



Sample Paper-01

Class 12<sup>th</sup> NEET (2024)

**CHEMISTRY**

**ANSWER KEY**

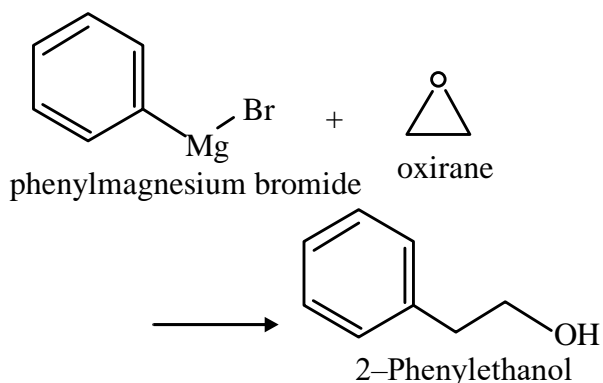
1. (2)
2. (2)
3. (4)
4. (1)
5. (3)
6. (3)
7. (2)
8. (3)
9. (2)
10. (3)
11. (1)
12. (4)
13. (2)
14. (2)
15. (4)
16. (1)
17. (1)
18. (3)
19. (1)
20. (1)
21. (2)
22. (3)
23. (1)
24. (2)
25. (2)

26. (3)
27. (1)
28. (2)
29. (1)
30. (3)
31. (4)
32. (3)
33. (4)
34. (2)
35. (3)
36. (4)
37. (2)
38. (1)
39. (2)
40. (1)
41. (1)
42. (4)
43. (2)
44. (2)
45. (4)
46. (3)
47. (4)
48. (3)
49. (2)
50. (1)



## HINTS AND SOLUTION

1. (2)  
At cathode:  $\text{Na}^+ + \text{e}^- \rightarrow \text{Na}$   
 $\text{Na} + \text{Hg} \rightarrow \text{Na} - \text{Hg}$
2. (2)  
$$X_{\text{urea}} = \frac{1}{10} = 0.1$$
  
$$X_{\text{H}_2\text{O}} = \frac{9}{10} = 0.9$$
  
$$\frac{P^0 - P^S}{P^0} = X_{\text{urea}}$$
  
$$\frac{40 - P^S}{40} = 0.1$$
  
$$P^S = 36 \text{ mmHg}$$
3. (4)  
Addition of solute will decrease the vapour pressure as some of the sites of the surface will be occupied by the solute particles. Whereas, the addition of solvent will result in dilution, ultimately increasing the surface area of the liquid surface. Thus, increasing the vapour pressure.
4. (1)  
Isotonic solution have  $C_1 = C_2$   
$$\frac{8.6}{60 \times 1} = \frac{5 \times 1000}{\text{M.wt} \times 100}$$
  
$$\text{M.wt} = \frac{5 \times 10 \times 60}{8.6} = 348.83 \text{ gm/mol}$$
5. (3)  
Van't Hoff factor =  $\frac{\text{normal molecular mass}}{\text{observed molecular mass}}$
6. (3)  
 $\Delta T_f = K_f m$   
$$\frac{\Delta T_{f_1}}{\Delta T_{f_2}} = \frac{m_1}{m_2}$$
  
For cane sugar  
 $\Delta T_{f_1} = 273.15\text{K} - 271\text{K} = 2.15\text{K}$   
 $m_1 = 342\text{g/mol}$   
for glucose solution  
 $\Delta T_{f_2} = ?$   
 $m_2 = 180\text{g/mol}$   
$$\Delta T_{f_2} = \frac{342 \times 2.15}{180} = 4.085\text{K}$$
  
So, freezing point of glucose solution  
 $= 273.15\text{K} - 4.085\text{K} = 269.07\text{K}$
7. (2)  
$$\text{A(g)} \longrightarrow \text{B(g)} + \text{C(g)}$$
  
At  $t=0$        $P_i$                       0                      0  
At  $t$  time     $P_i - x$                        $x$                        $x$   
Now,  $P_t = (P_i - x) + x + x$   
 $= P_i + x$   
 $x = P_t - P_i$   
 $P_A = (P_i - x)$  on substituting the value of  $x$   
 $P_A = P_i - (P_t - P_i) = 2P_i - P_t$   
$$\therefore K = \frac{2.303}{t} \log \frac{P_i}{2P_i - P_t}$$
8. (3)  
Extensive properties are the properties which depend upon the quantity of the matter contained in the system e.g mass, volume, Gibbs free energy etc. Intensive properties are the properties which depend only upon the nature of the substance and are independent of the amount of the substance present in the system. e.g- heat, boiling point, emf of cell.
9. (2)  
For the reaction  $\text{A} + \text{B} \rightarrow \text{C} + \text{D}$  the variation of the concentration of the product is given by the curve Y.  
Initially the product concentration is 0, then it gradually rises and reaches a maximum value. After it remain constant.  
This behaviour is represented by the curve Y.
10. (3)  
$$\text{Pb} \longrightarrow \text{Pb}^{2+} + 2\text{e}^- \text{ (oxidation)}$$
  
$$\text{Cu}^{2+} + 2\text{e}^- \longrightarrow \text{Cu} \text{ (Reduction)}$$
  
$$\text{Pb} + \text{Cu}^{2+} \longrightarrow \text{Pb}^{2+} + \text{Cu}$$
  
$$E_{\text{cell}}^0 = E_{\text{red}}^0 - E_{\text{oxi}}^0$$
  
$$= 0.518 - (-0.127) = 0.645 \text{ V}$$
11. (1)  
Rate law is always written according to the slowest step and thus the exponents for concentrations do not necessarily match the stiochiometric coefficients.
12. (4)  
Epoxide form primary alcohol when react with Grignard reagent.



13. (2)

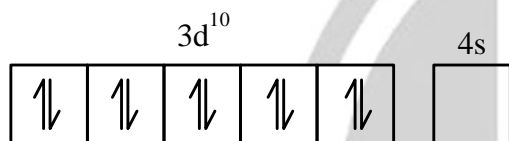
According to Arrhenius equation,  $k = Ae^{-E_a/RT}$   
 When  $E_a = 0$ ,  $k = A$ .

14. (2)

In  $[\text{Cu}(\text{CN})_4]^{3-}$ , Cu is in +1 oxidation state

$_{29}\text{Cu} : [\text{Ar}] 3d^{10} 4s^1$

$\text{Cu}^+ : [\text{Ar}] 3d^{10} 4s^0$



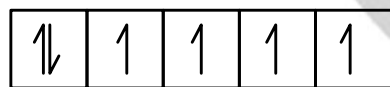
So, unpaired electron in  $[\text{Cu}(\text{CN})_4]^{3-}$  is 0.

The magnetic moment  $\bar{\mu} = \sqrt{n(n+2)} = \sqrt{0(0+2)}$   
 $\bar{\mu} = 0$ .

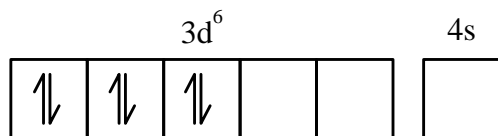
In  $[\text{Co}(\text{NH}_3)_6]^{3+}$ , Co is in +3 oxidation state.

$_{27}\text{Co} : [\text{Ar}] 3d^7 4s^2$

$\text{Co}^{3+} : [\text{Ar}] 3d^6 4s^0$



After pairing



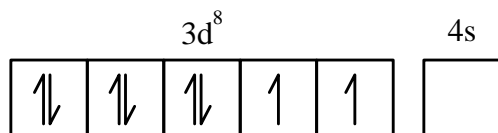
$\text{Co}^{3+}$  with  $\text{NH}_3$  ligand form inner sphere complex.

So, pairing of electron take place due to which it has 0 unpaired electrons and magnetic moment  $\mu = 0$ .

In  $[\text{Ni}(\text{NH}_3)_6]^{2+}$ , Ni is in +2 oxidation state.

$_{28}\text{Ni} : [\text{Ar}] 3d^8 4s^2$

$\text{Ni}^{2+} : [\text{Ar}] 3d^8 4s^0$



In presence of  $\text{NH}_3$ , electron do not pair up.

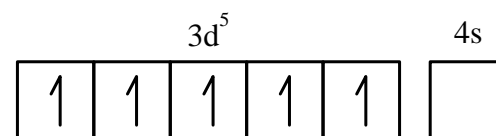
So, unpaired electron in  $[\text{Ni}(\text{NH}_3)_6]^{2+}$  is 2.

Then magnetic moment  $\bar{\mu} = \sqrt{2(2+2)} = \sqrt{8} \text{ BM}$

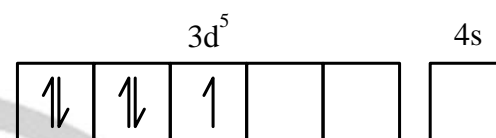
In  $[\text{Fe}(\text{CN})_6]^{3-}$ , Fe is in +3 oxidation state

$_{26}\text{Fe} : [\text{Ar}] 3d^6 4s^2$

$\text{Fe}^{3+} : [\text{Ar}] 3d^5 4s^0$



Due to presence of strong field ligand CN pairing take place.



Number of unpaired electrons become 1 i.e.  $n = 1$ .

So, magnetic moment  $\bar{\mu} = \sqrt{n(n+2)}$

$\bar{\mu} = \sqrt{1(1+2)} \text{ BM} = \sqrt{3} \text{ BM}$

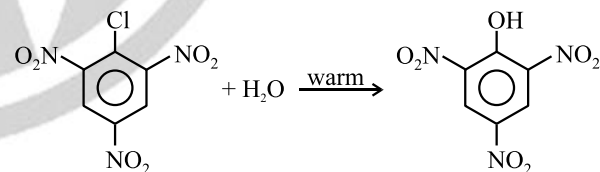
(I)  $[\text{Cu}(\text{CN})_4]^{3-} \rightarrow \mu = 0$  (Diamagnetic)

(II)  $[\text{Co}(\text{NH}_3)_6]^{3+} \rightarrow \mu = 0$  (Diamagnetic)

(III)  $[\text{Ni}(\text{NH}_3)_6]^{2+} \rightarrow \mu = \sqrt{8} \text{ BM}$  (Paramagnetic)

(IV)  $[\text{Fe}(\text{CN})_6]^{3-} \rightarrow \mu = \sqrt{3} \text{ BM}$  (Paramagnetic)

15. (4)

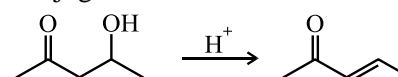


16. (1)

$$\Delta T_f = K_f \cdot m \Rightarrow K_f = \frac{\Delta T_f}{m} = \frac{0.73}{0.1435} = 5.087 \text{ K m}^{-1}$$

17. (1)

Dehydration of gives more stable conjugated alkene.





18. (3)  
The specific conductivity decreases while equivalent and molar conductivities increase with dilution.

19. (1)  
At cathode :  $\text{Cu}^{2+}(\text{aq}) + 2\text{e}^- \rightarrow \text{Cu}(\text{s})$  (Reduction)  
At anode :  $\text{Cu}(\text{s}) \rightarrow \text{Cu}^{2+}(\text{aq}) + 2\text{e}^-$  (Oxidation)

20. (1)  
The order of a reaction can have fractional value. The order of a reaction can not be written from balanced equation of a reaction because its value changes with pressure, temperature, and concentration. It can only be determined experimentally.

21. (2)  
 $E_{\text{cell}}^0 = E_{\text{cathode}}^0 - E_{\text{anode}}^0$   
 $E_{\text{cell}}^0 = -0.41 - (-0.76) = 0.35\text{V}$

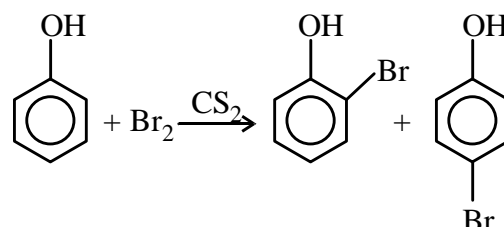
22. (3).

List-I		List-II	
(A)	$\text{XeF}_4$	(II)	Square planar
(B)	$\text{XeF}_6$	(I)	Distorted octahedral
(C)	$\text{XeO}_3$	(III)	Pyramidal
(D)	$\text{XeO}_4$	(IV)	Tetrahedral

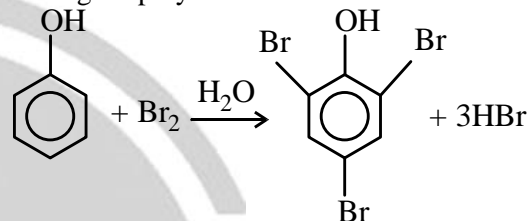
23. (1)  
For a reaction,  $t_{1/2} \propto (a)^{1-n} = K(a)^{1-n}$   
or  $\log t_{1/2} = (1-n) \log(a) + \log K$   
 $y = mx + c$   
slope =  $m = 1-n$   
 $\therefore 1-n = \tan 45^\circ = 1$   
 $\therefore n = 0$  [order]  
Now, for a zero-order reaction,  
$$t_{1/2} = \frac{[A]_0}{2K}$$
  
where,  $K$  is the rate constant.  
$$\Rightarrow K = \frac{[A]_0}{2t_{1/2}}$$
  
From the graph we have:  
 $\log t_{1/2} = \log[A]_0$   
$$\Rightarrow t_{1/2} = [A]_0 \text{ (Taking antilog on both sides)}$$
  
So, from eqn. above,  $K = \frac{[A]_0}{2[A]_0} = \frac{1}{2}$

24. (2)  
Due to larger atomic size P is unable to form pi bond and so it is tetra-atomic in which each P atom is linked with 3 other P atoms by 3 sigma bonds.

25. (2)  
In presence of Non-polar Solvent ( $\text{CS}_2$ ), the ionization of phenol is suppressed.



Whereas, in presence of water (polar solvent), the ionization of phenol is enhanced, hence it undergoes poly substitution.



26. (3)  
 $\text{CHCl}_3$  sample contains phosgene ( $\text{COCl}_2$ ), it will give a white ppt when treated with  $\text{AgNO}_3$  solution in cold. After boiling  $\text{AgNO}_3$  solution with alcoholic  $\text{KOH}$  will always give white ppt with  $\text{CHCl}_3$ , whether it contains  $\text{COCl}_2$  or not.

27. (1)  
In  $3s^2 3p^6 3d^5 4s^1$ , the last electron is entering in d orbital making it a transition element.

28. (2)

List-I		List-II	
(A)	Oleum	(III)	$\text{H}_2\text{S}_2\text{O}_7$
(B)	Caro's acid	(II)	$\text{H}_2\text{SO}_5$
(C)	Marshall's acid	(I)	$\text{H}_2\text{S}_2\text{O}_8$

29. (1)  
Non-metallic character  $\propto$  Acidic strength  
( $\text{P} < \text{S} < \text{Cl}$ )

30. (3)  
 $2\text{KMnO}_4 + 16\text{HCl} \rightarrow 2\text{KCl} + 2\text{MnCl}_2 + 5\text{H}_2\text{O} + 8\text{Cl}_2$   
 $\text{Mn}$  is reduced from +7 to +2 and  $\text{Cl}_2$  is produced.

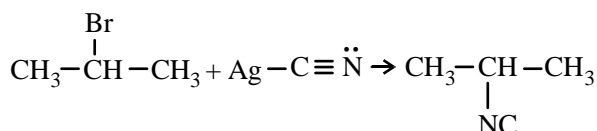
31. (4)  
Sulphur dioxide ( $\text{SO}_2$ ) is a colorless, nonflammable gas with a pungent odour that is detectable by the human nose. It also dissolves in water to form Sulphurous acid, i.e.  $\text{SO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_3$   
Bleaching by sulphur dioxide is temporary as atmospheric oxygen re-oxides the bleached matter after some time.



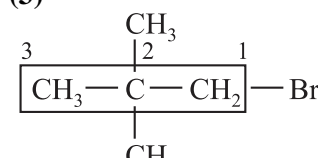
32. (3)  
More acidic H will be eliminated and Hoffmann elimination take place.

33. (4)  
DMSO is a polar aprotic solvent.

34. (2)  
Isopropyl isocyanide

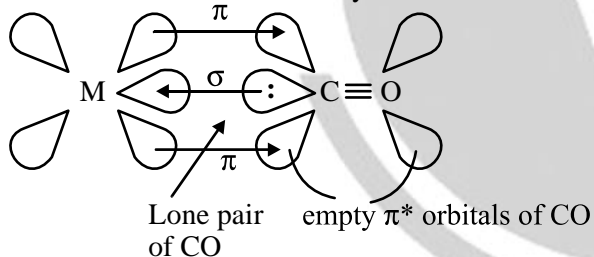


35. (3)



1-Bromo-2,2 Dimethylpropane

36. (4)  
Metal-carbon  $\sigma$  bond is formed by the donation of lone pair of electrons of carbonyl carbon into vacant d-orbital of metal. Metal-carbon bond in metal carbonyls possesses both  $\sigma$  and  $\pi$  character. Metal-carbon  $\pi$  bond is formed by the donation of lone pair of electrons from filled d-orbital of metal to vacant  $\pi^*$  orbital of carbonyl.

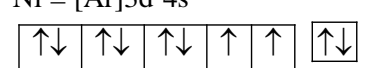


37. (2)  
Wilkinson's Catalyst  $[\text{Rh}(\text{Ph}_3\text{P})_3]\text{Cl}$  is used for hydrogenation of alkenes. The rhodium is able to form a 6-coordinate complex, allowing it to selectively reduce alkenes. The Wilkinson's catalyst is not able to reduce carbon-oxygen double bonds or double bonds, and it selectively reduces the least hindered double bond.

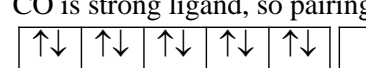
38. (1)  
In the compounds  $[\text{Co}(\text{NH}_3)_5(\text{ONO})]\text{Cl}_2$ , the oxidation state of cobalt is +3 and here 5  $\text{NH}_3$  ligand and  $\text{NO}_2$  ligand are attached to the central atom. The linkage isomer of the above complex is  $[\text{Co}(\text{NH}_3)_5(\text{ONO})]\text{Cl}_2$  so, its name is pentaamminenitrito-O-cobalt(III) chloride

39. (2)  
 $\pi$  acid ligand are  $\text{CO}$ ,  $\text{CN}^-$ ,  $\text{NO}^+$ .

40. (1)  
 $[\text{Ni}(\text{CO})_4]$   
 $\text{Ni} = [\text{Ar}]3d^84s^2$



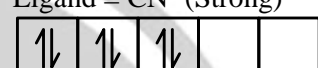
CO is strong ligand, so pairing take place.



d                      s                       $p^3$

41. (1)  
The correct order for the spectrochemical series of ligands is  $\text{Cl}^- < \text{NO}_2^- < \text{CN}^- < \text{CO}$ . This order is based on the increasing field strength and is determined from experimental measurements.

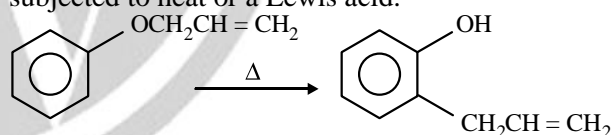
42. (4)  
 $\text{Fe}^{+2} = [\text{Ar}]3d^6$   
Ligand =  $\text{CN}^-$  (Strong)



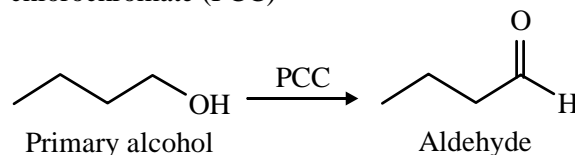
= Diamagnetic

43. (2)  
Trans effect =  $\text{CN}^- > \text{CH}_3^- > \text{OH}^- > \text{H}_2\text{O}$

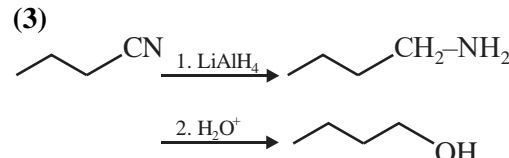
44. (2)  
Claisen rearrangement is an organic chemical reaction that offers a powerful method of the formation of carbon-carbon bonds. The reactant of this reaction – allyl vinyl ether, is converted into a gamma, delta-unsaturated carbonyl compound when subjected to heat or a Lewis acid.



45. (4)  
Primary alcohols can also be oxidised to their corresponding aldehydes using pyridinium chlorochromate (PCC)

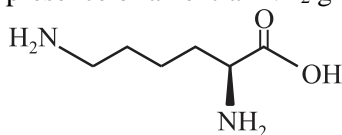


46. (3)

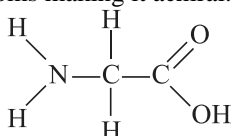




47. (4) Amino acids are classified as acidic, basic or neutral depending upon the relative number of amino and carboxyl groups in their molecule. Hence, Lysine is Basic in nature because of presence of an extra  $\text{-NH}_2$  group.

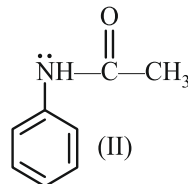


48. (3) The  $\text{sp}^3$  hybridised carbon of Glycine contains 2 Hydrogen atoms making it achiral.



49. (2) Lactose is a disaccharide consisting of the monomer's glucose and galactose. It is found naturally in milk. Maltose, or malt sugar, is a disaccharide formed by a dehydration reaction between two glucose molecules.

50. (1) Assertion & Reason both are correct but the accurate explanation should be:



In (II), the lone pair of electrons on the N atom is delocalised over the benzene ring. As a result, the electron density on nitrogen decreases, hence decreasing its basic strength.

