

6. The one that is NOT suitable for the removal of permanent hardness of water is :

- (1) Treatment with sodium carbonate
- (2) Calgon's method
- (3) Clark's method
- (4) Ion-exchange method

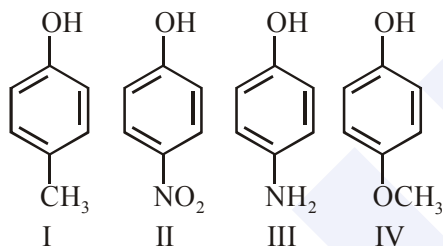
Official Ans. by NTA (3)

7. The correct statement about probability density (except at infinite distance from nucleus) is :

- (1) It can be negative for 2p orbital
- (2) It can be zero for 3p orbital
- (3) It can be zero for 1s orbital
- (4) It can never be zero for 2s orbital

Official Ans. by NTA (2)

8. The increasing order of boiling points of the following compounds is :



- (1) I < IV < III < II
- (2) IV < I < II < III
- (3) I < III < IV < II
- (4) III < I < II < IV

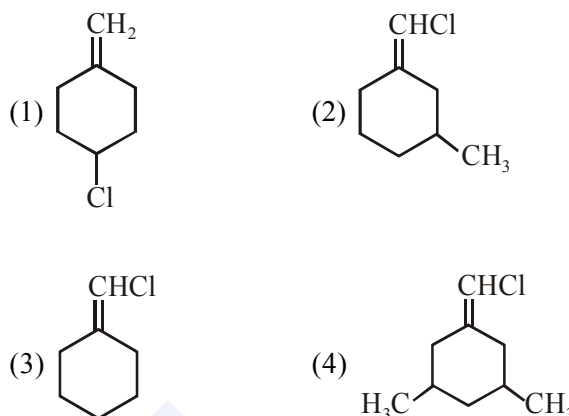
Official Ans. by NTA (1)

9. The compound that has the largest H–M–H bond angle (M=N, O, S, C), is :

- (1) H₂O
- (2) CH₄
- (3) NH₃
- (4) H₂S

Official Ans. by NTA (2)

10. Among the following compounds, geometrical isomerism is exhibited by :



Official Ans. by NTA (2)

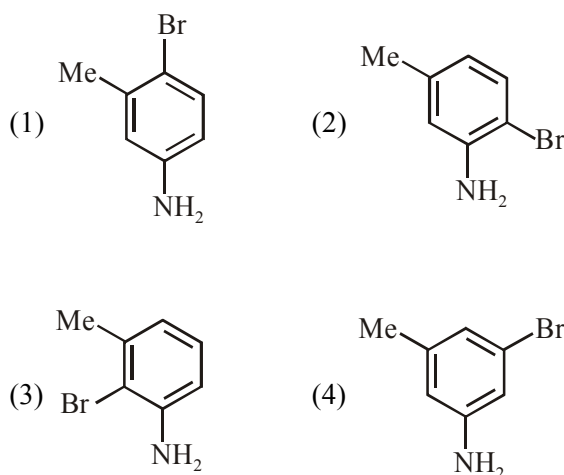
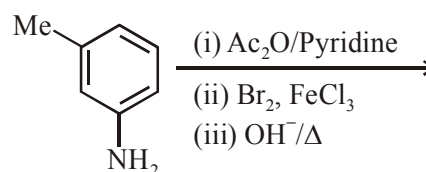
Official Ans. by ALLEN (2 & 4)

11. Which one of the following polymers is not obtained by condensation polymerisation?

- (1) Buna - N
- (2) Bakelite
- (3) Nylon 6
- (4) Nylon 6, 6

Official Ans. by NTA (1)

12. The final major product of the following reaction is :



Official Ans. by NTA (1)

13. Hydrogen peroxide, in the pure state, is :

- (1) non-planar and almost colorless
- (2) linear and almost colorless
- (3) planar and blue in color
- (4) linear and blue in color

Official Ans. by NTA (1)

14. Boron and silicon of very high purity can be obtained through :

- (1) vapour phase refining
- (2) electrolytic refining
- (3) liquation
- (4) zone refining

Official Ans. by NTA (4)

15. Lattice enthalpy and enthalpy of solution of NaCl are 788 kJ mol^{-1} and 4 kJ mol^{-1} , respectively. The hydration enthalpy of NaCl is :

- (1) -780 kJ mol^{-1} (2) -784 kJ mol^{-1}
- (3) 780 kJ mol^{-1} (4) 784 kJ mol^{-1}

Official Ans. by NTA (2)

16. Reaction of ammonia with excess Cl_2 gives :

- (1) NH_4Cl and N_2
- (2) NCl_3 and NH_4Cl
- (3) NH_4Cl and HCl
- (4) NCl_3 and HCl

Official Ans. by NTA (4)

17. The correct order of the ionic radii of O^{2-} , N^{3-} , F^- , Mg^{2+} , Na^+ and Al^{3+} is :

- (1) $\text{Al}^{3+} < \text{Na}^+ < \text{Mg}^{2+} < \text{O}^{2-} < \text{F}^- < \text{N}^{3-}$
- (2) $\text{N}^{3-} < \text{O}^{2-} < \text{F}^- < \text{Na}^+ < \text{Mg}^{2+} < \text{Al}^{3+}$
- (3) $\text{Al}^{3+} < \text{Mg}^{2+} < \text{Na}^+ < \text{F}^- < \text{O}^{2-} < \text{N}^{3-}$
- (4) $\text{N}^{3-} < \text{F}^- < \text{O}^{2-} < \text{Mg}^{2+} < \text{Na}^+ < \text{Al}^{3+}$

Official Ans. by NTA (3)

18. Consider the complex ions,

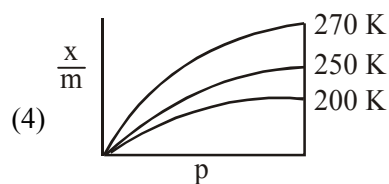
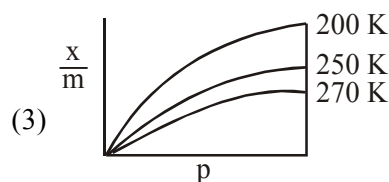
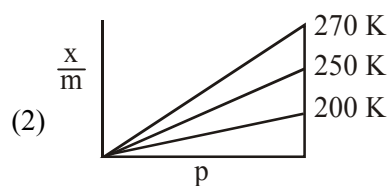
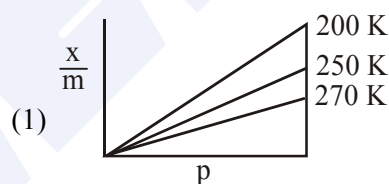
$\text{trans-}[\text{Co}(\text{en})_2\text{Cl}_2]^+$ (A) and

$\text{cis-}[\text{Co}(\text{en})_2\text{Cl}_2]^+$ (B). The correct statement regarding them is :

- (1) both (A) and (B) can be optically active
- (2) both (A) and (B) cannot be optically active
- (3) (A) can be optically active, but (B) cannot be optically active
- (4) (A) cannot be optically active, but (B) can be optically active

Official Ans. by NTA (4)

19. Adsorption of a gas follows Freundlich adsorption isotherm. If x is the mass of the gas adsorbed on mass m of the adsorbent, the correct plot of $\frac{x}{m}$ versus p is :



Official Ans. by NTA (3)

20. The major product formed in the following reaction is :



- (1) $\text{CH}_3\text{CH}_2\text{CH}_2\text{C}(\text{Br})(\text{CH}_3)_2$
 (2) $\text{Br}(\text{CH}_2)_3\text{CH}(\text{CH}_3)_2$
 (3) $\text{CH}_3\text{CH}_2\text{CH}(\text{Br})\text{CH}(\text{CH}_3)_2$
 (4) $\text{CH}_3\text{CH}(\text{Br})\text{CH}_2\text{CH}(\text{CH}_3)_2$

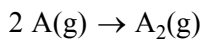
Official Ans. by NTA (1)

Official Ans. by ALLEN (4)

21. The number of chiral carbons present in sucrose is _____ .

Official Ans. by NTA (9)

22. For a dimerization reaction,



at 298 K, $\Delta U^\ominus = -20\text{kJ mol}^{-1}$, $\Delta S^\ominus = -30\text{ J}$

$\text{K}^{-1}\text{ mol}^{-1}$, then the ΔG^\ominus will be _____ J.

Official Ans. by NTA (-13538.00)

Official Ans. by ALLEN (-13537.57)

23. For a reaction $\text{X} + \text{Y} \rightleftharpoons 2\text{Z}$, 1.0 mol of X, 1.5 mol of Y and 0.5 mol of Z were taken in a 1 L vessel and allowed to react. At equilibrium, the concentration of Z was 1.0 mol L^{-1} . The equilibrium constant of the reaction is

$$\frac{x}{15}. \text{ The value of } x \text{ is } \underline{\hspace{2cm}} .$$

Official Ans. by NTA (16)

24. The volume, in mL, of 0.02 M $\text{K}_2\text{Cr}_2\text{O}_7$ solution required to react with 0.288 g of ferrous oxalate in acidic medium is _____ .

(Molar mass of Fe = 56 g mol^{-1})

Official Ans. by NTA (50.00)

25. Considering that $\Delta_0 > P$, the magnetic moment (in BM) of $[\text{Ru}(\text{H}_2\text{O})_6]^{2+}$ would be _____ .

Official Ans. by NTA (00)