JEE-MAIN EXAM APRIL, 2025

Date: - 03-04-2025 (SHIFT-1)

CHEMISTRY

SECTION-A

1. Which of the following statements are correct?

A. The process of adding an electron to a neutral gaseous atom is always exothermic.

B. The process of removing an electron from an isolated gaseous atom is always endothermic.

C. The 1^{st} ionization energy of boron is less than that of beryllium.

D. The electronegativity of C is 2.5 in CH_4 and CCl_4

E. Li is the most electropositive among elements of group I .

Choose the correct answer from the options given below:

(1) B, C and E Only (2) A, C and D Only (3) B and C Only (4) B and D Only

2. 2 moles each of ethylene glycol and glucose are dissolved in 500 g of water. The boiling point of the resulting solution is:

(Given : Ebullioscopic constant of water $= 0.52\,K\,kg\,mol^{-1}$)

(1) 377.3 K (2) 379.2 K (3) 277.3 K (4) 375.3 K

3. Which of the following postulate of Bohr's model of hydrogen atom is not in agreement with quantum mechanical model of an atom?

(1) An atom can take only certain distinct energies E_1, E_2, E_3, etc. These allowed states of constant energy are called the stationary states of atom.

(2) The electron in a H atom's stationary state moves in a circle around the nucleus.

(3) An atom in a stationary state does not emit electromagnetic radiation as long as it stays in the same state.

(4) When an electron makes a transition from a higher energy stationary state to a lower energy stationary state, then it emits a photon of light.

4. Among $10^{-9}\,g$ (each) of the following elements, which one will have the highest number of atoms?

Element: Pb, Po, Pr and Pt

(1) Po (2) Pt (3) Pr (4) Pb

5. The correct order of the complexes

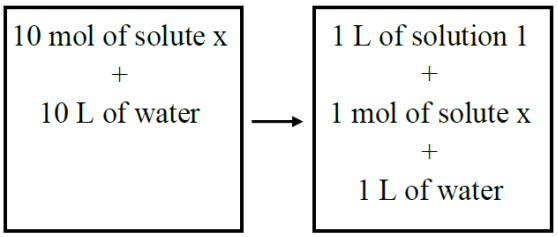
$\left[Co\left(NH_3\right)_5\left(H_2O\right)\right]^{3+}$ (A), $\left[Co\left(NH_3\right)_6\right]^{3+}$ (B), $\left[Co(CN)_6\right]^{3-}$ (C) and $\left[CoCl\left(NH_3\right)_5\right]^{2+}$ (D) in terms of wavelength of light absorbed is

(1) $C > B > A > D$ (2) $D > C > B > A$ (3) $C > B > D > A$ (4) $D > A > B > C$

6. In a reaction $A+B \rightarrow C$, initial concentrations of A and B are related as $[A]_0 = 8[B]_0$. The half lives of A and B are 10 min and 40 min , respectively. If they start to disappear at the same time, both following first order kinetics, after how much time will the concentration of both the reactants be same?

(1) 60 min (2) 20 min (3) 40 min (4) 80 min

7. Which of the following properties will change when system containing solution 1 will become solution 2?



(Solution 1) (Solution 2)

(1) Gibbs free energy (2) Concentration

(3) Molar heat capacity (4) Density

8. Given below are two statements:

Statement I : The N - N single bond is weaker and longer than that of P - P single bond.

Statement II : Compounds of group 15 elements in +3 oxidation states readily undergo disproportionation reactions.

In the light of the above statements, choose the correct answer from the options given below

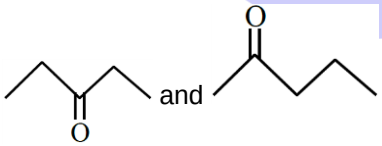
(1) Statement I is true but Statement II is false

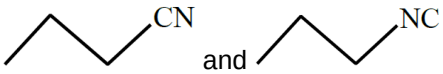
(2) Statement I is false but Statement II is true

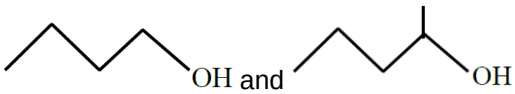
(3) Both Statement I and Statement II are false

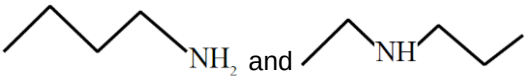
(4) Both Statement I and Statement II are true

9. Identify the correct statements from the following.

(A)  and are metamers

(B)  are functional isomers

(C)  are position isomers

(D)  are homologous

Choose the correct answer from the options given below:

(1) A & B Only (2) B & C Only

(3) A, B & C Only (4) C & D Only

10. Match the LIST-I with LIST-II

List-I (Molecules/ion)		List-II (Hybridisation of central atom)	
A.	PF_5	I.	dsp^2
B.	SF_6	II.	sp^3d
C.	$Ni(CO)_4$	III.	sp^3d^2
D.	$[PtCl_4]^{2-}$	IV.	sp^3

Choose the correct answer from the options given below:

(1) A-I, B-II, C-III, D-IV (2) A-III, B-I, C-IV, D-II

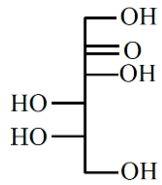
(3) A-II, B-III, C-IV, D-I (4) A-IV, B-I, C-II, D-III

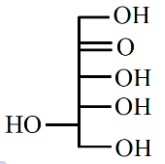
11. Correct order of limiting molar conductivity for cations in water at 298 K is :

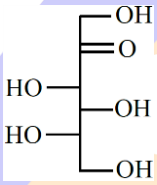
(1) $H^+ > Na^+ > Ca^{2+} > Mg^{2+} > K^+$ (2) $H^+ > Na^+ > K^+ > Ca^{2+} > Mg^{2+}$

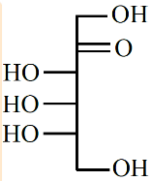
(3) $Mg^{2+} > H^+ > Ca^{2+} > K^+ > Na^+$ (4) $H^+ > Ca^{2+} > Mg^{2+} > K^+ > Na^+$

12. Which of the following is the correct structure of L- Fructose?

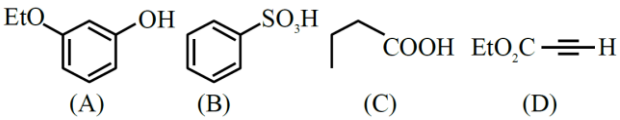
(1) 

(2) 

(3) 

(4) 

13. The least acidic compound, among the following is:



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

(1) D (2) A (3) C (4) B

14. The metal ions that have the calculated spin-only magnetic moment value of 4.9 B.M. are :

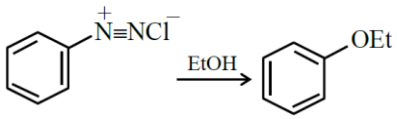
A. Cr^{2+} B. Fe^{2+} C. Fe^{3+} D. Co^{2+}

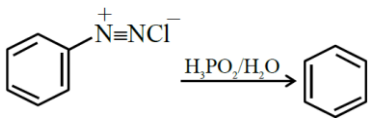
E. Mn^{3+}

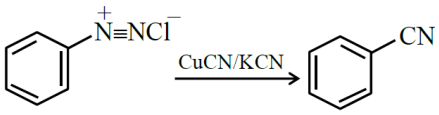
Choose the correct answer from the options given below:

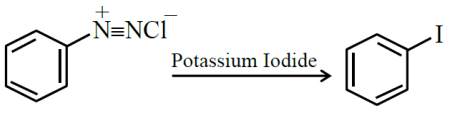
(1) B and E Only (2) A, C and E Only (3) A, B and E Only (4) A, D and E Only

15. In the following reactions, which one is NOT correct?

(1) 

(2) 

(3) 

(4) 

16. Number of molecules from below which cannot give iodoform reaction is:

Ethanol, Isopropyl alcohol, Bromoacetone, 2-Butanol, 2-Butanone, Butanal, 2-Pentanone, 3-Pentanone, Pentanal and 3-Pentanol.

(1) 3 (2) 2 (3) 5 (4) 4

17. In the following system, $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ at equilibrium, upon addition of xenon gas at constant T & p, the concentration of

(1) PCl_3 will increase

(2) PCl_5, PCl_3 & Cl_2 remain constant

(3) Cl_2 will decrease

(4) PCl_5 will increase

18. Given below are two statements:

Statement I : A catalyst cannot alter the equilibrium constant (K_c) of the reaction, temperature remaining constant.

Statement II : A homogenous catalyst can change the equilibrium composition of a system, temperature remaining constant.

In the light of the above statements, choose the correct answer from the options given below

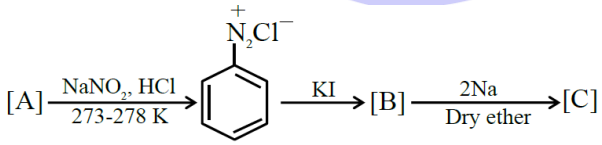
(1) Both Statement I and Statement II are false

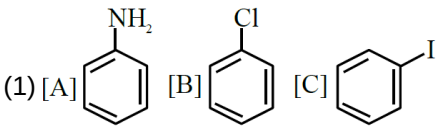
(2) Both Statement I and Statement II are true

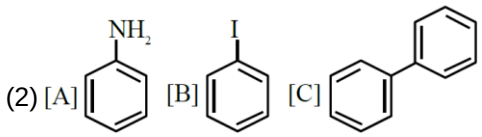
(3) Statement I is true but Statement II is false

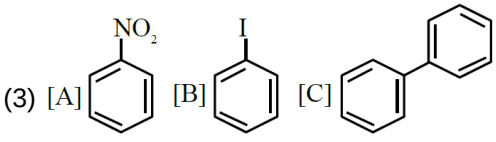
(4) Statement I is false but Statement II is true

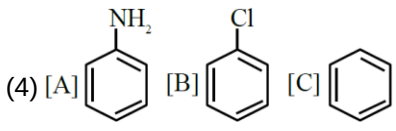
19. Identify $[A], [B]$ and $[C]$, respectively in the following reaction sequence:



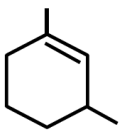
(1) 

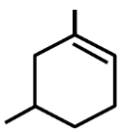
(2) 

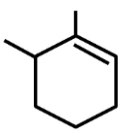
(3) 

(4) 

20. Which compound would give 3-methyl-6-oxoheptanal upon ozonolysis?

(1) 

(2) 

(3) 

(4) 

SECTION-B

21. 0.5 g of an organic compound on combustion gave 1.46 g of CO_2 and 0.9 g of H_2O. The percentage of carbon in the compound is _____ . (Nearest integer)

[Given : Molar mass $\left(in\ gmol^{-1}\right)$ $C:12, H:1, O:16$]

22. Given :

$\Delta H^{\ominus}$ sub $[C\ (graphite)] = 710\,kJ\,mol^{-1}$

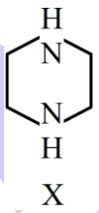
$\Delta_{C-H}H^{\ominus} = 414\,kJ\,mol^{-1}$

$\Delta_{H-H}H^{\ominus} = 436\,kJ\,mol^{-1}$

$\Delta_{C=C}H^{\ominus} = 611\,kJ\,mol^{-1}$

The $\Delta H_f^{\ominus}$ for $CH_2 = CH_2$ is _____ $kJmol^{-1}$ (nearest integer value)

23. During estimation of nitrogen by Dumas' method of compound $X(0.42\,g)$



X

_____ mL of N_2 gas will be liberated at STP. (nearest integer) (Given molar mass in $gmol^{-1}: C:12, H:1, N:14$)

24. The number of optical isomers exhibited by the iron complex (A) obtained from the following reaction is _____

$$FeCl_3 + KOH + H_2C_2O_4 \rightarrow A$$

25. Consider the following reactions

$$A + \underset{\text{Little amount}}{NaCl} + H_2SO_4 \rightarrow CrO_2Cl_2 + \text{ Side Products}$$

$$CrO_2Cl_{2\ (Vapour)} + NaOH \rightarrow B + NaCl + H_2O$$

$$B + H^+ \rightarrow C + H_2O$$

The number of terminal 'O' present in compound 'C' is _____

NTA ANSWERS

1.	**(3)**	**2.**	**(1)**	**3.**	**(2)**	**4.**	**(3)**	**5.**	**(4)**	**6.**	**(3)**	**7.**	**(1)**
8.	**(3)**	**9.**	**(1)**	**10.**	**(3)**	**11.**	**(4)**	**12.**	**(1)**	**13.**	**(1)**	**14.**	**(3)**
15.	**(1)**	**16.**	**(4)**	**17.**	**(1)**	**18.**	**(2)**	**19.**	**(2)**	**20.**	**(4)**	**21.**	**(80)**
22.	**(25)**	**23.**	**(109)**	**24.**	**(2)**	**25.**	**(6)**						