Sample Paper-04

Class 11th NEET (2024)

CHEMISTRY

ANSWER KEY

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

HINTS AND SOLUTION

1. (1)

(n + l) rule the higher the value of (n + l), the higher is the energy.

2. (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

3. (1)

Number of radial nodes = n − l − 1

For 3s orbital, number of radial nodes = 3 − 0 − 1 = 2

For 4p orbital, number of radial nodes = 4 − 1 − 1 = 0

4. (1)

$$C_6H_6(l) + \frac{15}{2}O_2(g) \rightarrow 3H_2O(l) + 6O_2(g)$$

We know that,

$$\Delta H = H_P - H_R$$

$$= (3 \times \Delta H_{H_2O} + 6\Delta H_{CO_2}) - \Delta H_{C_6H_6}$$

$$= (3 \times (-68) + 6(-94) - 11.7)$$

$$= -780 \text{ Kcal/mole}$$

Number of mole of $C_6H_6 = \frac{780}{78} = 10$ mole

Required amount of Heat = 780 × 10 = 7800 Kcal

5. (2)

Li^+ and H^- are isoelectronic. Radius of anion is larger than that of cation.

6. (3)

After removal of 2nd electron from F, fluorine will get half-filled configuration but for oxygen half-filled configuration has to be disturbed.

7. (2)

$$PCl_{5(g)} \rightleftharpoons PCl_3 + Cl_{2(g)}$$

$$\alpha = \frac{D - d}{d(n-1)}$$

Where,

D = Density in the beginning

d = Density at equilibrium

n = No. of particles formed by dissociation of one molecule

$$= \frac{104.16 - 62}{62(2-1)} = 0.68$$

8. (1)

In ClO_2^- the central atom (Cl) has two bond pairs and two lone pairs. Hence sp^3 hybridisation.

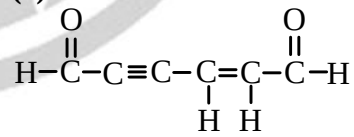
9. (4)

For transition elements, the d-subshells are not filled monotonically (one at a time) with increase in atomic number. This is because of extra stability of half-filled (d^5) and fully filled (d^{10}) configuration.

10. (2)

Quantum numbers of an atom can be defined on the basis of Pauli's exclusion principle which states that no two electrons can have the same value of all the four quantum numbers.

11. (3)



π – electrons = 10

12. (3)

% ionic characters =

$$\frac{\text{observed dipole moment}}{\text{calculated dipole moment assu min g}} \times 100$$

100% ionic character

$$= \left[\frac{1.92D}{(4.80 \times 10^{-10}) \times (2 \times 10^{-8} cm)}\right] \times 100$$

$$= \frac{1.92D}{(4.8 \times 2)D} \times 100 = 20\%$$

13. **(2)**

For the element symbol Uuu have atomic number 111

$1 \rightarrow Un$

14. **(3)**

$$C_{(graph)} + \frac{3}{2}O_2 \longrightarrow CO_2(g) + H_2O(l)$$

$$C_{(diamond)} + \frac{3}{2}O_2 \longrightarrow CO_2(g) + H_2O(l)$$

$$C_{(graph)} \longrightarrow C_{(diamond)}$$

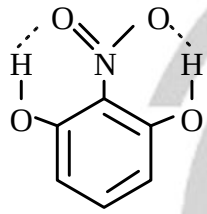
$\Delta H = -393.5 - (-395.4)$

$= +1.9$

15. **(3)**

Less heat of neutralization shows acid is weak.

16. **(4)**



both OH and NO_2 group involve in intramolecular H^-bonding.

17. **(1)**

Number of unpaired electron in N_2^+ is 1.

18. **(3)**

List I	List II
H_2O	Bent
CO_2	Linear
BF_3	Trigonal planar
NH_4^+	Tetrahedral

19. **(2)**

Azimuthal quantum no. 'ℓ' defines angular momentum of electron.

20. **(1)**

This is because the amount of energy released per gm will be same. The rise in temperature will be same

21. **(2)**

Cationic hydrolysis occurs in salts of strong acids and weak bases.

22. **(3)**

In the given reaction, water is being oxidised because it is accepting oxygen from Ag_2O, while Ag^+ is reduced.

$Ag_2O + H_2O + 2e^- \rightarrow 2Ag + 2OH^-$

23. **(1)**

$PCl_5 \rightleftharpoons PCl_3 + Cl_2$ have more number of molecules on product side so , on lowering the pressure equilibrium shift towards right side.

24. **(2)**

In BF_3, B is electron deficient because it has incomplete octet and thus can accept electron pair (Lewis acid).

25. **(1)**

Borax contains tetranuclear units $[B_4O_5(OH)_4]^{2-}$.

26. **(2)**

Down the group size increases and, therefore, attraction between valence shell electron and nucleus decreases and thus ionisation energies decrease.

Along the period the atomic size decreases and nuclear charge increases. So generally, the ionization energy increases. However, half-filled and completely filled valence shell electron also affect the ionization energies along the period.

27. **(2)**

Moving down the group with increasing atomic number, the oxidation state two less than the highest group oxidation state becomes more stable in groups 14 due to inert pair effect.

28. **(3)**

Diamond is good thermal conductor.

29. **(3)**

$K_a \propto \alpha^2$

$$\frac{K_{a_1}}{K_{a_2}} = \left(\frac{4}{9}\right)^2 = \frac{16}{81}$$

30. **(1)**

1 mol of $O_2 \rightarrow$ 2 atoms of O

1 mole of $O_3 \rightarrow$ 3 atoms of O.

Therefore no. of atoms in 1g O_2

$$= \frac{1}{32} \times 2 \times 6.02 \times 10^{23} = \frac{6.02 \times 10^{23}}{16}$$

Similarly, no. of atoms in 1g O_3

$$= \frac{1}{48} \times 3 \times 6.02 \times 10^{23} = \frac{6.02 \times 10^{23}}{16}$$

They have same no. of atoms

Mass of 1 mole is its gram- atomic mass.

31. **(2)**

One atomic mass unit is defined as one twelfth of the mass of one carbon – 12 atom. Carbon-12 isotope is the most abundant isotope of carbon and has been chosen as standard.

32. **(1)**

The principal quantum number, n, describes the energy of an electron and the most probable distance of the electron from the nucleus. In other words, it refers to the size of the orbital and the energy level an electron is placed in.

33. **(4)**

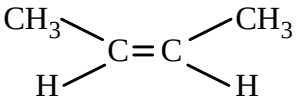
The metal is covered with a layer of oxide which does not.

34. **(3)**

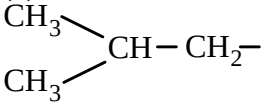
The ozonolysis of 3-methyl-1-butene gives a mixture of 2–methylpropanal ($H_2C–CH_2–CH(CH_2)–CH_2$) and methanal (HCHO)

35. **(2)**

$$CH_3-C\equiv C-CH_3 \xrightarrow[\text{Quinoline}]{H_2,Pd/C}$$



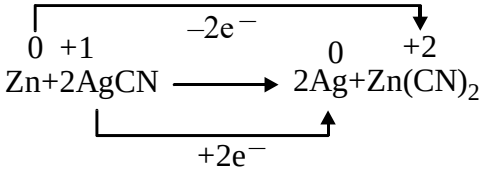
36. **(4)**



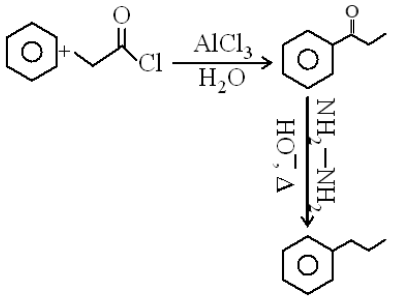
[Isobutyl group]

37. **(4)**

The oxidation states show a change only in reaction.

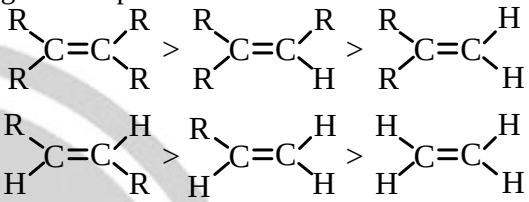


38. **(2)**



39. **(2)**

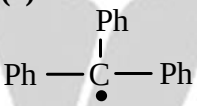
The relatives rates of Hydrogenation decrease with the increase in steric hindrance. In order of stability of alkene, most stable the alkene slowly it given the product.



40. **(2)**

Eclipsed conformer is least stable while staggered conformer is most stable. In eclipsed conformer the dihedral angle is 0°.

41. **(2)**



This radical is stabilized by three phenyl ring resonance**.**

42. **(1)**

In the Lassaigne test for nitrogen in an organic compound the sodium fusion extract is boiled with iron (II) sulphate and then acidified with sulphuric acid. In the process sodium cyanide first reacts ‘with iron (II) sulphate and forms sodium hexacyano Ferrate (II). Then heating with sulphuric acid some from (II) gets oxidised to form iron (III) hexacyanoferrate (II), which is Prussian blue in colour.

$$6CN^- + Fe^{2+} \longrightarrow [Fe(CN)_6]^{4-}$$

$$3[Fe(CN)_6]^{4-} + 4Fe^{3+} \longrightarrow \underset{\text{Prussian blue}}{Fe_4[Fe(CN)_6]_3}$$

43. **(3)**

K = 2, 8, 8, 1

After removal of one electron, the second electron will be remove from another shell which has an octet configuration, hence there is a large difference between first and second ionization energies.

44. **(3)**

0.01M of $Ca(OH)_2$ ∵ $2OH^-$ ions are there,

$[OH^-] = 2 \times 10^{2-}$

$pOH = -\log(2 \times 10^{2-})$

$= -\log 2 + 2\log 10$

$= -0.301 + 2$

$= 1.699$

$pH = 14 - 1.699 = 12.301$

45. **(3)**

Here I^- is Lewis base as it is giving electron to I_2 molecule.

46. **(2)**

For combustion reaction, ΔH is negative,

$\Delta n = (16+18) - (25+2) = +7$, so ΔS is +ve

reaction is spontaneous, hence 'G is –ve.

47. **(4)**

ΔG must be zero at equilibrium, but it's not necessarily true that $\Delta G = \Delta G°$ at equilibrium. In general $\Delta G = \Delta G° + RT\ln(Q)$, where Q is the ratio of products to reactants at the standard state. Only when Q = 1 will $\Delta G = \Delta G°$. Also, $\Delta G° = -RT\ln(K)$, where K is the reaction constant. So $\Delta G = 0$ and $\Delta G° = 0$.

Spontaneous reaction have $\Delta G < 0$, $K > 1$

Non-Spontaneous reaction $\Delta G > 0$, $K < 1$

48. **(1)**

More the enthalpy of formation less will be the stability of the compound.

49. **(4)**

The transition elements have a characteristic $(n-1)s^2p^6d^{1-10}ns^{1 \text{ or } 2}$ electronic configuration.

50. **(3)**

Zn is a d-block element