcyclobut-2-en-1-ol

**40.** **(3)**

In Wurtz reaction the simplest alkane which can be prepared is $C_2H_6$, and it gives product with even number of carbon atoms.

$$CH_3Br + 2Na + BrCH_3 \xrightarrow{\text{dryether}} \underset{\text{ethane}}{CH_3 - CH_3} + 2NaBr$$

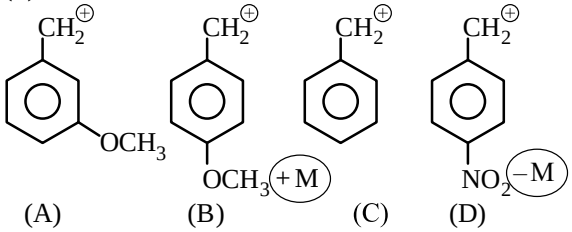
**41.** **(4)**




**(Zaitsev's Rule)**

Most substituted product will be most stable therefore the most favoured.

**42.** **(4)**




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

Stability = B > C > A > D

**43.** **(2)**

$Be^{2+}$ and $Li^+$ both ions contains 2 $e^-$ hence these are isoelectronics.

**44.** **(2)**

$CH_3-CH=CH-CH_3$ [2-butene]

$\xrightarrow[\text{[EAR]}]{HBr}$ $CH_3-\underset{\underset{Br}{|}}{CH}-CH_3-CH_3$

[Due to chiral carbon mirror Image is possible. So number of product is 2.]

**45.** **(2)**

In this method a known weight of organic compound is heated with fuming nitric acid in the presence of $AgNO_3$ in a hard glass tube called carius tube.

% of Halogen (x) = $\frac{\text{At. wt. of X} \times \text{wt. of Ag X}}{\text{M. wt of Ag X} \times \text{wt. of organic compound}} \times 100$

**46.** **(2)**

s-character of C–H bond is higher in acetylene because it is sp hybridized, due to which E. N. of C increases, hence acidic strength increases.

**47.** **(4)**

Free-radical elimination reaction.

**48.** **(2)**

Number of moles = $V/V_m$= 11.2/22.4 mol

Mol. wt. of gas = $\frac{\text{given mass}}{\text{no. of moles}}$

$= \frac{32 \times 22.4}{11.2} = 64\,g$

Mol. wt. of $SO_x$ = 32 + 16x = 64 $\Rightarrow$ x = 2

**49.** **(1)**

Given is a solution of 1M NaCl and 1M HCl, where NaCl is a salt of strong acid and a strong base & HCl is a strong acid.

When equimolar amounts of them are mixed together, they do not form a buffer because a strong acid and salt of the strong acid does not form the buffer. The solution of 1 M NaCl and 1 M HCl cannot resist the change in pH when acid or base are added to it.

Also, the mixture is strongly acidic because, upon hydrolysis, NaCl gives NaOH and HCl, and HCl is also present there. So, there is twice the amount of HCl as compared to NaOH. This renders the solution acidic in nature. Hence, the pH of the solution will be less than 7.

**50.** **(4)**

HF has the highest boiling point among hydrogen halides because it has the strongest hydrogen bonding.

In HF, there is a high electronegativity difference between H and F, thus they form strong intermolecular hydrogen bonding.