

CUET-PG – 2026 – Chemistry



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Q.1 – Q.75 MCQ, carry Four marks each. (for each wrong answer: –1).

1. A molecule XY (mol. wt 180 g mol^{-1}) undergoes second order association in water. If the van't Hoff factor 'i' of the substance is 0.88, the degree of association of the substance is :
- (a) 10% (b) 28% (c) 48% (d) 24%
2. Match List-I with List-II.

	Structure of amino acid	Name of the amino acid
(P)		(i) Glutamic acid
(Q)		(ii) Isoleucine
(R)		(iii) Asparagine
(S)		(iv) Serine

Choose the correct answer from the options given below:

- | | | | | | | | | | |
|-----|------|-------|------|------|-----|-------|------|------|------|
| (P) | (Q) | (R) | (S) | (P) | (Q) | (R) | (S) | | |
| (a) | (iv) | (iii) | (ii) | (i) | (b) | (iii) | (iv) | (i) | (ii) |
| (c) | (iv) | (iii) | (i) | (ii) | (d) | (iii) | (iv) | (ii) | (i) |

3. IUPAC name of the given compound is



- (a) tricyclo [2, 2, 1, 0^{2,6}] heptane (b) tricyclo [2, 2, 2, 1^{1,5}] heptane
 (c) tetra cyclo [2, 1, 0, 1^{1,2}] heptane (d) tetra cyclo [2, 2, 1, 0^{2,6}] heptane

4. Match List-I with List-II.

	Compounds	Shape	
(P)	XeF ₂	(i) Pyramidal	(P)
(Q)	XeF ₄	(ii) Linear	(Q)
(R)	XeF ₆	(iii) Square planar	(R)
(S)	XeO ₃	(iv) Distorted Octahedron	(S)

5. In a reaction $A + B \rightarrow P$, rate is doubled when the concentration of B is doubled, and the rate increases by a factor of 8 when the concentration of both the reactants are doubled. The rate law of the reaction is:

- (a) $r = k[A][B]$ (b) $r = k[A]^2[B]$ (c) $r = k[A][B]^2$ (d) $r = k[A][B]^3$

6. Match List-I with List-II.

	Crystal System		Characteristics
(P)	Hexagonal	(i)	$a = b \neq c ; \alpha = \beta = 90^\circ, \gamma = 120^\circ$
(Q)	Cubic	(ii)	$a = b = c ; \alpha = \beta = \gamma = 90^\circ$
(R)	Tetragonal	(iii)	$a \neq b \neq c ; \alpha = \gamma = 90^\circ \neq \beta$
(S)	Monoclinic	(iv)	$a = b \neq c ; \alpha = \beta = \gamma = 90^\circ$

Choose the correct answer from the options given below:

(P)	(Q)	(R)	(S)	(P)	(Q)	(R)	(S)								
(a)	(ii)	;	(i)	;	(iii)	;	(iv)	(b)	(iv)	;	(ii)	;	(i)	;	(iii)
(c)	(i)	;	(ii)	;	(iii)	;	(iv)	(d)	(i)	;	(ii)	;	(iv)	;	(iii)

7. Reaction of Glucose with Excess acetic anhydride gives:

- (a) Diacetate (b) Triacetate (c) Polyacetate (d) Pentaacetate

8. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).

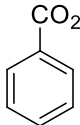
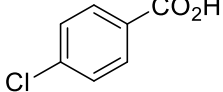
Assertion (A) : Enantiomers are inseparable on simple column chromatography.

Reason (R) : Enantiomers bind achiral stationary phase with equal affinity and Enantiomers can be separated by using chiral stationary phase.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (a) Both (A) and (R) are correct and (R) is the correct explanation of (A)
 (b) Both (A) and (R) are correct but (R) is NOT the correct explanation of (A)
 (c) (A) is correct but (R) is not correct
 (d) (A) is not correct but (R) is correct

9. Correct order of pKa values of following acid is:

P	Q	R	S	T
HCOOH	$\text{H}_3\text{C}(\text{CH}_2)_8\text{COOH}$	$\text{CCl}_3\text{-COOH}$		

Choose the correct answer from the options given below:

- (a) $Q > S > T > P > R$ (b) $R > P > T > S > Q$

(c) $Q > P > S > T > R$ (d) $T > R > S > P > Q$ 10. Choose the common features of **VBT** and **MOT** :**P. Resonance****Q. Energy of overlapping orbitals of bonding atoms should be comparable****R. Paramagnetic behaviour of O_2** **S. Symmetry of orbitals of bonding atoms**

Choose the correct answer from the options given below :

(a) P and Q only

(b) Q and S only

(c) P and R only

(d) Q and R only

11. The element with highest Electron Affinity among **Group 16** is :

(a) O

(b) S

(c) Se

(d) Te

12. Identify the correct statement:

P. Nitriles react with Grignard Reagent followed by hydrolysis gives carbonyl compounds.**Q. Aldehyde reacts with alcohol to form hemiacetal.****R. Carbonyl compounds are converted to corresponding acetal to increase the chemoselectivity.****S. Carbonyl compound reacts with 2° amines and forms enamines.**

Choose the correct answer from the options given below:

(a) P, Q and R only

(b) P, R and S only

(c) Q, R and S only

(d) P, Q, R and S only

13. Identify the compound which shows mass spectrum

$$\frac{m}{z} = 60(100\%); \frac{m}{z} = 61(3\%); \frac{m}{z} = 62(0.2\%) \quad (m = \text{mass}, z = \text{charge})$$

(a) $H_2N-CH_2-CH_2-NH_2$ (b) $CH_3-CH_2-CH_2-OH$ (c) $CHO-CH_2-OH$ (d) N_4H_4 14. The **Radial wave function** for **2p orbital** is:

$$(a) 2 \left[\frac{z}{a_0} \right]^{\frac{3}{2}} e^{-\sigma}$$

$$(b) 2^{-\frac{3}{2}} \left[\frac{z}{a_0} \right]^{\frac{3}{2}} (e^{-\sigma}) e^{-\frac{\sigma}{2}}$$

$$(c) 2^{-1} \left[\frac{z}{a_0} \right]^{\frac{3}{2}} \sigma e^{-\frac{\sigma}{2}}$$

$$(d) 2^{-1} \left[\frac{z}{a_0} \right]^{\frac{3}{2}} (1 - \sigma) e^{-\frac{\sigma}{2}}$$

15. Match List-I with List-II.

	Indicators		pH range
(P)	Methyl orange	(i)	6.8 – 8.4
(Q)	Phenolphthalein	(ii)	4.2 – 6.3

(R)	Methyl red	(iii)	3.1 – 4.4
(S)	Phenol red	(iv)	8.3 – 10.0

Choose the correct answer from the options given below:

	(P)	(Q)	(R)	(S)		(P)	(Q)	(R)	(S)
(a)	(iii)	;	(ii)	;	(i)	;	(iv)		
(c)	(iii)	;	(iv)	;	(ii)	;	(i)		

	(P)	(Q)	(R)	(S)		(P)	(Q)	(R)	(S)
(b)	(ii)	;	(iv)	;	(iii)	;	(i)		
(d)	(iii)	;	(i)	;	(ii)	;	(iv)		

16. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).

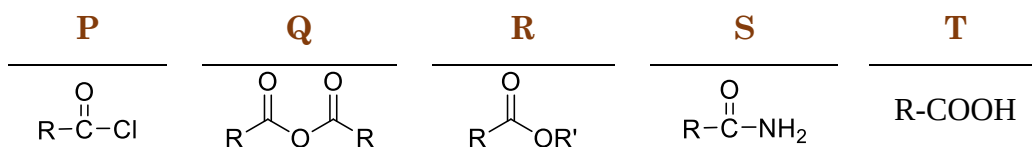
Assertion (A) : The equivalent conductance of weak electrolyte falls off much more rapidly with increase in concentration.

Reason (R) : The equivalent conductance of weak electrolyte at infinite dilution can be determined by extrapolation of the curve between equivalent conductance vs $\sqrt{c}$ to zero concentration.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (a) Both (A) and (R) are correct and (R) is the correct explanation of (A)
 (b) Both (A) and (R) are correct but (R) is NOT the correct explanation of (A)
 (c) (A) is correct but (R) is not correct
 (d) (A) is not correct but (R) is correct
17. What type of **bonding** is present in **clathrate compounds**?
 (a) Ionic (b) Covalent (c) Coordinate (d) No bond formation
18. Considering the normalized wave function of a particle in a **1-D box**. Which of the following are true?
P. The wave functions are all sine functions.
Q. The wave functions are with same maximum amplitude but different wave lengths.
R. The number of nodes increases as 'n' increases.
S. The wave function Ψ_n has $n + 1$ nodes.
- Choose the correct answer from the options given below:
 (a) P, R, S only (b) Q, S only (c) P, Q, R only (d) R, S only
19. The **capillary action** tendency of a liquid is a consequence of:
 (a) Osmosis (b) Vapour Pressure (c) Viscosity (d) Surface tension
20. Relative reactivity of the following compounds is towards displacement reaction is





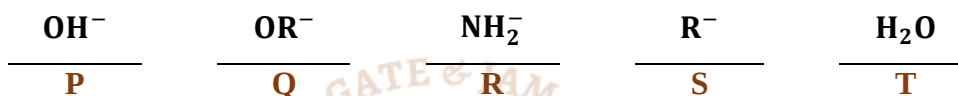
Choose the correct answer from the options given below:

- (a) $\text{P} > \text{Q} > \text{S} > \text{R} > \text{T}$ (b) $\text{P} > \text{R} > \text{Q} > \text{T} > \text{S}$
 (c) $\text{T} > \text{S} > \text{R} > \text{Q} > \text{P}$ (d) $\text{P} > \text{Q} > \text{R} > \text{T} > \text{S}$

21. Which one of the following is used as internal standard in **NMR analysis**?

- (a) Me_3SiCl (b) CCl_4 (c) Me_4Si (d) CD_3OD

22. Correct **order of basicity** of the following is:



Choose the correct answer from the options given below:

- (a) $\text{T} > \text{P} > \text{Q} > \text{R} > \text{S}$ (b) $\text{T} < \text{P} < \text{Q} < \text{R} < \text{S}$
 (c) $\text{R} > \text{P} > \text{Q} > \text{S} > \text{T}$ (d) $\text{T} < \text{Q} < \text{S} < \text{P} < \text{R}$

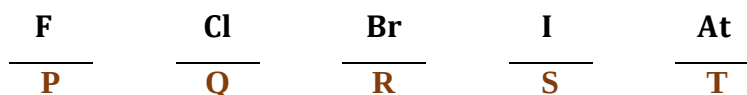
23. Match List-I with List-II.

	Molecule		Interatomic Forces
(P)	HCl	(i)	Intermolecular H-bonding
(Q)	O-nitrophenol	(ii)	Induced dipole-Induced dipole
(R)	N_2	(iii)	Intramolecular H-bonding
(S)	p-nitrophenol	(iv)	Dipole-Dipole

Choose the correct answer from the options given below:

(P)	(Q)	(R)	(S)	(P)	(Q)	(R)	(S)
(a)	(iv)	;	(i)	;	(ii)	;	(iii)
(b)	(iv)	;	(iii)	;	(i)	;	(ii)
(c)	(iv)	;	(iii)	;	(ii)	;	(i)
(d)	(ii)	;	(iii)	;	(iv)	;	(i)

24. Arrange the following in **increasing order of electron affinity**:



Choose the correct answer from the options given below:

- (a) $\text{Q} > \text{P} > \text{R} > \text{S} > \text{T}$ (b) $\text{P} > \text{Q} > \text{R} > \text{S} > \text{T}$
 (c) $\text{Q} > \text{R} > \text{P} > \text{S} > \text{T}$ (d) $\text{Q} > \text{P} > \text{R} > \text{T} > \text{S}$

25. Which of the following statements are correct about aromatic compounds?

P. Isopropyl benzene can be prepared by Friedel-Craft alkylation reaction using propyl chloride and AlCl_3

Q. Styrenes on reaction with HBr gives Bromobenzene

R. t-Butyl benzene gives benzoic acid on reaction with KMnO_4

S. Arenium ion complex formed during the electrophilic substitution reaction

Choose the correct answer from the options given below:

- (a) P and Q only (b) P and R only (c) P and S only (d) P, Q and S only

26. The enthalpy change in the complete combustion of α -D-glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) and maltose ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$) at 298 K, with the formation of gaseous CO_2 and liquid H_2O , are $-2809.1 \text{ kJ mol}^{-1}$ and $-5645.5 \text{ kJ mol}^{-1}$ respectively. The enthalpy change accompanying the conversion of 1 mol of α -D-glucose to maltose and H_2O is:

- (a) $-13.7 \text{ kJ mol}^{-1}$ (b) $+27.4 \text{ kJ mol}^{-1}$ (c) $+13.7 \text{ kJ mol}^{-1}$ (d) $-27.4 \text{ kJ mol}^{-1}$

27. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A) : The enthalpy of neutralization of any strong acid by a strong base is practically the same ($-13.7 \text{ kCal mol}^{-1}$).

Reason (R) : Every neutralization reaction involves the combination of H^+ and OH^- ions to form water.

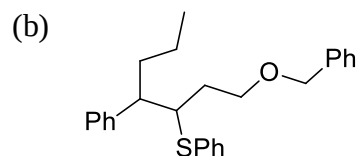
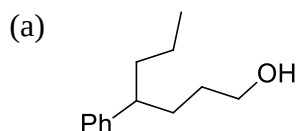
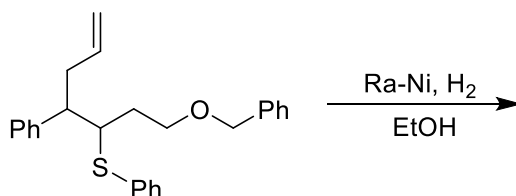
In the light of the above statements, choose the most appropriate answer from the options given below:

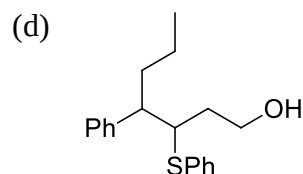
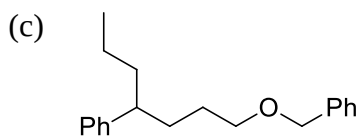
- (a) Both (A) and (R) are correct and (R) is the correct explanation of (A)
 (b) Both (A) and (R) are correct but (R) is NOT the correct explanation of (A)
 (c) (A) is correct but (R) is not correct
 (d) (A) is not correct but (R) is correct

28. pH of a 0.01 M Ca(OH)_2 solution is: (Given $\log_{10} 2 = 0.3010$)

- (a) 12.3 (b) 7.0 (c) 12.0 (d) 12.602

29. The product formed in the reaction is:





30. Which of the following conditions are **correct**?

P. ΔH is +ve, ΔS is -ve at any T, results in non-spontaneous process

Q. ΔH is -ve, ΔS is -ve at low T, results in non-spontaneous process

R. ΔH is +ve, ΔS is +ve at low T, results in spontaneous process

S. ΔH is -ve, ΔS is +ve at any T, results in spontaneous process

Choose the correct answer from the options given below:

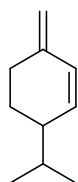
(a) R, S only

(b) P, Q, R only

(c) Q, R only

(d) P, S only

31. $\lambda_{\max}$ in UV spectrum of the given compound



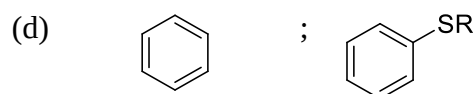
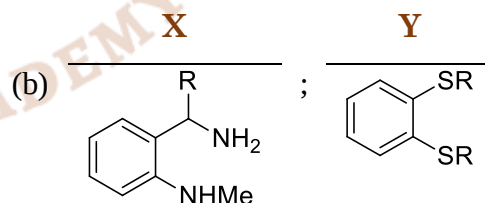
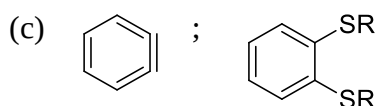
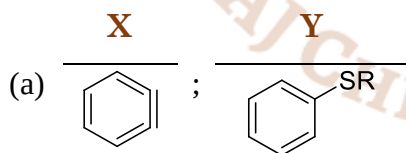
(a) 215 nm

(b) 237 nm

(c) 229 nm

(d) 219 nm

32. Find the **product X, Y** in the following reaction



33. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A) : In S_N1 reaction racemic mixture is formed and in S_N2 reaction inversion of configuration is observed.

Reason (R) : S_N1 reaction is concerted mechanism and S_N2 reaction involves carbocation intermediate.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (a) Both (A) and (R) are correct and (R) is the correct explanation of (A)
 (b) Both (A) and (R) are correct but (R) is NOT the correct explanation of (A)
 (c) (A) is correct but (R) is not correct
 (d) (A) is not correct but (R) is correct
34. How many **N-H Stretching bands** observed in the IR spectrum of primary Amines ($R-NH_2$)?
 (a) 0 (b) 1 (c) 2 (d) 3
35. **0.28 g** of the following are dissolved in **1 L** of water. Arrange them in increasing order of their molarities:

P. Glucose ($C_6H_{12}O_6$)

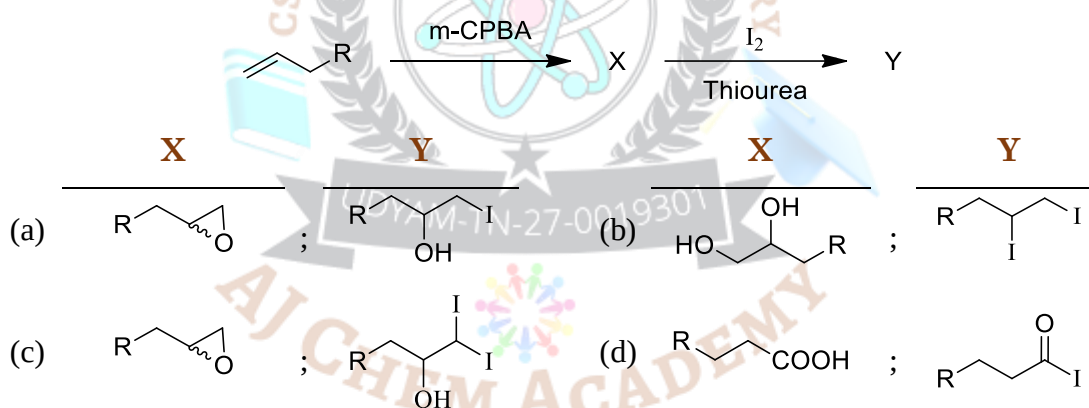
Q. Urea (NH_2CONH_2)

R. Benzoic Acid (C_6H_5COOH)

S. Sucrose ($C_{12}H_{22}O_{11}$)

Choose the correct answer from the options given below:

- (a) S, P, R, Q (b) S, Q, R, P (c) Q, P, R, S (d) Q, R, P, S
36. Find the **product X, Y** in the following reactor:



37. Arrange the following gases in **increasing order** of their **critical temperatures**,

	a ($\text{atm L}^2 \text{mol}^{-2}$)	b (L mol^{-1})
P.	4.0	0.027
Q.	8.0	0.030
R.	6.0	0.032
S.	12	0.027

- (a) S, Q, R, P
 (b) P, R, Q, S
 (c) S, Q, P, R
 (d) Q, R, S, P
38. Which of the following is **not true** with reference to derivation of **Langmuir isotherm**?
- (a) All parts of the surface behave in exactly the same way as far as adsorption is concerned.
 (b) The rate of adsorption is proportional to the concentration $[A]$ of the molecule in gas

or liquid phase.

(c) The rate of adsorption is proportional to the fraction of the surface that is bare.

(d) Fraction of surface covered (θ) is given by $\theta = \frac{K[A]}{1+K[A]}$, K - Equilibrium constant.

39. **Natural Mechanism in human body to inhibit the heavy metal ion poisoning is by:**

(a) Cysteine (b) thioneins (c) glutathione (d) 2,3 dimercaptoproponol

40. **Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).**

Assertion (A) : In B_2H_6 , two bridging H atoms prevent the rotation between B atoms.

Reason (R) : Terminal B-H bonds are normal covalent bonds i.e two centre two electron (2C-2e) bonds.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (a) Both (A) and (R) are correct and (R) is the correct explanation of (A)
- (b) Both (A) and (R) are correct but (R) is NOT the correct explanation of (A)
- (c) (A) is correct but (R) is not correct
- (d) (A) is not correct but (R) is correct

41. **Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).**

Assertion (A) : HBr addition to alkenes gives Markovnikov addition.

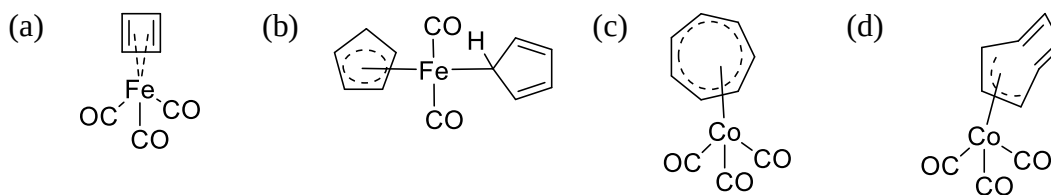
Reason (R) : HBr addition to alkene in the presence of peroxide gives Anti-Markovnikov addition as the reaction proceeds via radical mechanism.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (a) Both (A) and (R) are correct and (R) is the correct explanation of (A)
- (b) Both (A) and (R) are correct but (R) is NOT the correct explanation of (A)
- (c) (A) is correct but (R) is not correct
- (d) (A) is not correct but (R) is correct

42. **Which of following organometallic complex do NOT OBEY 18 EAN Rule**





43. Match List-I with List-II.

	Conversion		Name of the reaction
(P)	Pyridine → 2-Amino pyridine	(i)	Dakin reaction
(Q)	Salicylaldehyde → catechol	(ii)	Etard reaction
(R)	Toluene → Benzaldehyde	(iii)	Chichibabin reaction
(S)	Homologation of carboxylic acids	(iv)	Arndt-Eistert Synthesis

Choose the correct answer from the options given below:

	(P)	(Q)	(R)	(S)		(P)	(Q)	(R)	(S)
(a)	(iv)	(iii)	(ii)	(i)	(b)	(iii)	(ii)	(i)	(iv)
(c)	(iii)	(i)	(ii)	(iv)	(d)	(iii)	(iv)	(i)	(ii)

44. IR absorption spectra of **metal carbonyl** determine:

P. Geometry of mononuclear metal carbonyls

Q. Determine bond order of CO bond

R. Differentiating between terminal and bridging CO

S. Enantiomerism in metal carbonyls

T. Study of Reaction Rates of Substitution reactions

Choose the correct answer from the options given below:

(a) P, Q, R and S only

(b) P, Q, R and T only

(c) Q, R, S and T only

(d) P, R, S and T only

45. Which of the following equation is **not correct**?

(a) $dG = Vdp - SdT$

(b) $dA = -pdV + SdT$

(c) $dH = TdS + Vdp$

(d) $dU = TdS - pdV$

46. Choose the Diamagnetic tripositive ion of Lanthanoids:

P	Q	R	S	T
La	Ce	Eu	Yb	Lu

Choose the correct answer from the options given below:

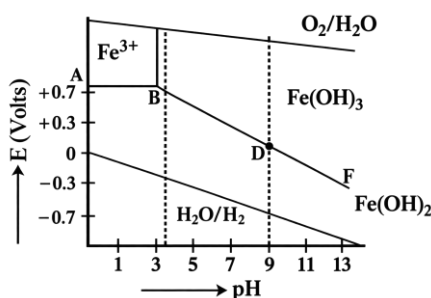
(a) P, Q and R only

(b) Q, S and T only

(c) P, R and T only

(d) Q, R and S only

47. Using Pourbaix Diagram choose the **Incorrect** statement:



- (a) $Fe_{(aq)}^{3+} + e^- \rightarrow Fe^{2+}$ $E^\circ = 0.77$ is independent of pH
- (b) $Fe_{(aq)}^{3+} + 3H_2O \rightarrow Fe(OH)_{3(s)} + 3H^+_{(aq)}$, formation of $Fe(OH)_3$ is favoured by high pH
- (c) $Fe_{(aq)}^{3+} + 3H_2O_{(l)} \rightarrow Fe(OH)_{2(s)} + 2H^+_{(aq)}$, formation of $Fe(OH)_2$ is favoured by high pH
- (d) $Fe(OH)_{3(s)} + H^+_{(aq)} + e^- \rightarrow Fe(OH)_{2(s)} + H_2O_{(l)}$ the reaction is independent of pH
48. Which of the following statements is **not correct** with reference to a catalyst?
- (a) A catalyst does not increase the rate at which equilibrium is attained.
- (b) A catalyst does not alter the value of equilibrium constant of a reversible reaction.
- (c) A catalyst accelerates a reaction but undergoes no net chemical change.
- (d) A catalyst does not initiate a chemical reaction.
49. Which of the following are **correct** with reference to Maxwell-Boltzmann distribution of velocities?
- P.** The fraction of molecules with very low ($c \rightarrow 0$) velocities and very high ($c \rightarrow \infty$) velocities, is very small.
- Q.** The area under different curve obtained at different temperature is same.
- R.** The maximum of the curve represent average velocity at a particular temperature.
- S.** The area under the curve represents total number of molecules.
- Choose the correct answer from the options given below:
- (a) P, Q and R only (b) P, Q and S only (c) P, Q, R and S only (d) Q, R and S only
50. The number of photons emitted by a **100 W** yellow lamp ($\lambda = 560 \text{ nm}$) in **1.0 s** (assuming 100% efficiency) is: (Given: $h = 6.6 \times 10^{-34} \text{ Js}$, $c = 3.0 \times 10^8 \text{ m s}^{-1}$)
- (a) 2.8×10^{16} (b) 2.8×10^{23} (c) 2.8×10^{18} (d) 2.8×10^{20}
51. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A) : He and Ne do not form clathrates.

Reason (R) : He and Ne can be separated from Ar, Kr and Xe using quinol from the mixture of these gas.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (a) Both (A) and (R) are correct and (R) is the correct explanation of (A)
- (b) Both (A) and (R) are correct but (R) is NOT the correct explanation of (A)
- (c) (A) is correct but (R) is not correct
- (d) (A) is not correct but (R) is correct

52. Match List-I with List-II.

	Quantities		Relation		(P)	(Q)	(R)	(S)
(P)	μ_i	(i)	$\left(\frac{\partial \mu_i}{\partial p}\right)_{T, n_i}$					
(Q)	$\bar{V}_i$	(ii)	$\left(\frac{\partial G}{\partial n_i}\right)_{T, P, n_j}$	(a)	(ii)	(i)	(iii)	(iv)
(R)	$\bar{S}_i$	(iii)	$-\left(\frac{\partial \mu_i}{\partial T}\right)_{P, n_i}$	(b)	(i)	(ii)	(iv)	(iii)
				(c)	(iii)	(i)	(ii)	(iv)
(S)	μ_i°	(iv)	$\mu_i - RT \ln p_i$	(d)	(ii)	(iii)	(iv)	(i)

53. Pulegone on reaction with KMnO_4 forms:

- (a) 3-methyl adipic acid and Acetone
- (b) Acetylene, and 3-methyl adipic Acid
- (c) Cyclohexanone and Acetic acid
- (d) 3-methyl cyclohexanone and Acetone

54. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A) : Reactions between ions in solution are usually much faster than reactions between covalent substances.

Reason (R) : Covalent compounds are not soluble in water.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (a) Both (A) and (R) are correct and (R) is the correct explanation of (A)
- (b) Both (A) and (R) are correct but (R) is NOT the correct explanation of (A)
- (c) (A) is correct but (R) is not correct
- (d) (A) is not correct but (R) is correct

55. Following are the sentences about alkenes reactions.

P. Alkenes undergoes electrophilic addition reactions

Q. Alkenes undergoes nucleophilic addition reactions in general

R. As per Saytzeff's rule ease of formation of alkene is more substituted alkenes

S. Alkenes are inert towards peracids

Choose the correct answer from the options given below:

- (a) P, Q and R only (b) P, R and S only
(c) P, Q, R and S only (d) P and R only

56. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A) : $\text{Na}^+(\text{C}_5\text{H}_{11})^-$ is more stable than $\text{Na}^+(\text{C}_5\text{H}_5)^-$

Reason (R) : C_5H_5 readily accept electron to become 6-electron aromatic C_5H_5^-

In the light of the above statements, choose the most appropriate answer from the options given below:

- (a) Both (A) and (R) are correct and (R) is the correct explanation of (A)
(b) Both (A) and (R) are correct but (R) is NOT the correct explanation of (A)
(c) (A) is correct but (R) is not correct
(d) (A) is not correct but (R) is correct

57. Match List-I with List-II.

Compounds		Applications	
(P)	Silicones	(i)	Transparent films
(Q)	Borazines	(ii)	Water repellent
(R)	Phosphazenes	(iii)	Electrical Insulator
(S)	Poly siloxanes	(iv)	Cutting tools

Choose the correct answer from the options given below:

	(P)	(Q)	(R)	(S)		(P)	(Q)	(R)	(S)
(a)	(iii)	;	(iv)	;	(i)	;	(ii)		
(c)	(iii)	;	(iv)	;	(ii)	;	(i)		

	(P)	(Q)	(R)	(S)		(P)	(Q)	(R)	(S)
(b)	(iv)	;	(iii)	;	(i)	;	(ii)		
(d)	(iii)	;	(ii)	;	(i)	;	(iv)		

58. Consider the redox reaction, $\text{Mg}_{(s)} + 2\text{Ag}_{(aq)}^+ \rightarrow \text{Mg}_{(aq)}^{2+} + 2\text{Ag}_{(s)}$

The expression of cell emf at 298 K is:

- (a) $E = E^\circ + \frac{0.059}{2} \log \frac{[\text{Mg}^{2+}]}{[\text{Ag}^+]^2}$ (b) $E = E^\circ + \frac{0.059}{2} \log \frac{[\text{Ag}^+]^2}{[\text{Mg}^{2+}]}$
(c) $E = E^\circ - \frac{0.059}{2} \log \frac{[\text{Mg}^{2+}]}{[\text{Ag}]}$ (d) $E = E^\circ - \frac{0.059}{2} \log \frac{[\text{Mg}^{2+}]^2}{[\text{Ag}^+]}$

59. Given below are two statements: one is labelled as Assertion (A) and the other is

labelled as Reason (R).

Assertion (A) : Carbon halogen bond in aryl and vinyl halides are unusually shorter.

Reason (R) : Chlorobenzene, and vinyl chlorides undergo S_N1 and S_N2 reaction in general.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (a) Both (A) and (R) are correct and (R) is the correct explanation of (A)
- (b) Both (A) and (R) are correct but (R) is NOT the correct explanation of (A)
- (c) (A) is correct but (R) is not correct
- (d) (A) is not correct but (R) is correct

60. Which of the following is/are intensive property/ies?

P	Q	R	S	T
Volume	Density	Energy	Pressure	Molar heat Capacity

Choose the correct answer from the options given below:

- (a) P, Q, R, S only
- (b) Q, S, T only
- (c) T only
- (d) P, R only

61. Relative rate of alkaline hydrolysis of the compound is



Choose the correct answer from the options given below:

- (a) I > II > III > IV > V
- (b) I > V > III > II > IV
- (c) I < II < III < IV < V
- (d) I < V < II < III < IV

62. Arrange the following four compounds in increasing order of their stability, if their heat of formation in standard states are given as:

P	Q	R	S
-500 kJ mol^{-1}	$+700 \text{ kJ mol}^{-1}$	-900 kJ mol^{-1}	250 kJ mol^{-1}

Choose the correct answer from the options given below:

- (a) R, P, S, Q
- (b) P, Q, R, S
- (c) Q, S, P, R
- (d) R, P, Q, S

63. Arrange the following in increasing order of spin only magnetic moment:

P	Q	R	S	T
Co ²⁺	Ti ³⁺	Ti ²⁺	Fe ²⁺	Sc ³⁺

Choose the correct answer from the options given below:

- (a) T < R < Q < P < S
- (b) T < Q < R < P < S

(c) $T < Q < P < R < S$ (d) $T < P < Q < R < S$

64. Arrange the following ligands as per increasing hapticity:

P	Q	R	S	T
Allyl	Butadiene	Phenyl	Tropillium	Cyclooctatriene

Choose the correct answer from the options given below:

(a) $R < P < Q < T < S$ (b) $P < Q < R < T < S$ (c) $P < Q < R < S < T$ (d) $Q < R < P < T < S$ 65. The **Interhalogen compound** used in the estimation of iodine number in fats and oils is:

(a) ICl

(b) IBr

(c) ICl₃(d) IF₇

66. For Schrödinger Wave Equation

$$\nabla^2 \Psi + \frac{8\pi^2 m}{h^2} (E - V) \Psi = 0$$

Acceptable solution does NOT possess which of the following property?(a) Ψ must be continuous(b) Ψ must be single valued(c) Ψ must be finite(d) The probability of finding an electron at a point x, y, z is Ψ^2 so $\int_{-\infty}^{\infty} \Psi^2 dx dy dz \leq 1$ 67. In metal carbonyl, **IR absorption** can distinguish nature of CO because:

(a) absorption for CO Terminal is at high frequency than CO Bridging

(b) absorption for CO Terminal is at same frequency than CO Bridging

(c) absorption for CO Terminal is at lower frequency than CO Bridging

(d) The intensity of peak for bridging is stronger than Terminal one

68. Following are the identification test of alcohols:

P. In Victor Meyer Test 1° alcohol gives red colour**Q. In Victor Meyer Test 2° alcohol gives blue colour****R. In Victor Meyer Test 3° alcohol gives green colour****S. In Victor Meyer Test 1° alcohol gives yellow colour**

Choose the correct answer from the options given below:

(a) P, Q and R only

(b) P, Q and S only

(c) P, R and S only

(d) P and Q only

69. Choose the paramagnetic species:

P

Q

R

S

T



Choose the correct answer from the options given below:

(a) P, Q and R only

(b) Q, R and S only

(c) R, S and T only

(d) P, Q and T only

70. Arrange the following in order of their decreasing ionic strength:

P

Q

R

S

0.1 m NaCl

0.01 m K_2SO_4

0.001 m AlCl_3

0.01 m glucose

Choose the correct answer from the options given below:

(a) Q, R, P, S

(b) S, R, Q, P

(c) P, Q, R, S

(d) R, Q, S, P

71. Given * denotes an excited state; S-singlet state; T-triplet state.

Match List-I with List-II.

	Photophysical Processes	Representations
(P)	Phosphorescence	(i) $\text{S}^* \rightarrow \text{S} + h\nu$
(Q)	Internal conversion	(ii) $\text{T}^* + \text{M} \rightarrow \text{S} + \text{M}$
(R)	Fluorescence	(iii) $\text{S}^* \rightarrow \text{S}$
(S)	Collisional deactivation	(iv) $\text{T}^* \rightarrow \text{S} + h\nu$

Choose the correct answer from the options given below:

(P)	(Q)	(R)	(S)	(P)	(Q)	(R)	(S)
(a)	(i)	(ii)	(iii)	(b)	(iv)	(iii)	(ii)
(c)	(iv)	(iii)	(i)	(d)	(ii)	(iii)	(iv)

72. The correct sequence of Extraction of Lanthanoids from monazite sand is :

P. Treat with cold water

Q. Dilute and adjust pH in alkaline range

R. Digest with Conc. H_2SO_4 at 200°C

S. Separation by Ion Exchange method

T. Add Na_2SO_4

Choose the correct answer from the options given below:

(a) $\text{R} \rightarrow \text{Q} \rightarrow \text{P} \rightarrow \text{T} \rightarrow \text{S}$

(b) $\text{P} \rightarrow \text{Q} \rightarrow \text{R} \rightarrow \text{S} \rightarrow \text{T}$

(c) $\text{P} \rightarrow \text{Q} \rightarrow \text{R} \rightarrow \text{T} \rightarrow \text{S}$

(d) $\text{R} \rightarrow \text{P} \rightarrow \text{Q} \rightarrow \text{T} \rightarrow \text{S}$

73. Match List-I with List-II.

	Name of the reaction	Conversion
(P)	Elbs reaction	(i) Synthesis of salicylic acid
(Q)	Reimer-Tieman reaction	(ii) Synthesis of Anthracene
(R)	Kolbe-reaction	(iii) Allyl phenols
(S)	Claisen rearrangement	(iv) Synthesis of Salicylaldehyde

Choose the correct answer from the options given below:

(P)	(Q)	(R)	(S)	(P)	(Q)	(R)	(S)
(a)	(ii)	;	(iv)	;	(iii)	;	(i)
(b)	(ii)	;	(iv)	;	(i)	;	(iii)
(c)	(iii)	;	(iv)	;	(ii)	;	(i)
(d)	(ii)	;	(i)	;	(iv)	;	(iii)

74. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A) : In $[\text{Ti}(\text{H}_2\text{O}_6)]^{3+}$ electronic spectra the observed absorption is unsymmetrical and appears to be result of more than one absorption bands.

Reason (R) : Due to Jahn Teller effect energy of d_{xy} is lowered so as shown electronic jump $d'_{xy} \rightarrow d'_{x^2-y^2}$ and $d'_{xy} \rightarrow d'_{z^2}$ so give rise two absorption bands.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (a) Both (A) and (R) are correct and (R) is the correct explanation of (A)
 (b) Both (A) and (R) are correct but (R) is NOT the correct explanation of (A)
 (c) (A) is correct but (R) is not correct
 (d) (A) is not correct but (R) is correct

75. Match List-I with List-II.

	Compounds		Hybridization	no. of LP
(P)	SF_4	(i)	SP^3	2 LP
(Q)	ClF_3	(ii)	SP^3d	1 LP
(R)	H_2O	(iii)	SP^3	1 LP
(S)	NH_3	(iv)	SP^3d	2 LP

Choose the correct answer from the options given below:

(P)	(Q)	(R)	(S)	(P)	(Q)	(R)	(S)
(a)	(ii)	;	(iv)	;	(i)	;	(iii)
(b)	(iii)	;	(iv)	;	(i)	;	(ii)
(c)	(ii)	;	(i)	;	(iv)	;	(iii)
(d)	(i)	;	(iv)	;	(ii)	;	(iii)

Answer Key

Q.No	Ans	Q.No	Ans	Q.No	Ans	Q.No	Ans	Q.No	Ans
1.	d	16.	c	31.	c	46.	c	61.	a
2.	a	17.	d	32.	a	47.	d	62.	c
3.	*	18.	c	33.	c	48.	a	63.	b
4.	c	19.	d	34.	c	49.	b	64.	a
5.	b	20.	d	35.	a	50.	d	65.	a
6.	d	21.	c	36.	a	51.	b	66.	d
7.	d	22.	b	37.	b	52.	a	67.	a
8.	a	23.	c	38.	d	53.	a	68.	d
9.	a	24.	a	39.	b	54.	c	69.	c
10.	b	25.	c	40.	b	55.	d	70.	c
11.	b	26.	c	41.	b	56.	d	71.	c
12.	d	27.	a	42.	c	57.	a	72.	d
13.	b	28.	a	43.	c	58.	b	73.	b
14.	c	29.	a	44.	b	59.	c	74.	a
15.	c	30.	d	45.	b	60.	b	75.	a

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