Sample Paper-02

Dropper NEET (2024)

CHEMISTRY

ANSWER KEY

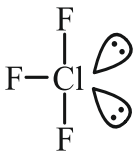
1.	(4)	26.	(4)
2.	(3)	27.	(1)
3.	(4)	28.	(1)
4.	(3)	29.	(4)
5.	(4)	30.	(1)
6.	(4)	31.	(2)
7.	(3)	32.	(3)
8.	(2)	33.	(2)
9.	(2)	34.	(3)
10.	(2)	35.	(1)
11.	(1)	36.	(4)
12.	(2)	37.	(3)
13.	(4)	38.	(2)
14.	(2)	39.	(3)
15.	(4)	40.	(4)
16.	(2)	41.	(4)
17.	(3)	42.	(2)
18.	(1)	43.	(2)
19.	(4)	44.	(3)
20.	(1)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

HINTS AND SOLUTION

1. **(4)**

$CH_3MgBr + H_2O \rightarrow CH_4 + MgBr(OH)$

2. **(3)**



ClF_3 (3 bond pairs and 2 lone pairs)

3. **(4)**

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

On doubling the volume of container pressure decreases and reaction moves in the direction where number of gaseous mole increases (forward shift) according to Le-chatelier's principle.

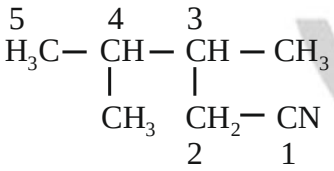
4. **(3)**

Addition of electron to anionic species is endothermic due to inter electronic repulsions.

5. **(4)**

PH_3 is less basic than NH_3 because of large size of P.

6. **(4)**



3,4-Dimethylpentanenitrile

7. **(3)**

Change in entropy for spontaneous reaction may be positive or negative.

8. **(2)**

$A + 2B \rightarrow C$

1 mol of A reacts with 2 mol of B

5 mol of A will require 10 mol of B

But given amount of B is 8 mol

$\Rightarrow$ B is limiting reagent

2 mol of B gives 1 mol of C

8 mol of B will give 4 mole of C.

9. **(2)**

$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1 \rightarrow$ Alkali metal

$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6 \rightarrow$ Noble gas

$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^6\ 4s^2 \rightarrow$ d-block element

$1s^2\ 2s^2\ 2p^5 \rightarrow$ Halogen

10. **(2)**

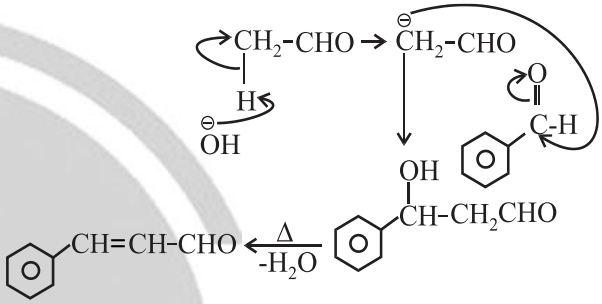
$\Delta G = \Delta H - T\Delta S$

$\Delta G = \Delta U + \Delta n_g RT - T\Delta S$

$\Delta G = 2.0 + (1)(2 \times 10^{-3})(300) - 300 \times 50 \times 10^{-3}$

$\therefore \quad \Delta G = -12.4$ kcal.

11. **(1)**



12. **(2)**

Molisch's test is used for detection of sugars.

13. **(4)**

$\left.\begin{matrix} Yb^{2+} \\ Lu^{3+} \end{matrix}\right\} \rightarrow 4f^{14}5d^{0}6s^{0}$

14. **(2)**

'R' & 'S' are enantiomers and they differ only in direction of rotation of Plane polarised light.

15. **(4)**

$\Delta H = \Delta U + \Delta n_g RT$

where Δn_g = (Number of gaseous mole of product – Number of gaseous mole of reactant)

16. **(2)**

$H_3PO_2 > H_3PO_3 > H_3PO_4$ (reducing nature)

17. **(3)**

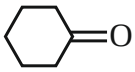
Turn bull's blue $\rightarrow \overset{II}{Fe}[\overset{III}{Fe}(CN)_6]^-$

Prussian's blue $\rightarrow \overset{III}{Fe}[\overset{II}{Fe}(CN)_6]^-$

18. **(1)**

Bond order is inversely related to bond length and directly related to bond strength.

19. **(4)**

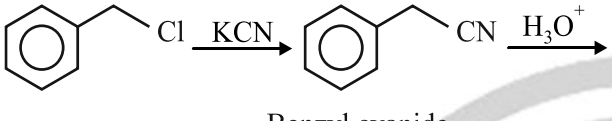
The IUPAC name of the compound  is cyclohexanone.

20. **(1)**

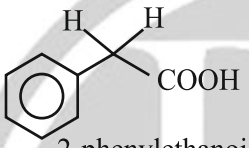
Ionic compounds dissolve in water when their hydration energy exceeds the lattice energy.

21. **(3)**

Reaction sequence is as follows:



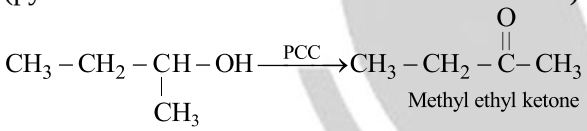
Benzyl cyanide



2-phenylethanoic acid

22. **(2)**

Oxidation of butan-2-ol to ethyl methyl ketone can be made effective by using oxidising agent (pyridinium chlorochromate in dichloromethane).



Butan-2-ol

Methyl ethyl ketone

23. **(2)**

Acidic character increases with increase in s-character of the orbital. The increasing order of s-character in the following molecules follows the order:

Hexane < Benzene < Ethyne

sp^3	sp^2	sp
(25%)	(33.3%)	(50%)

Thus, the acidic behaviour follows the same order.

24. **(3)**

From first order rate equation.

$$\log[A] = \log[A_0] - \frac{kt}{2.303}$$

On comparing this equation with equation of straight line.

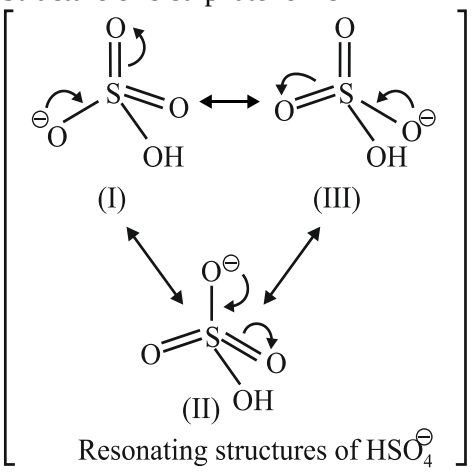
$$y = mx + c \text{ and } m = -\frac{k}{2.303}$$

$\therefore$ Slope (X) $= -\frac{k}{2.303}$

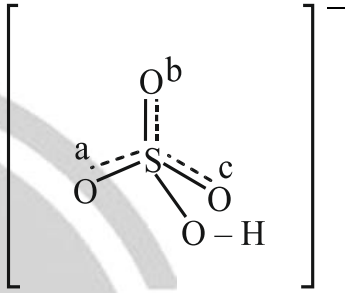
Intercept (c) = $\log[A]_0$

25. **(1)**

Structure of bisulphate ion is



Resonating structures of $HSO_4^{\ominus}$



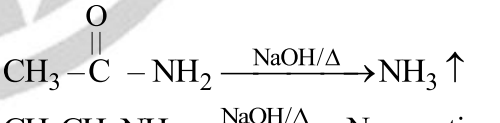
26. **(4)**

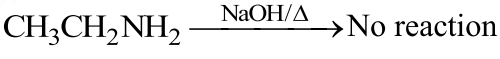
The two most common pyrimidines of DNA are cytosine (C) and thymine (T) and the two most common purines of DNA are adenine (A) and guanine (G).

27. **(1)**

CH_3CONH_2 (acetamide) and $CH_3CH_3NH_2$ (ethylamine) are distinguished by reacting with NaOH followed by heating.

The reactions is as follows:





28. **(1)**

$$\Delta H^o = \Delta H_f^o(\text{product}) - \Delta H_f^o(\text{reactants})$$

$$\Delta H^o = \Delta H_f^o(HS^-) + \Delta H_f^o(H^+) - \Delta H_f^o(H_2S)$$

$x_1 = x + x_3 - x_2$

$\therefore \quad x = (x_1 + x_2 - x_3)$

29. **(4)**

Conductance depends on the number of ions present in the solution.

		Number of ions furnished
Urea	:	0
Glucose	:	0
NaCl	:	2
$Ba(OH)_2$	:	3

30. **(1)**

If a reactant is taken in excess, order with respect to this reactant becomes zero.

Given rate law is: $r = k[A][B]^2$

If reactant A is taken in excess, then rate will depend only on B.

Hence,

$r = k[A]^0[B]^2$

$r = k \times 1 \times [B]^2$

$r = k[B]^2$

Thus, overall order of the reaction is 2.

31. **(2)**

A catalyst increases reaction rates by reducing activation energies of both forward and backward reactions.

A catalyst does not alter ΔG or K_{eq} of a reversible reaction.

32. **(3)**

4-methoxy-2-nitrobenzaldehyde

33. **(2)**

Oxidation state of Ni in $[Ni(CN)_4]^{2-}$ = + 2

Ni = [Ar] $3d^8\ 4s^2\ 4p^0$

Ni^{2+} = [Ar] $3d^8\ 4s^0\ 4p^0$ or

CN^- is a strong field ligand. Hence Ni^{2+} after pairing of electrons;

The hybridization state of Ni^{2+} is dsp^2. Hence the complex $[Ni(CN)_4]^{2-}$ is a square planar complex.

Since there is no any unpaired electrons in the complex $[Ni(CN)_4]^{2-}$, hence it is diamagnetic.

34. **(3)**

$$v = \frac{Z}{n} \times 2.188 \times 10^8 \text{ cm/sec}$$

$$v_1 = \frac{1}{1} \times 2.188 \times 10^8 \text{ cm/sec}$$

$$\frac{\text{Velocity of light}}{\text{Velocity of electron}} = \frac{3 \times 10^{10}}{2.188 \times 10^8} = 137 \text{ times}$$

35. **(1)**

$AlCl_3(aq.) \rightarrow Al^{3+}(aq.) + 3Cl^-(aq.)$

Hence, n = 4

For dissociation Van't Hoff factor (i) is:

$i = 1 + (n - 1)\alpha$

$2.8 = 1 + (4 - 1)\ \alpha$

$2.8 = 1 + 3\alpha$

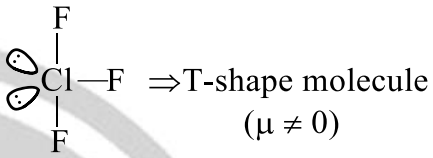
$3\alpha = 2.8 - 1$

$3\alpha = 1.8$

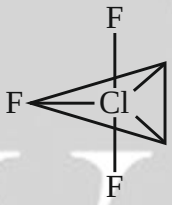
$\alpha = 0.6$

Hence, percentage dissociation (α) = 60%

36. **(4)**



37. **(3)**

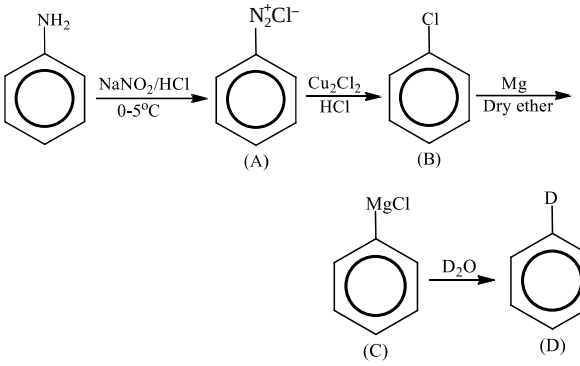


Cl in ClF_3 is in sp^3d hybridization. The molecule has T-shape structure.

38. **(2)**

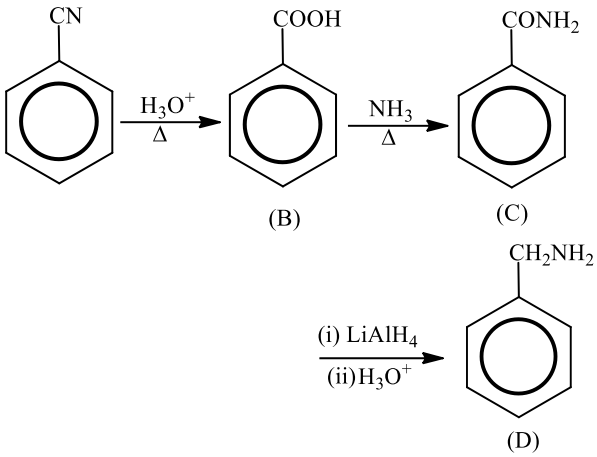
Extensive properties are mass dependent. Thus, volume is an extensive property.

39. **(3)**



40. (4)

Identify the product (D) in the following reaction sequence:



41. (4)

$$2NH_3(g) \rightleftharpoons N_2(g) + 3H_2(g)$$

t = 0	2	0	0
t_{eq}	1	1/2	3/2

$$K_c = \frac{[N_2][H_2]^3}{[NH_3]^2}$$

$$= \frac{\frac{1}{2} \times \left(\frac{3}{2}\right)^3}{1^2} = 1.685 \approx 1.7$$

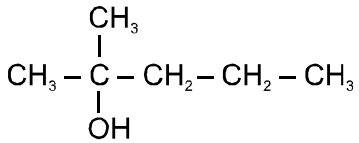
42. (2)

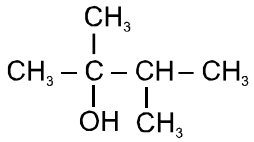
$$\Delta T_f = (1 - \alpha + 2\alpha) 1.86 \times \frac{\frac{8.1}{81}}{0.1}$$

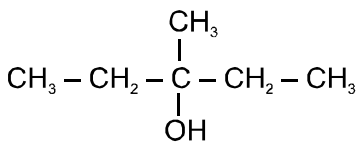
= 1.9 × 1.86 = 3.53

T_f of water = – 3.53°C

43. (2)

(i) 

(ii) 

(iii) 

44. (3)

$$\Lambda_m^o CaCl_2 = \lambda^o Ca^{2+} + 2\lambda^o Cl^-$$

$= (118.88 \times 10^{-4}) + 2(77.33 \times 10^{-4})$

$= 273.54 \times 10^{-4}$ m^2 mho mol^{-1}

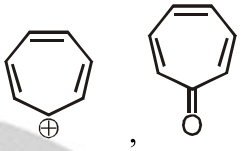
45. (2)

The EN values of Carbon family are:

Element	C	Si	Ge	Sn	Pb
EN	2.5	1.8	1.8	1.8	1.9

46. (1)

Aromatic species are



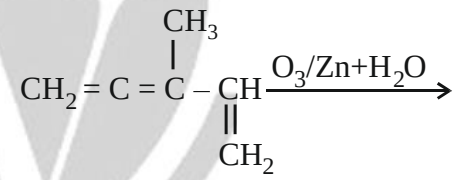
47. (2)

$$\Delta S_{system} = nR \ln \frac{V_2}{V_1} = 2 \times R \times \ln 2 \text{ J/K}$$

$$\Delta S_{surrounding} = -q/T$$

$$\Delta S_{total} = 2R \ln 2 - q/T$$

48. (2)



$2HCHO + CO_2 + CH_3 — CO — CHO$

49. (2)

Given, $CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$;

ΔH = – 210 kcal/mol .....(i)

$$C_2H_6 + \frac{7}{2}O_2 \rightarrow 2CO_2 + 3H_2O;$$

ΔH = – 368 kcal/mol ..... (ii)

On subtracting Eq. (i) from Eq. (ii), we get

$$CH_2 + \frac{3}{2}O_2 \rightarrow CO_2 + H_2O;$$

ΔH = – 158 kcal/mol

∴ Enthalpy of combustion of one CH_2 unit

= – 158 kcal/mol

$\Delta H_{comb}(C_{10}H_{22}) = \Delta H_{comb}(CH_4) + 9 \times \Delta H_{comb}(CH_2)$

= – 210 + (9 × – 158)

= – 1632 kcal

50. **(4)**

$P = P_A^\circ X_A + P_B^\circ X_B$

$\frac{100}{4} + \frac{60 \times 3}{4}$

= 70 mm < 75 mm (experimental)

Thus, there is positive deviation (1) is true; mixture is more volatile due to decrease in b.p. Thus, (2) is true also force of attraction is decreased thus (3) is true.