Sample Paper-05

Class 11th NEET (2024)

CHEMISTRY

ANSWER KEY

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

HINTS AND SOLUTION

1. (2)

$N_1V_1 = N_2V_2$

$\frac{N}{10} \times 15 = N_2 \times 12$

$N_2 = \frac{1}{8}N$

2. (4)

Crystalline oxalic acid is HOOC – COOH.$2H_2O$. It contains 2 molecules of water per molecule of oxalic acid.

$$\text{Equivalent mass} = \frac{\text{mol.wt.}}{\text{basicity}} = \frac{126}{2} = 63$$

3. (1)

No. of molecules

$$= \frac{6.02 \times 10^{23} \times 1.12 \times 10^{-7}}{22400} = 3.01 \times 10^{12}$$

4. (1)

$$[H^+]_{net} = \frac{0.1 \times V + 0.1 \times V + 0.1 \times V}{3V}$$

$$= \frac{0.3V}{3V} = 0.1$$

$[H^+] = 10^{-1} \Rightarrow pH = 1$

5. (2)

Atomic number of the given element = 10

Electronic configurations = $1s^2 2s^2 2p^6$

$1s^2 2s^2 2p^6$ is electronic configuration of Ne.

$1s^2 2s^2 2p^5 3s^1$ is excited state.

6. (3)

Inorganic benzene is $B_3H_6N_3$

7. (1)

More number of bonds, more stability and nonpolar structures are more stable than polar structures.

8. (2)

On mixing the two solutions complete neutralization would take place resulting information of sodium acetate solution having conc. 0.1 M. For hydrolysis of sodium acetate solution,

$$P^H = \frac{1}{2}[pKa + pKw + \log C]$$

$$= \frac{1}{2}\left[14 + 4.74 + \log(0.1) = \frac{1}{2}[14 + 4.74 - 1]\right] = 8.87$$

9. (3)

Hybridisation of Be atom in $BeCl_2$

$$\frac{1}{2}[2 + 2 - 0 + 0] = \frac{4}{2} = 2\ (sp, \text{linear})$$

Hybridisation of B atom in BCl_3

$$= \frac{1}{2}[3 + 3 - 0 + 0] = \frac{6}{2} = 3(sp^2.\text{trigonal planar})$$

10. (4)

Isobars have the same atomic mass (sum of protons and neutrons) but different atomic numbers.

11. (1)

	$H_2(g)$	+	$I_2(g)$	$\rightleftharpoons$	$2HI(g)$
$t = 0$	1		1		0
t_{eq}	$\frac{1-0.8}{V}$		$\frac{1-0.8}{V}$		$\frac{2 \times 0.8}{V}$

$$K_C = \frac{\left(\frac{1.6}{V}\right)^2}{\frac{0.2}{V} \times \frac{0.2}{V}} = 64$$

12. (1)

The bond order $O_2^{2-}, O_2^-, O_2, O_2^+$ is 1.0, 1.5, 2.0 and 2.5 respectively. The higher the bond order lower the bond length. So, order become.

$O_2^{2-} > O_2^- > O_2 > O_2^+$

13. (1)

Polarising power of Ag^+ is maximum. Among the given compounds the least ionic is AgCl. The ionic characteristics decrease as we move from left to right in the periodic table and it increases as we move top to bottom in any group. Here Ag is the d-block element and it forms least ionic compound whereas K, Ba, and Ca are the s-block element and form an ionic compound.

14. (4)

For V.B.T., overlapping orbital must contain one electron each with opposite spin for bond formation. Hence existence of one electron species cannot be explained by VBT. Also, according to V.B.T, O_2 and B_2 should be diamagnetic but actually; they are paramagnetic.

15. **(2)**

Plus, and minus signs of spin quantum numbers imply that spin angular momentum of the electron, a vector quantity, acts in the same or opposite directions of orbital angular momentum.

16. **(4)**

Energy of a photon $E = h\nu = h\frac{c}{\lambda}$.

So, energy depends upon wavelength.

17. **(4)**

Absorption spectrum consists of dark lines separated by bright space and emission spectrum consists of bright lines.

18. **(3)**

The process which follows the reversible path or which occurs an infinite number of steps in this way that the equilibrium conditions are maintained at each step, and the process can be reversed by an infinitesimal change in the state of functions is called reversible process. In thermodynamics, a process is called reversible when the surroundings are always in equilibrium with the system**.**

19. **(3)**

The value of n for a line in Balmer series of hydrogen spectrum having the highest wavelength will be $n_1 = 2$ and $n_2 = 3$ because this transition will have lowest energy and so highest wavelength.

20. **(4)**

Heat change at constant pressure and at constant volume is a state function. Enthalpy is also a state function.

21. **(4)**

The equation q = –w is not true for adiabatic processes since there is no exchange of heat between the system and the surroundings. However, it is applicable for isothermal and cyclic processes where there is exchange of heat and work between the system and the surroundings.

22. **(2)**

More will be the value of solubility product more will be solubility.

23. **(3)**

10^{-2} M NaOH will give $[OH^-] = 10^{-2}$

So, pOH = 2

pH + pOH = 14

pH =12

24. **(4)**

$\Delta n_g = 2 - 2 = 0$ in the reaction $H_2(g) + Cl_2(g) \rightleftharpoons 2HCl(g)$

So, $K_p = K_c (RT)^{\Delta n}$

$K_p = K_c$

25. **(4)**

The polymerisation of ethene has one mole of C = C bond is decomposed and two moles of C − C bonds are formed per mole of ethylene

$\Delta H = 590 - 2 \times 331 = -72$ kJ per mole of ethylene

26. **(1)**

Combustion is always an exothermic process. Decomposition of water requires energy. Hence it is endothermic.

Graphite is more stable than diamond and energy is needed to convert graphite into diamond. The extra energy that must be provided ends up in the tetrahedral structure of diamond.

The melting of ice absorbs heat, so it is an example of an Endothermic reaction.

27. **(2)**

Carbon monoxide is a neutral oxide, it reacts neither with acids nor bases.

28. **(1)**

$PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$

t = 0	1	0	0
$t = t_{eq}$	1 – x	x	x

Total moles = 1 + x

Given $\frac{1-x}{1+x} = 0.4$

$x = \frac{3}{7}$

$x_{PCl_3} = \frac{\frac{3}{7}}{1+\frac{3}{7}} = 0.3$

29. **(4)**

List-I		List-II	
(A)	pH of milk	(I)	6.8
(B)	pH of black coffee	(II)	5.5
(C)	pH of tomato juice	(III)	4.2
(D)	pH of egg white	(IV)	7.8

30. **(4)**

Carbon forms a large number of compounds because it has property of catenation.

31. **(3)**

Molecules	Hybridization
PCl_5	sp^3d
ICl_5	sp^3d^2
XeF_6	sp^3d^3
SO_3	sp^2

32. **(1)**

$MnO_4^- + C_2O_4^{2-} + H^+ \rightarrow Mn^{2+} + CO_2 + H_2O$

V.f. = 5 V.f. = 2

$\therefore$ Balanced equation:

$2MnO_4^- + 5C_2O_4^{2-} + 16H^+ \rightarrow 2Mn^{2+} + 10CO_2 + 8H_2O$

33. **(4)**

0.1 N NaOH $\rightleftharpoons Na^+ + OH^-$

Normality of NaOH = Molarity of NaOH =M/10

$[OH^-] = 10^{-1}$

$[OH^-]\,[H^+] = 10^{-14}$

$[H^+] = 10^{-13}$

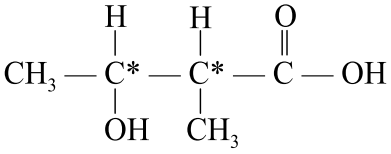
$pH = -\log 10^{-13}$

pH =13

34. **(2)**

H_3PO_2, H_3BO_3 and HCOOH are monoprotic acid where as H_3PO_3 is polyprotic acid.

35 **(4)**



If molecule is unsymmetrical than optically active isomer = 2^n

optically inactive isomer = 0

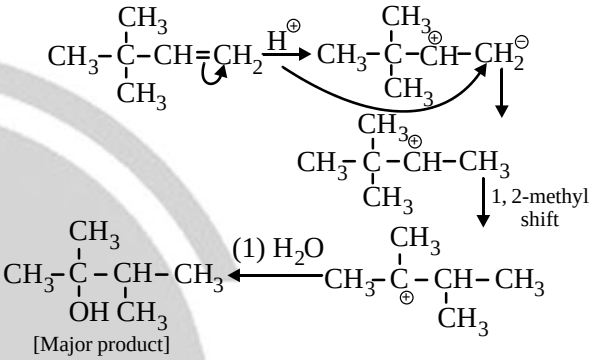
Total = $2^n = 2^2 = 4$

36. **(2)**

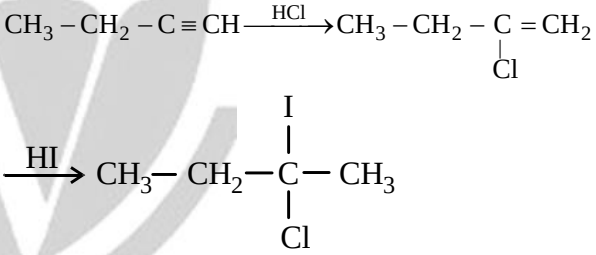
Since the gas expands adiabatically (i.e., no change in enthalpy). So, the heat is totally converted into work. For the gas, C_V = 20 J/K. Thus, 20 J of heat is required for 1° change in temperature of the gas. Heat change involved during the process i.e., work done = 3 kJ = 3000 J.

Change in temperature $= \frac{3000}{20}\text{K} = 150\,\text{K}$ Initial temperature = 300 K Since, the gas expands so the temperature decreases and thus final temperature is 300 – 150 = 150 K.

37. **(3)**



38. **(3)**



39. **(1)**

$CH_2 = CH - \overset{\oplus}{C}H_2 > CH_3 - CH_2 - \overset{\oplus}{C}H_2$

due to Resonance allyl carbocation is more stable than propyl carbocation.

40. **(4)**

–I effect of F is more stronger than –I effect of Cl, Br. So, with increase in –I effect acidic nature increase.

Order of –I effect F > Cl > Br

$\text{Acidic nature} \propto \frac{-M\ -I}{+M\ +I}$

41. **(3)**

Enthalpy of neutralisation of CH_3COOH by NaOH is –50.6 kJ/mole; for strong acid and base this value is 55.9 kJ/mole. Heat evolved in the first case is less as some heat is used up in ionisation of CH_3COOH. So, H for ionisation of CH_3COOH = 55.9 – 50.6 = 5.3 kJ/mol.

42. **(3)**

$2Cl(g) \rightarrow Cl_2(g)$ Entropy is decreasing (–ve) in the reaction. Further the reaction is exothermic since a bond is being formed, i.e., ΔH is also –ve.

43. **(1)**

The IUPAC name of element having atomic number 119 is "Un-un-enn-ium".
So, its symbol is uue.

44. **(3)**

Maximum number of electrons in a shell
$= 2n^2 = 2 \times 4^2 = 32$
So, one atomic orbital can accommodate only 2 electrons. Hence there is only 16 atomic orbitals in n =4.

45. **(3)**

Group I A and III A contain mostly metals. Group VIII contains transition elements which are metals. Group VII A contains mostly non-metals (F, Cl, Br).

46. **(1)**

PbI_4 does not exist because the iodine reduces the lead to Pb (II) and the Pb oxidizes the iodine to iodine (I_2). Since the iodine is not a strong reducing agent to reduce Pb (II) to Pb, the compound PbI_2 is formed.

47. **(4)**

Total entropy change (system and surrounding) is always positive.

48. **(4)**

The electronic configuration of Ce is [Xe] $4f^1\ 5d^1\ 6s^2$. Ce-58 is a member of f-block.

49. **(2)**

$SnCl_2$ shape is bent.
Isocyanate (NCO^-) shape is linear.
CS_2 shape is linear. S = C = S
NO_2^+ shape is linear.

50. **(2)**

If an atom has lone pairs and bonded electron pairs, the greater lone pair-lone pair repulsions will cause bond angle to decrease between bonded atoms.
NH_2^- has 2 bond pairs and 2 lone pairs of electrons.
NH_3 has 3 bond pairs and 1 lone pair. NH_4^+ has 4 bond pairs.
Bond pair - Bond pair electron repulsions < Bond pair - Lone pair electron repulsions < Lone pair - Lone pair electron repulsions
Greater lone pair - lone pair repulsions among electrons causes the H − N − H bond angle to decrease. This effect is greatest for NH_2^-., followed by NH_3
Hence, the correct order is:
$NH_4^+ > NH_3 > NH_2^-$