

TARGET AIIMS

Directions for Assertion & Reason questions

These questions consist of two statements each, printed as Assertion and Reason. While answering these Questions you are required to choose any one of the following four responses.

- A. If both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
- B. If both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
- C. If Assertion is True but the Reason is False.
- D. If both Assertion & Reason are false.

<p>1. Assertion : Solid CO_2 is called dry ice. Reason : It sublimes without melting</p> <p>2. Assertion : Liquid NH_3 is used in refrigeration. Reason : NH_3 has lower dielectric constant than H_2O</p> <p>3. Assertion : Nitrogen does not form pentahalide. Reason : Due to absence of 'd' orbital.</p> <p>4. Assertion : Both Cl_2 and SO_2 are bleaching agents. Reason : The bleaching action of Cl_2 and SO_2 is by oxidation process.</p> <p>5. Assertion : FeCl_3 does not exist. Reason : Fluorine contains vacant 'd' orbitals.</p> <p>6. Assertion : PbI_4 is not stable. Reason : Due to large size reducing nature of I^- ion and inert pair effect.</p> <p>7. Assertion : Dry green leaf can be bleached by Cl_2 gas. Reason : Cl_2 is bleaching agent.</p> <p>8. Assertion : Na^+ does not form complex. Reason : It does not contain vacant 'd' orbitals.</p> <p>9. Assertion : A Mg wire burns in the presence of CO_2. Reason : Mg acts as a reducing agent.</p> <p>10. Assertion : Common salt turns moist during rainy day. Reason : It is due to ion dipole attraction.</p> <p>11. Assertion : 'Al' Can not be extracted by smelting process. Reason : It has less affinity for oxygen than carbon.</p>	<p>12. Assertion : PH_3 is more basic than NH_3. Reason : Electronegativity of 'P' is more than 'N'.</p> <p>13. Assertion : Zeolite is dehydrating agent. Reason : It is porous catalyst.</p> <p>14. Assertion : Lyophobic Sols are more stable than Lyophilic Sols. Reason : Lyophilic contains more solvation energy.</p> <p>15. Assertion : BF_3 is more stable than BCl_3. Reason : Due to small size of 'F' atom.</p> <p>16. Assertion : R_4Si does not form silicones. Reason : Due to large size of Si. than 'R'</p> <p>17. Assertion : 'Cu' forms hydrogen gas with dil HCl. Reason : Position of Cu below H in electrochemical series.</p> <p>18. Assertion : The purest form of Fe is steel. Reason : Percentage 'C' in steel is approx 3%.</p> <p>19. Assertion : Hypo is used in photography. Reason : It is a strong non-complexing agent.</p> <p>20. Assertion : ZnO is amphoteric. Reason : It reacts with both acid and base.</p> <p>21. Assertion : Fluorine has a less electron affinity than chlorine. Reason : Fluorine is more oxidising than chlorine.</p> <p>22. Assertion : Ionic radius of Li^+ in aqueous medium is larger than Cs^+. Reason : Due to high charge density, degree of hydration in Li^+ is greater than Cs^+.</p>
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- 23. Assertion :** Li and Mg shows diagonal relationship.
Reason : Li and Mg are placed diagonal to each other in the periodic table.
- 24. Assertion :** Na^+ and F^- are isoelectronic but the Na^+ has more electron affinity than F^- .
Reason : The magnitude of effective nuclear charge in the outer shell of Na^+ is greater than F^- .
- 25. Assertion :** Helium is a p-block element.
Reason : Last filling electron goes into p-subshell.
- 26. Assertion :** F_2 act as stronger oxidising agent than O_2 .
Reason : Bond strength of F_2 is greater than O_2 .
- 27. Assertion :** Successive IP of an element goes on increasing.
Reason : On removing succeeding electrons Z_{eff} decreases.
- 28. Assertion :** Element having $3d^{10} 4s^1$ configuration is placed in s-block.
Reason : Last filling electron enters into s-subshell.
- 29. Assertion :** Potassium and argon are the anomalous pair in the Mendeleev's periodic table.
Reason : They are not placed in the increasing order of their atomic numbers.
- 30. Assertion :** NaOH can not be stored in the vessel made of Al or Zn.
Reason : A protective layer of oxide is formed on the surface of the metal.
- 31. Assertion :** BaSO_4 is insoluble in water but, readily dissolves in solution of sodium salt of EDTA.
Reason : Ba^{+2} forms a very stable complex with the anion of the sodium salt EDTA, which is water soluble.
- 32. Assertion :** Sulphur exhibit paramagnetic behaviour in vapour state.
Reason : In vapour state sulphur partly exist as S_2 molecule, which has two unpaired electrons in ABMO.
- 33. Assertion :** On cooling, the brown colour of NO_2 disappears.
Reason : On cooling NO_2 forms dimer (N_2O_4) resulting in the pairing of odd electron in NO_2 .
- 34. Assertion :** Water is liquid but H_2S is a gas.
Reason : Molecular weight of H_2O is higher than H_2S .
- 35. Assertion :** C_2 is paramagnetic.
Reason : The highest occupied molecular orbital is of σ (sigma)-type.
- 36. Assertion :** Ice is less dense than liquid water.
Reason : There are vacant spaces between, hydrogen bonded water molecules in ice.
- 37. Assertion :** CO_2 is a non polar molecule.
Reason : In the molecule C-O bond is nonpolar.
- 38. Assertion :** NO_2 is bent molecule.
Reason : It is sp^2 hybridised, having repulsion in between an unpaired e- and bond pairs.
- 39. Assertion :** Ortho and para-nitrophenol can be separated by steam distillation.
Reason : O-nitrophenol have intramolecular H-bonding while p-nitrophenol exists as associated molecules.
- 40. Assertion :** MgO has higher thermal stability than Na_2O .
Reason : MgO is more ionic than Na_2O .
- 41. Assertion :** Spots of iron rusting can be removed by addition of oxalic acid.
Reason : Water soluble complex is formed with oxalic acid.
- 42. Assertion :** Optical isomerism is not shown by square planar complex.
Reason : Square planar complexes do not possess chiral structures.
- 43. Assertion :** $\text{K}_4[\text{Fe}(\text{CN})_6]$ is less stable than $\text{K}_3[\text{Fe}(\text{CN})_6]$.
Reason : Magnetic moment is controlled by number of paired electrons.

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51. A

R

52. A

R

53. A

Re

- 44. Assertion :** When donor atoms are same then chelated complexes are more stable than nonchelated complexes.
- Reason :** Complexes containing ligands which can be easily replaced by other ligands are called labile complexes.
- 45. Assertion :** Ruthanocene is a π -bonded organometallic complex.
- Reason :** π -bonded organometallic compounds are formed by donation of π -electrons to metal atom.
- 46. Assertion :** Aqueous solution of Mohr's salt exhibits the test for NH_4^+ , Fe^{+2} and SO_4^{2-} ions.
- Reason :** Mohr's salt is a double salt.
- 47. Assertion :** $[\text{Ti}(\text{H}_2\text{O})_6]^{+3}$ is coloured while $[\text{Sc}(\text{H}_2\text{O})_6]^{+3}$ is colourless.
- Reason :** d-d transition is not possible in $[\text{Sc}(\text{H}_2\text{O})_6]^{+3}$.
- 48. Assertion :** The ligands nitro and nitrito are ambidentate ligands.
- Reason :** These ligands give linkage isomers.
- 49. Assertion :** AgBr used in photography.
- Reason :** AgBr is photo sensitive.
- 50. Assertion :** In the actinides, number of electron participating in reaction are lesser than lanthanides
- Reason :** Energy difference in between 5f and 6d electrons is greater than, that of in between 4f and 5d electrons.
- 51. Assertion :** Tungsten filament is used in electric bulbs.
- Reason :** Tungsten is a metal of high melting point.
- 52. Assertion :** $\text{Cp}-\text{Cv} = \text{R}$ for 1 mole of an ideal gas.
- Reason :**
$$\left(\frac{\delta E}{\delta V} \right)_T = 0$$
 for an ideal gas.
- 53. Assertion :** A reaction which is spontaneous and accompanied by decrease of randomness must be exothermic.
- Reason :** All exothermic reaction are accompanied by decrease of randomness.
- 54. Assertion :** An exothermic process, non-spontaneous at high temperature, may become spontaneous at low temperature.
- Reason :** With decrease in temperature, randomness (entropy) decrease.
- 55. Assertion :** Internal energy change in a cyclic process is zero.
- Reason :** Internal energy is a state function.
- 56. Assertion :** Enthalpy of formation of HCl is equal to the bond energy of HCl.
- Reason :** Enthalpy of formation and bond energy both involve formation of one mole of HCl from its elements.
- 57. Assertion :** Magnitude of heat of ionization of water is equal to the heat of neutralisation of a strong acid with a strong base.
- Reason :** Water ionises to a very small extent while H^+ ions from acid combine very rapidly with OH^- from base to form H_2O .
- 58. Assertion :** The enthalpy of formation of $\text{H}_2\text{O}(\ell)$ is greater than that of $\text{H}_2\text{O}(g)$.
- Reason :** Enthalpy change is negative for the condensation reaction
- $$\text{H}_2\text{O}(g) \longrightarrow \text{H}_2\text{O}(\ell)$$
- 59. Assertion :** Orbital angular momentum of $1s, 2s, 3s$ etc. are zero.
- Reason :** $1s, 2s, 3s$ etc. all have spherical shape.
- 60. Assertion :** If the potential difference applied to an electron is made 4 times, the DeBroglie wavelength associated is halved.
- Reason :** On making potential difference 4 times, velocity is doubled and hence λ is halved.
- 61. Assertion :** Zinc reacts with dil H_2SO_4 to give H_2 gas but copper does not.
- Reason :** Zinc has higher reduction potential than copper.
- 62. Assertion :** Sulphur dioxide and chlorine are both bleaching agents.
- Reason :** Both are reducing agents.

- 63. Assertion :** Hydrogen peroxide acts only as Oxidising agent.
- Reason :** All peroxides behave as the oxidising agent only.
- 64. Assertion :** Fe^{+2} has 24 electrons hence, its electronic configuration is similar to that of $\text{Cr}(24)[\text{Ar}]3d^5 4s^1$
- Reason :** All the five unpaired electrons in 3d gives stability to the ion.
- 65. Assertion :** Electronic configuration of K(19) is $1s^2, 2s^2, 2p^6 3s^2 3p^6 4s^1$.
- Reason :** Energy of 4s < 3d hence, 4s is filled before 3d as decided by Aufbau rule.
- 66. Assertion :** In an atom, the energy of the electron decreases as the value of n increases.
- Reason :** In an atom, the energy of electron
- $$E \propto -\frac{1}{n^2}$$
- 67. Assertion :** Total spin of $2p^4$ electrons is 1
- Reason :** Total spin = $\frac{1}{2} \times \text{no. of unpaired electrons}$.
- 68. Assertion :** Heat of neutralization of HF(aq) . with NaOH(aq.) is less than 13.7Kcal.
- Reason :** Some heat is lost in the ionisation of a weak acid.
- 69. Assertion :** In the following reaction.
- $$\text{C(s)} + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}); \Delta H = \Delta E - RT$$
- Reason :** ΔH is related to ΔE by equation.
- $$\Delta H = \Delta E + \Delta n_g RT$$
- 70. Assertion :** As temperature increases, heat of reaction also increases for exothermic as well as for endothermic reactions.
- Reason :** ΔH varies with temperature as given by :
- $$\Delta H_2(\text{at } T_2) = \Delta H_1(\text{at } T_1) + \Delta C_p(T_2 - T_1)$$
- 71. Assertion :** The ratio by volume of $\text{NH}_3 : \text{HCl} : \text{NH}_4\text{Cl}$ is 1:1:1 in the reaction
- $$\text{NH}_3(\text{g}) + \text{HCl}(\text{g}) \longrightarrow \text{NH}_4\text{Cl}(\text{s})$$
- Reason :** Gay Lussac's law deals with gaseous reaction and solid product only.
- 72. Assertion :** The number of Oxygen atoms in 16 g of Oxygen and 16 g of O_3 are same.
- Reason :** Each of these species represent 1g atom of Oxygen.
- 73. Assertion :** The equation $PV=nRT$ does not applicable to real gas.
- Reason :** For real gases the attractive forces between the molecules can not be neglected.
- 74. Assertion :** Helium shows only positive deviation from ideal behaviour.
- Reason :** Helium is chemically inert noble gas.
- 75. Assertion :** In CsCl crystal, the co-ordination number of Cs^+ ions is 6.
- Reason :** Cl^- ions in CsCl adopt B.C.C arrangement.
- 76. Assertion :** In third energy level there is no f-subshell.
- Reason :** For $n=3$, the possible value of ℓ are 0, 1 and 2.
- 77. Assertion :** Size of the nucleus is very small as compared with size of the atom.
- Reason :** Almost all the mass of the atom is concentrated in the nucleus.
- 78. Assertion :** Isotopes of an element have almost similar chemical properties.
- Reason :** Isotopes have same electronic configuration.
- 79. Assertion :** The orbital angular momentum of 2s-electron is equal to that of 3s-electron.
- Reason :** The orbital angular momentum is given by the relation $\frac{\hbar}{2\pi}\sqrt{\ell(\ell+1)}$ and the value of ℓ is same for 2s-electron and 3s-electron.

- 80. Assertion :** The chemical reaction,
 $3\text{H}_2(\text{g}) + \text{N}_2(\text{g}) \longrightarrow 2\text{NH}_3(\text{g})$
should be exothermic.
- Reason :** The process passes into equilibrium state when ΔG becomes zero.
- 81. Assertion :** $\Delta H^\circ = \sum(\Delta_f H^\circ)_P - \sum(\Delta_f H^\circ)_R$
- Reason :** ΔH of the reaction does not change with changes in temperature of the reaction.
- 82. Assertion :** Both ΔH_{cyclic} and ΔE_{cyclic} are equal to zero.
- Reason :** Cyclic process is another name of reversible process.
- 83. Assertion :** K_p is related to K_c by the relation
 $K_p = K_c (RT)^{\Delta n}$
- Reason :** K_p has same dimensions as K_c .
- 84. Assertion :** For the reaction, $\text{N}_2 + \text{O}_2 \rightleftharpoons 2\text{NO}$, increase in pressure at equilibrium has no effect on the reaction.
- Reason :** The reaction is not accompanied by any change in number of moles of gaseous species.
- 85. Assertion :** For a sparingly soluble salt, K_{sp} is the maximum value of ionic product of ions in a saturated solution.
- Reason :** K_{sp} corresponds to the ionic product of the salt in a saturated solution.
- 86. Assertion :** pH of 10^{-3} M HCl is equal to 3
- Reason :** HCl being a strong acid is completely ionized.
- 87. Assertion :** pH of a buffer solution does not change on dilution.
- Reason :** On dilution the ratio of concentration of salt and acid (or base) remains unchanged.
- 88. Assertion :** An aqueous solution of NH_4NO_3 is acidic in character.
- Reason :** NH_4NO_3 in an aqueous solution undergoes anionic hydrolysis.
- 89. Assertion :** For zero order reaction, the rate vs time graph is a straight line parallel to x-axis.
- Reason :** The rate of change of concentration per unit time in zero order reaction remains constant.
- 90. Assertion :** Catalyst increases the rate of a reaction.
- Reason :** It lowers threshold energy of the reaction.
- 91. Assertion :** Molarity of 0.02N solution of HNO_3 is 0.02 M.
- Reason :** Molarity and normality of a solution are always equal for any acid.
- 92. Assertion :** 0.02m solutions of urea and sucrose will freeze at same temp.
- Reason :** Freezing point of solution decreases with increase the concentration of solution.
- 93. Assertion :** Relative lowering of vapour pressure is equal to mole fraction of the solvent.
- Reason :** Relative lowering of vapour pressure is not a colligative property.
- 94. Assertion :** In the reaction,
 $\frac{1}{2} \text{O}_2 + \text{F}_2 \rightarrow \text{OF}_2$, F_2 is oxidant.
- Reason :** Fluorine cannot show positive oxidation state.
- 95. Assertion :** Conductivity of 0.1 M NH_4OH solution is less than that of 0.001 M NH_4OH solution.
- Reason :** Dilution increases the degree of ionization of NH_4OH .
- 96. Assertion :** CuSO_4 solution can not be stored in iron vessel.
- Reason :** Cu atoms are oxidised by iron ions.
- 97. Assertion :** Electrolysis of molten KCl produces Cl_2 at anode.
- Reason :** Electrode where reduction occurs is referred to as cathode.
- 98. Assertion :** Solution of gum in water is a lyophilic sol.
- Reason :** Solution of gum in water is an irreversible sol.
- 99. Assertion :** The equilibrium constant for the reaction
 $\text{CaSO}_4 \cdot 5\text{H}_2\text{O}(\text{s}) \rightleftharpoons \text{CaSO}_4 \cdot 3\text{H}_2\text{O}(\text{s}) + 2\text{H}_2\text{O}(\text{g})$ is
- $$K_c = \frac{[\text{CaSO}_4 \cdot 3\text{H}_2\text{O}][\text{H}_2\text{O}]^2}{[\text{CaSO}_4 \cdot 5\text{H}_2\text{O}]}$$
- Reason :** Equilibrium constant is the ratio of the product of molar concentration of the substances produced to the product of the molar concentrations of reactants with each concentrations terms raised to the power equal to the respective stoichiometric coefficient.

100. Assertion : If Q_c (reaction quotient) $<$ K_c (equilibrium constant) reaction moves in the direction of reactants. Reason : Reaction quotient is defined in the same way as equilibrium constant at any stage of the reaction.	107. Assertion : BaCO_3 is less soluble in HNO_3 than in plain water Reason : Carbonate is a weak base and reacts with the H^+ from the strong acid, causing the barium salt to dissociate.
101. Assertion : Equilibrium constant has meaning only when the corresponding balanced chemical equation is given. Reason : It's value changes for the new equation obtained by multiplying or dividing the original equation by a number.	108. Assertion : In any ionic solid (MX) with schottky defects, the number of positive and negative ions are same. Reason : Equal numbers of cation and anion vacancies are present.
102. Assertion : The value of K gives us a relative idea about the extent to which a reaction proceeds. Reason : The value of K is independent of the stoichiometry of reactants and products at the point of equilibrium.	109. Assertion : In close packing of spheres a tetrahedral void is surrounded by four spheres whereas an octahedral void is surrounded by six spheres. Reason : A tetrahedral void has a tetrahedral shape whereas an octahedral void has an octahedral shape.
103. Assertion : For a reaction $\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightleftharpoons 2\text{HI}(\text{g})$ if the volume of vessel is reduced to half of its original volume, the equilibrium constant will be doubled. Reason : According to Le-chatelier's principle reaction shifts in a direction that tends to undo the effect of the stress.	110. Assertion : At 25°C the pH of 10^{-8} N HCl solution is 8. Reason : pH of acidic solution is always below 7 at 25°C
104. Assertion : Effect of temperature on K_c or K_p depends on enthalpy change. Reason : Increase in temperature shifts the equilibrium in exothermic direction and decrease in temperature shifts the equilibrium position in endothermic direction.	111. Assertion : H_2SO_4 acts as a base in presence of HClO_4 Reason : Perchloric acid is stronger acid than H_2SO_4
105. Assertion : For a gaseous reaction $xA + yB \rightleftharpoons nC + mD, K_p = K_c$ Reason : Concentration of gaseous reactant is taken to be unity.	112. Assertion : If a solution with $\text{pH}=2$ is diluted to double the volume, the pH of the solution will fall to 1. Reason : pH is inversely proportional to the volume of the solution.
106. Assertion : pH of hydrochloric acid solution is less than that of acetic acid solution of the same concentration. Reason : In equimolar solutions, the number of titratable protons present in hydrochloric acid is less than that present in acetic acid.	113. Assertion : pH of a buffer changes with temperature. Reason : Ionic product of water (K_w) changes with temperature.
	114. Assertion : On diluting the solution of $\text{CH}_3\text{COONH}_4$ by 100 times its degree of hydrolysis doesn't change. Reason : Degree of hydrolysis for this type of salt is $h = \sqrt{\frac{K_w}{K_b \times K_a}}$

- 115. Assertion :** An aqueous solution of NH_4Br is acidic in character.
- Reason :** NH_4Br in an aqueous solution undergoes cationic hydrolysis.
- 116. Assertion :** If water is heated to 350 K, pOH will decrease.
- Reason :** K_w (ionic product of water) increases with increase in temperature.
- 117. Assertion :** NaCl solution in water will have higher pH than aqueous solution of Na_2CO_3 .
- Reason :** NaCl hydrolyses to give HCl .
- 118. Assertion :** Electrolysis of hard water produces O_2 and D_2 .
- Reason :** Heavy hydrogen is called protium.
- 119. Assertion :** In a reaction of H_2O_2 and Na_2CO_3 , hydrogen peroxide acts as an acid.
- Reason :** H_2O_2 cannot act as acid.
- 120. Assertion :** In the electrolytic reduction of alumina, cryolite is added to it.
- Reason :** Cryolite dissolves alumina readily and decrease fusion temperature.
- 121. Assertion :** Electrolysis of molten Calcium hydride produce hydrogen gas at anode.
- Reason :** Hydrogen in Calcium hydride is present as H^- ion.
- 122. Assertion :** Absolute value of E_{red}° of an electrode cannot be determined.
- Reason :** Neither oxidation nor reduction can take place alone.
- 123. Assertion :** Alkali metal can be extracted from the electrolysis of aqueous solution of their halide.
- Reason :** Alkali metal reacts with water to produce H_2 .
- 124. Assertion :** In the reaction
- $$\text{Na} + \text{H}_2\text{O} \longrightarrow \text{NaOH} + \text{H}_2$$
- Na acts as reductant.
- Reason :** Generally metal cannot show negative oxidation state.

- 125. Assertion :** Salt bridge is used generally in the electrochemical cells (Galvanic cells).
- Reason :** Salt bridge provide sufficient ions to neutralize excess ions.
- 126. Assertion :** $\text{AgCN} + \text{KCN} \longrightarrow \text{K}[(\text{Ag}(\text{CN})_2)]$
- In this reaction Ag undergoes oxidation.
- Reason :** Increment in oxidation number is called Oxidation.
- 127. Assertion :** 1- Butene on reaction with HBr in the presence of a peroxide produces 1-bromo butane.
- Reason :** It involves the formation of a primary radical
- 128. Assertion :** Alkanes containing more than three carbon atoms exhibit chain isomerism.
- Reason :** All the carbon atoms in alkanes are sp^2 hybridised.
- 129. Assertion :** Although F has more electronegativity than Cl; yet p-fluoro benzoic acid is a weaker acid than p-chloro benzoic acid.
- Reason :** Due to matching size of 2p-orbital of F and C, F has a stronger +R effect than Cl.
- 130. Assertion :** $\text{C}_2\text{H}_5\text{OH}$ is a weaker acid than phenol but it is stronger nucleophile than phenol.
- Reason :** In phenol, the lone pair of electron on oxygen are localized.
- 131. Assertion :** Reaction of CH_3OH with phenyl magnesium bromide gives benzene.
- Reason :** CH_3OH is a stronger acid than benzene.
- 132. Assertion :** Melting point of neopentane is higher than that of n-pentane but the boiling point of n-pentane is higher than that of neopentane.
- Reason :** Melting point depends upon packing of molecules in the crystal lattice while boiling point depends upon surface area of the molecules.

- 133. Assertion :** Pyrrole is less basic than pyridine.
Reason : In pyrrole, the nitrogen atom is sp^2 hybridized.
- 134. Assertion :** Ethyl acetate is more reactive than acetamide towards nucleophilic substitution reaction.
Reason : More positive charge on carbonyl carbon in ethyl acetate than acetamide.
- 135. Assertion :** Propene reacts with perbenzoic acid to produce 1, 2-epoxy propane.
Reason : In this reaction propene acts as a nucleophile.
- 136. Assertion :** Cyclopropane and propene both gives addition reactions readily.
Reason : Both are isomers of each other.
- 137. Assertion :** Acetylene reacts with sodamide to evolve NH_3 gas.
Reason : Acetylene is a weaker acid than ammonia.
- 138. Assertion :** Isocyanides are prepared by carbyl amine reaction.
Reason : Carbyl amines on reduction always give 2° amines.
- 139. Assertion :** Benzene readily undergoes electrophilic substitution reaction.
Reason : Benzene is an unsaturated compound.
- 140. Assertion :** Nitration of benzoic acid gives m-nitro benzoic acid.
Reason : Carboxyl group increases the electron density at meta-position.
- 141. Assertion :** Ethyldene chloride on treatment with aqueous KOH yield ethanal.
Reason : Ethyldene chloride is a vicinal dihalide.
- 142. Assertion :** $CH_3-C\equiv CH$ is more polar than $CH_3-CH=CH_2$.
Reason : sp carbon is more electronegative than sp^2 carbon.
- 143. Assertion :** Pyrrole can be prepared by the reaction of a acetylene with NH_3 .
Reason : Pyrrole is a homocyclic aromatic compound.
- 144. Assertion :** Benzene and Cl_2 react in the presence of light to give BHC.
Reason : BHC is also called gammexene or 666.
- 145. Assertion :** The nitrating reagent for carrying out nitration of benzene contains conc. H_2SO_4 , and conc. HNO_3 .
Reason : In the presence of conc. H_2SO_4 , HNO_3 acts as a base and produces $\overset{+}{NO}_2$ ions.
- 146. Assertion :** Glyptal is a polymer of phthalic acid and ethylene glycol.
Reason : Glyptal is a homopolymer.
- 147. Assertion :** A solution of table salt in water is homogeneous.
Reason : Solution having same composition throughout is heterogeneous.
- 148. Assertion :** The terms empirical formula and molecular formula bear the similar meaning.
Reason : Molecular formula of a compound defines the relative number of constituent atom in the simplest ratio.
- 149. Assertion :** The molecular weight of Oxygen is 32 amu.
Reason : The atomic weight of Oxygen is 16 amu and oxygen is diatomic molecule.
- 150. Assertion :** The mathematical approach to obtain the amount of the products and reactants in a chemical reaction is called stoichiometry.
Reason : The stoichiometry calculations are derived from balanced chemical equations.
- 151. Assertion :** A chemical equation represents the chemical change.
Reason : A chemical equation informs nothing about the products.
- 152. Assertion :** Molality, mole fraction and mass fraction change with temperature.
Reason : Molarity and Normality do not change with themperature.

153. Assertion : An increase in surface area increases the rate of evaporation.

Reason : Stronger the inter molecular attractive forces, faster is the rate of evaporation at a given temperature.

154. Assertion : The freezing point is the temperature at which a solid crystallizes from its solution.

Reason : The freezing point depression is the difference between the freezing point of a pure solvent and freezing point of solution.

155. Assertion : If for a non-ideal solution, $\Delta V_{\text{mix}} > 0$ and $\Delta H_{\text{mix}} > 0$, then the solution shows positive deviation.

Reason : If for solution $\Delta V_{\text{mix}}=0$ and $\Delta H_{\text{mix}}=0$ then the solution obeys the Raoult's law.

156. Assertion : When dried fruits or vegetables are placed in water, they slowly get swelled.

Reason : It happens due to phenomenon of osmosis.

157. Assertion : On addition of AgNO_3 to NaCl , precipitation occurs slowly.

Reason : The reaction is unionic.

158. Assertion : For the first order reaction half-life period is expressed as

$$t_{(1/2)} = \frac{2.303}{K} \log 2$$

Reason : The half-life time of a first order reaction is not always constant and it depends upon the initial concentration of reactants.

159. Assertion : Combustion of carbon is exothermic, but coal stored in a coal depot does not burn automatically.

Reason : Higher energy of activation is needed for burning.

160. Assertion : Small pieces of wood burn faster than a log of wood of same mass.

Reason : Surface area of small pieces is larger than the single log.

161. Assertion : In effective collision, the energy of molecules can be greater than threshold energy.

Reason : In effective collisions, molecules do not have proper orientation.

162. Assertion : During electrolysis of fused NaCl , Cl^- is reduced at cathode.

Reason : Molten NaCl conducts electricity due to the presence of Na and Cl atoms.

163. Assertion : Specific conductance of a cell depends upon area of its electrode.

Reason : Unit of cell constant is cm^{-1}

164. Assertion : Tin can displace lead from lead bromide solution.

Reason : The standard reduction potential of tin is less than that of lead.

165. Assertion : For spontaneity of cell $\text{Cu}/\text{Cu}^{+2}(\text{C}_1) \parallel \text{Cu}^{+2}(\text{C}_2)/\text{Cu}, \text{C}_1$ must be less than C_2 .

Reason : It is not a concentration cell.

166. Assertion : Ether have lower boiling points than isomeric alcohols.

Reason : Alcohols form H-bond but there is no H-bonding among ether molecules.

167. Assertion : Benzaldehyde is less reactive than acetaldehyde towards nucleophiles

Reason : Benzaldehyde is heterocyclic compound.

168. Assertion : HCHO undergoes Cannizzaro reaction.

Reason : It has α - hydrogen.

169. Assertion : Formic acid reacts with HgCl_2 .

Reason : It has a carboxylic acid group.

170. Assertion : In order to convert $\text{R}-\text{Cl}$ to pure $\text{R}-\text{NH}_2$, Gabriel phthalimide synthesis can be used.

Reason : Phthalimide synthesis can be used to prepare pure 1° or 2° or 3° amines separately with proper choice of alkyl halide.

- 171. Assertion :** Nitrobenzene does not undergo Friedel-Crafts-reaction.
- Reason :** Nitrogroup in nitrobenzene deactivates the benzene ring.
- 172. Assertion :** Tertiary nitroalkanes cannot tautomerise to aciform.
- Reason :** Tertiary nitroalkanes do not contain α -hydrogen.
- 173. Assertion :** During acid catalysed esterification Oxygen atom of alcohol is present in ester molecule.
- Reason :** Esterification is a reversible reaction.
- 174. Assertion :** Anisole undergoes electrophilic substitution at *o*- and *p*- positions.
- Reason :** Anisole is aromatic compound.
- 175. Assertion :** 2-Pentanol and 3-Pentanol cannot be distinguished by iodoforn test.
- Reason :** 2-Pentanol and 3-Pentanol both are primary alcohols.
- 176. Assertion :** In formaldehyde, all the four atoms are in the same plane.
- Reason :** The carbon atom in formaldehyde is sp^2 - hybridised.
- 177. Assertion :** α -Hydrogen atoms in aldehydes and ketones are acidic.
- Reason :** Anion formed after loss of α -hydrogens are stabilized due to its +I effect.
- 178. Assertion :** Ethers behave as bases in the presence of acids.
- Reason :** This is due to the presence of lone pairs of electrons on oxygen.
- 179. Assertion :** At the isoelectric point of an amino acid it does not migrate under the influence of an electric field.
- Reason :** An amino acid at the isoelectric point exists as a zwitter ion whose net charge is zero.
- 180. Assertion :** The main product of reaction of silver nitrite with ethyl bromide is nitroethane.
- Reason :** Silver nitrite is ionic compound.
- 181. Assertion :** Acylation of aniline increases the reactivity of benzene ring as compared with aniline.
- Reason :** Acylation of aniline results in decrease in electron density at the benzene ring.
- 182. Assertion :** Nitration of nitrobenzene using nitrating mixture yields m-nitrobenzene.
- Reason :** Nitro group at benzene ring lowers the electron density at the *m*-position only.
- 183. Assertion :** In isocyanide test, the alkyl isocyanide are converted into 1° amine.
- Reason :** Alkyl isocyanide is an isomer of 1° amine.
- 184. Assertion :** Tertiary amines give alkanes with alkyl magnesium halide.
- Reason :** Tertiary amines contain active -H.
- 185. Assertion :** Phenol generally does not show protonation reaction.
- Reason :** Lone pair of electrons in phenol is stable by resonance.
- 186. Assertion :** Heterolytic fission involves the breaking of a covalent bond in such a way that both the electrons of the shared pair are carried away by one of the atoms.
- Reason :** Heterolytic fission occurs readily in polar covalent bonds.
- 187. Assertion :** Cyclohexanone exhibits keto-enol tautomerism.
- Reason :** For cyclohexanone, one form contains the keto group ($C=O$) while other contains enolic group ($-C=C-OH$).
- 188. Assertion :** Staggered form is less stable than the eclipsed form.
- Reason :** The conformation in which the bond pairs of two central atoms are very far from one another is called staggered form.
- 189. Assertion :** Carbon-oxygen bonds are of equal length in carbonate ion.
- Reason :** Bond length decreases with the multiplicity of bond between two atoms.

190. **Assertion** : Isobutane on oxidation with KMnO_4 gives tert-butyl alcohol.

Reason : Generally oxidising agents have no effect on alkanes.

191. **Assertion** : 2-Butanol on heating with H_2SO_4 gives major product as 2-butene.

Reason : Dehydration of 2-butanol takes place according to Saytzeff rule.

192. **Assertion** : Propene reacts with HBr in presence of benzoyl peroxide to yield 2-bromopropane.

Reason : In presence of peroxide, the addition of HBr to propene follows ionic mechanism.

193. **Assertion** : Benzene is used as a solvent for the Friedel-Craft's alkylation of nitrobenzene.

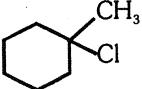
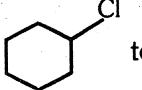
Reason : Friedel-Craft's reaction is used to introduce an alkyl or acyl group at nitrobenzene.

194. **Assertion** : Benzene reacts with CH_3COCl to give chlorobenzene.

Reason : Chlorination is an electrophilic substitution reaction.

195. **Assertion** : Alkyl halides form alkenes when heated above 300°C , in presence of base

Reason : $\text{CH}_3\text{CH}_2\text{l}$ react slowly with strong base as compare to $\text{CD}_3\text{CH}_2\text{l}$.

196. **Assertion** :  is less reactive than  towards S_{N}^1 reactions.

Reason : Tertiary alkyl halides react predominantly by S_{N}^1 mechanism.

197. **Assertion** : Aryl halides undergo electrophilic substitutions more readily than benzene.

Reason : Aryl halide gives a mixture of o-and p-products.

198. **Assertion** : Addition of Br_2 to cis-but-2-ene gives racemic mixture.

Reason : It is electrophilic addition reaction.

199. **Assertion** : Nucleophilic substitution reaction on an optically active alkyl halide gives a mixture of enantiomers.

Reason : The reaction occurs by S_{N}^1 mechanism.

200. **Assertion** : Tert-butyl alcohol undergoes acid catalysed dehydration readily than propanol.

Reason : 3°-alcohols in elimination follow E_1 mechanism.

201. **Assertion** : HIO_4 cleaves 1,2-glycols but not 1,3- or higher glycols.

Reason : Only 1,2-glycols form cyclic esters which subsequently undergo cleavage to form carbonyl compounds.

202. **Assertion** : $(\text{CH}_3)_3\text{C}-\text{Br}$ and $\text{CH}_3\text{CH}_2\text{ONa}$ react to form $(\text{CH}_3)_3\text{C}-\text{O}-\text{CH}_2\text{CH}_3$.

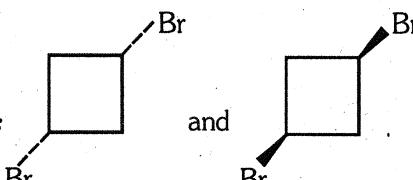
Reason : Good yields of ethers are obtained when tert-alkyl halides are treated with alkoxides.

203. **Assertion** : Ammonolysis of alkyl halides involves the reaction between alkyl halides and alcoholic ammonia.

Reason : Reaction can be used to prepare only 2° amines.

204. **Assertion** : Carbylamine reaction involves the reaction between 1° amine and chloroform in basic medium.

Reason : In carbylamine reaction, $-\text{NH}_2$ group is converted into $-\text{NC}$ group.

- 205. Assertion :** In water, orthoboric acid behaves as a weak monobasic acid.
- Reason :** In water, orthoboric acid acts as a proton donor.
- 206. Assertion :** p-Hydroxybenzoic acid has a lower boiling point than o-hydroxybenzoic acid.
- Reason :** o-Hydroxybenzoic acid has intermolecular hydrogen bonding.
- 207. Assertion :** Boron always forms covalent bond.
- Reason :** The small size of B^{3+} favours formation of covalent bond.
- 208. Assertion :** Glucose gives a reddish-brown precipitate with Fehling's solution.
- Reason :** Reaction of glucose with Fehling's solution gives CuO and gluconic acid.
- 209. Assertion :** Band gap in germanium is small.
- Reason :** The energy spread of each germanium atomic energy level is infinitesimally small.
- 210. Assertion :** Alkali metals dissolve in liquid ammonia to give blue solutions.
- Reason :** Alkali metals in liquid ammonia give solvated species of the type $[M(NH_3)_n]^+$ (M = alkali metals).
- 211. Assertion :** Molecules that are not superimposable on their mirror images are chiral.
- Reason :** All chiral molecules have chiral carbons.
- 212. Assertion :** Glycerol is purified by distillation under reduced pressure.
- Reason :** Organic compounds in liquid state are purified by distillation.
- 213. Assertion :** Polarisation of one σ bond caused by the polarisation of adjacent σ bond is referred to as the inductive effect.
- Reason :** The substituents can be classified as electron withdrawing or electron donating groups relative to hydrogen.
- 214. Assertion :** Allyl and benzyl carbocations are stable than propyl carbocations.
- Reason :** Electron releasing groups stabilize carbocations.
- 215. Assertion :** Chirality is the essential condition for a molecule to be optically active.
- Reason :** Chiral molecules can rotate the plane polarised light in clock wise or anti clock wise direction.
- 216. Assertion :** Structural isomers have different physical and chemical properties.
- Reason :** Structural isomers have different skeleton of σ covalent bonds so have different stability and polarity which affect the chemical and physical properties of the compounds.
- 217. Assertion :** cis and trans -2-Butene have different boiling point.
- Reason :** Geometrical isomers have different polarities so have different physical properties.
- 218. Assertion :**  are stereoisomers.
- Reason :** Stereoisomers have different orientation of group in space.
- 219. Assertion :** Corey-House reaction can be used to prepare both symmetrical and unsymmetrical alkanes.
- Reason :** The reaction involves the interaction between lithium dialkyl copper with an alkyl halide both of which may contain even or odd number carbon atoms.
- 220. Assertion :** All the hydrogen atoms in $CH_2=C=CH_2$ lie in one plane.
- Reason :** All the carbon atoms are sp^2 hybridized.

221. Assertion : But-2-ene shows geometrical isomerism but but-1-ene does not show.

Reason : Geometrical isomerism arises due to the restricted rotation of the double bond.

222. Assertion : Oxidation of toluene with chromyl chloride to get benzaldehyde is carried out in the presence of acetic anhydride.

Reason : Presence of $-\text{CH}_3$ group in toluene activates benzene ring.



223. Assertion : Tropylium cation is aromatic in nature

Reason : The only property that determines its aromatic behaviour is its planar structure.

224. Assertion : S_{N}^1 mechanism is facilitated by polar protic solvents like water, alcohol etc.

Reason : $\text{C}_6\text{H}_5\text{CH}(\text{C}_6\text{H}_5)\text{Br}$ is less reactive than $\text{C}_6\text{H}_5\text{CH}(\text{CH}_3)\text{Br}$ in S_{N}^1 reactions.

225. Assertion : $(\text{CH}_3)_3\text{C}-\text{OH}$ undergoes esterification faster than CH_3OH .

Reason : The reaction between an acid and alcohol in presence of dry HCl gas to give ester is known as esterification process.

226. Assertion : Reaction of phenol with CCl_4 in NaOH at 340 K gives salicylic acid as the major product.

Reason : The reaction occurs through intermediate formation of CHCl_2^+

227. Assertion : Acidic character of alcohols follows the order Primary > secondary > tertiary.

Reason : Acidic character of alcohols is due to the presence of polar $-\text{O}-\text{H}$ group.

228. Assertion : Benzoic acid does not give Friedel-Craft's reaction.

Reason : Benzoic acid is obtained by oxidation of toluene with $\text{K}_2\text{Cr}_2\text{O}_7/\text{H}^+$.

229. Assertion : Fluoroacetic acid is stronger than chloroacetic acid.

Reason : Carboxylic acids turn blue litmus red.

230. Assertion : Pure HCN reacts with aldehydes and ketones.

Reason : Addition of HCN to carbonyl compounds does not give cyanohydrins.

231. Assertion : CH_3CHO reacts with NH_3 to form urotropine.

Reason : Urotropine is used as medicine in case of urinary troubles.

232. Assertion : Alkyl cyanide can be prepared by carbylamine reaction.

Reason : Ethyl amine when heated with chloroform in presence of alcoholic KOH, cyanide is formed.

233. Assertion : A spectral line will be observed for a $2p_x - 2p_y$ transition.

Reason : The energy is released in the form of wave of light when electron drops from $2p_x$ to $2p_y$ orbital.

234. Assertion : The presence of a large number of Schottky defects in NaCl lowers its density.

Reason : In NaCl , there are approximately 10^6 Schottky pairs per cm^3 at room temperature.

235. Assertion : Azeotropic mixtures are formed only by non ideal solutions and they may have boiling points either greater than both the components or less than both components.

Reason : The composition of the vapour phase is same as that of the liquid phase of an azeotropic mixture.

236. Assertion : According to Le Chatelier's principle addition of heat to an equilibrium solid \rightleftharpoons liquid results in decrease in the amount of solid.

Reason : Reaction is endothermic, so on heating forward reaction is favoured.

237. Assertion : In the third group of qualitative analysis, NH_4OH is added in NH_4Cl medium.	245. Assertion : To precipitate the cations of fourth group in qualitative analysis, medium is made alkaline before passing H_2S gas.
Reason : This is to convert the ions of group into their respective chlorides.	Reason : This is done to suppress the ionisation of H_2S .
238. Assertion : The pK_a of a weak acid becomes equal to pH of the solution at the midpoint of its titration.	246. Assertion : The rate of the reaction is the rate of change of concentration of a reactant or a product per unit time.
Reason : The molar concentrations of proton acceptor and proton donor become equal at the midpoint of titration of a weak acid.	Reason : Rate of reaction remains constant during the complete reaction.
239. Assertion : The order of the reaction $\text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O} \rightarrow \text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH}$ is 2.	247. Assertion : If in a zero order reaction , the concentration of the reactant is doubled, the half-life period is also doubled.
Reason : The molecularity of this reaction is 2.	Reason : For a zero order reaction, the rate of reaction is independent of initial concentration.
240. Assertion : Many endothermic reactions that are not spontaneous at room temperature become spontaneous at high temperature.	248. Assertion : A process is called adiabatic if the system does not exchange energy with the surroundings.
Reason : Entropy of the system increases with increase in temperature.	Reason : It does not involve increase or decrease in temperature of the system.
241. Assertion : The molality of the solution does not change with change in temperature.	249. Assertion : Molar heat capacity of a substance is the quantity of heat required to raise the temperature of one gram mass of a substance by one degree celcius.
Reason : The molality is expressed in unit of moles per 1000 gm of solvent.	Reason : Molar heat capacity of solids are approximately equal to one another.
242. Assertion : In diffusion the flow of solvent molecules occur in one direction only through semipermeable membrane.	250. Assertion : For the combustion reactions, the value of ΔH is always negative.
Reason : In osmosis the flow of solvent molecules occur in both directions through semipermeable membrane.	Reason : The combustion reactions are always endothermic.
243. Assertion : Mixture of CH_3COOH and $\text{CH}_3\text{COONH}_4$ is an example of acidic buffer.	251. Assertion : The dissolution of gases in water proceed with negative value of ΔS .
Reason : Acidic buffer contains equimolar mixture of weak acid and its salt with weak base.	Reason : The dissolution of gases in water always an endothermic process.
244. Assertion : Ice \rightleftharpoons water, if pressure is applied water will freeze.	252. Assertion : Heat of neutralisation of perchloric acid, (HClO_4) with NaOH is same as that of HCl with NaOH .
Reason : Increase of pressure pushed the equilibrium towards the side in which number of gaseous mole decreases.	Reason : Both HCl and HClO_4 are strong acids.

- 253. Assertion :** If an aqueous solution of NaCl is electrolysed, the product obtained at the cathode is H₂ gas and not Na.
- Reason :** Gases are liberated faster than the metals.
- 254. Assertion :** In corrosion, a metal is reduced by gain of electrons.
- Reason :** Corrosion does not coat the surfaces of metallic objects with oxides.
- 255. Assertion :** The conductivity of solutions of different electrolytes in the same solvent and at a given temperature is same
- Reason :** The conductivity depends on the charge and size of the ions in which they dissociate, the concentration of ions or ease with which the ions move under potential gradient.
- 256. Assertion :** One mole of NaCl contains 6.023×10^{23} molecules of NaCl.
- Reason :** 58.5g of NaCl also contains 6.023×10^{23} molecules of NaCl.
- 257. Assertion :** Ionization enthalpy is the energy released to remove an electron from an isolated gaseous atom in its ground state.
- Reason :** Every element has a tendency to lose the electron to attain the stable configuration.
- 258. Assertion :** More is the electron affinity greater is the reducing character.
- Reason :** Reducing character depends on number of electrons gained.
- 259. Assertion :** Properties of atom and its corresponding ions remain same.
- Reason :** Electronic configuration of both atom and its corresponding ions remain same.
- 260. Assertion :** Geometry of NH₃ molecule is tetrahedral.
- Reason :** In NH₃, nitrogen is sp³ hybridized.
- 261. Assertion :** ClF₃ molecule is isoelectronic with SF₄ but its shape is T-shaped.
- Reason :** Five electron pairs present in SF₄ in total consist of two lps and three bps.
- 262. Assertion :** In change from PCl₃ \rightarrow PCl₅, the hybrid state of P remain same.
- Reason :** d-orbitals are not available for P to expand its octet.
- 263. Assertion :** The oxygen-oxygen bonds in the O₃ molecule are intermediate between a single and double bond.
- Reason :** Resonance averages the bond characteristic as whole.
- 264. Assertion :** In HClO₄, chlorine has the oxidation number of +4.
- Reason :** HClO₄ (perchloric acid) has two peroxide linkages.
- 265. Assertion :** Oxidation state of nitrogen in N₃H is +3.
- Reason :** Nitrogen is more electronegative than hydrogen
- 266. Assertion :** Bromide ion is serving as a reducing agent in a reaction.
- $$2\text{MnO}_4^-(\text{aq}) + \text{Br}^-(\text{aq}) + \text{H}_2\text{O}(\text{l}) \rightarrow$$
- $$2\text{MnO}_2(\text{aq}) + \text{BrO}_3^-(\text{aq}) + 2\text{OH}^-(\text{aq})$$
- Reason :** Oxidation number of Br increases from -1 to 5.
- 267. Assertion :** Salt like KCl, KNO₃, i.e. inert electrolytes are used in salt bridge.
- Reason :** An inert electrolyte can easily be filled in the U-tube.
- 268. Assertion :** Aluminium metal is used as a reducing agent in the extraction of chromium.
- Reason :** Copper pyrite is an ore of copper.
- 269. Assertion :** Leaching is a process of reduction.
- Reason :** Leaching involves treatment of the ore with a suitable reagent so as to make it soluble complex while impurities remains insoluble.
- 270. Assertion :** Baeyer's process is used for refining of bauxite ore.
- Reason :** Red bauxite contains iron oxide which is removed in Baeyer's process.
- 271. Assertion :** Pure iron when heated in a dry air is covered with a layer of rust.
- Reason :** Rust has the composition Fe₃O₄.

- 272. Assertion :** Para-hydrogen with lower energy is favoured at high temperatures.
- Reason :** The thermal conductivity of para-hydrogen is lesser than that of ortho-hydrogen.
- 273. Assertion :** Saline hydrides are non-volatile, non-conducting and crystalline solids.
- Reason :** Saline hydrides are compounds of hydrogen with p-block element.
- 274. Assertion :** Water is an excellent solvent.
- Reason :** Water is easily obtainable among all chemical compounds.
- 275. Assertion :** Sodium reacts with excess oxygen to form Na_2O_2 whereas potassium reacts with excess oxygen to form KO_2 .
- Reason :** Potassium is more reactive than sodium.
- 276. Assertion :** Helium and beryllium have similar outer electronic configuration of the type ns^2 .
- Reason :** Both are chemically inert.
- 277. Assertion :** Sodium ions are discharged in preference to hydrogen ions at a mercury cathode.
- Reason :** The nature of cathode can affect the order of discharge of cations.
- 278. Assertion :** Li^+ ion has the lowest mobility in aqueous solutions among alkali metal ion.
- Reason :** Lithium has higher ionization energy.
- 279. Assertion :** Among nitrogen halides NX_3 , the dipole moment is highest for NI_3 and lowest for NF_3 .
- Reason :** Nitrogen halides NX_3 , have pyramidal structure.
- 280. Assertion :** Nitrogen is unreactive at room temperature but becomes reactive at elevated temperatures or in presence of catalyst.
- Reason :** In nitrogen molecule there is extensive delocalization of electrons.
- 281. Assertion :** In SO_2 , the bond angle is 119° whereas in SO_3 , the bond angle is 120°
- Reason :** S atom in both SO_2 and SO_3 is sp^2 -hybridized.
- 282. Assertion :** Silver fluoride is insoluble in water.
- Reason :** Hydration energy of AgF is higher than its lattice energy.
- 283. Assertion :** $\text{Ti}(\text{H}_2\text{O})_6^{3+}$ is a coloured ion.
- Reason :** Ti shows +2, +3, +4 oxidation states due to $4s^2$ and $3d^2$ electrons.
- 284. Assertion :** On adding KI to blue CuSO_4 solution, the colour changes to dark brown.
- Reason :** This is due to the formation of CuO .
- 285. Assertion :** Most of the trivalent lanthanide ions are coloured both in the solid state and in aqueous solution.
- Reason :** The elements with xf electrons have a similar colour to those of $(14-x)f$ electrons.
- 286. Assertion :** $[\text{Ni}(\text{CO})_4]$ has square planar geometry while $[\text{Ni}(\text{CN})_4]^{2-}$ has tetrahedral geometry.
- Reason :** Geometry of any complex depends upon the nature of ligands attached.
- 287. Assertion :** $[\text{Al}(\text{H}_2\text{O})_6]^{3+}$ is a stronger acid than $[\text{Mg}(\text{H}_2\text{O})_6]^{2+}$
- Reason :** Size of $[\text{Al}(\text{H}_2\text{O})_6]^{3+}$ is smaller than $[\text{Mg}(\text{H}_2\text{O})_6]^{2+}$ and possesses more effective nuclear charge.
- 288. Assertion :** $[\text{Al}(\text{NH}_3)_6]^{3+}$ does not exist in aqueous solution.
- Reason :** NH_3 is a neutral ligand.
- 289. Assertion :** All the octahedral complexes of Ni^{2+} must be outer orbital complexes.
- Reason :** Outer orbital octahedral complexes are given by weak ligands.
- 290. Assertion :** 3rd period elements has greater electron affinity than 2nd period elements.
- Reason :** 3rd period elements has 3d orbitals.
- 291. Assertion :** $\text{K}_2\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3$ is not a complex compound.
- Reason :** It does not give an ionisation complex ion.

- 292. Assertion :** $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$ gives white ppt with AgNO_3 .
Reason : It contains free chloride ion.
- 293. Assertion :** CaCO_3 is an organometallic compound.
Reason : Ca is a s-Block metal.
- 294. Assertion :** Square planer complex Mabcd has three geometrical isomers.
Reason : It is an optically inactive.
- 295. Assertion :** NF_3 is a weaker ligand than NH_3 .
Reason : Strong - I effect of Fluorine.
- 296. Assertion :** CCl_4 is neither Lewis acid nor Lewis base.
Reason : It is non planar.
- 297. Assertion :** NaCl is soluble in water
Reason : In NaCl U > H
- 298. Assertion :** Melting point of Li is highest in group.
Reason : Li is the smallest in group.
- 299. Assertion :** FI_3 does not exist.
Reason : Large size of I atom.
- 300. Assertion :** NO & N_2O are neutral.
Reason : NO & NO_2 are inorganic compounds.
- 301. Assertion :** Be is not alkaline earth metal.
Reason : Be is Amphoteric.
- 302. Assertion :** EN of F is the lowest in group.
Reason : F has more Zeff.
- 303. Assertion :** IP of B is more than Be.
Reason : B has more Zeff.
- 304. Assertion :** Size of K^+ is smaller than Ba^{+2} .
Reason : K^+ has less number of shell than Ba^{+2} .
- 305. Assertion :** He is a p-block element.
Reason : He is smallest in group.
- 306. Assertion :** Fe^{+3} gives H_2 with HCl .
Reason : Fe^{+3} is above H in ECS.

- 307. Assertion :** Bond Energy of O-D is more than O-H.
Reason : D is isotope of H.
- 308. Assertion :** H_2O_2 is more acidic than H_2O .
Reason : H_2O_2 is half open book like but H_2O is planer.
- 309. Assertion :** Dielectric constant of D_2O is more than H_2O .
Reason : D_2O is heavier than H_2O .
- 310. Assertion :** H_2O_2 can be prepared by KO_2 & H_2SO_4 .
Reason : KO_2 is superoxide.
- 311. Assertion :** BCl_3 is more acidic than AlCl_3 .
Reason : BCl_3 contain back donation.
- 312. Assertion :** Bond energy of O-H is greater than S-H.
Reason : S-H has more size difference.
- 313. Assertion :** CCl_4 can not be hydrolysed but BCl_3 hydrolyse.
Reason : CCl_4 has no vacant 'd' orbital.
- 314. Assertion :** Tl^+ is more stable than Tl^{+3} .
Reason : Tl contains inert pair effect.
- 315. Assertion :** Borazole is called an inorganic benzene.
Reason : Borazole is planer, like benzene.
- 316. Assertion :** Density of K is more than Na.
Reason : K has more mass than Na.
- 317. Assertion :** Hydration energy of Li^+ is greater than Be^{+2} .
Reason : Li^+ contains more Zeff.
- 318. Assertion :** Be does not give flame test.
Reason : It contains high IP.
- 319. Assertion :** Na does not form super oxide.
Reason : Absence of vacant 'd' orbital in Na.
- 320. Assertion :** Na_4C is not possible but Li_4C is possible.
Reason : Na^+ is larger than Li^+ .

321. Assertion : Ag_2S can not be concentrated by froth floatation process.	Reason : Lumps of Ag settle down with impurities.	333. Assertion : The pressure of a fixed amount of an ideal gas is proportional to its temperature.
322. Assertion : Ag_2O gives Ag & O_2 on heating.	Reason : Due to low oxygen affinity Ag_2O is more oxidising metal oxide.	Reason : Frequency of collisions does not increase with temperature.
323. Assertion : ZnO is an amphoteric.	Reason : Zn react with acid as well as base.	334. Assertion : The unit of 'a' in vander Waal's equation is atm $\text{L}^2 \text{ mol}^{-2}$.
324. Assertion : Hg is liquid at room temp.	Reason : Hg is the smallest in group.	Reason : At relatively high pressure vander Waal's equation reduces to $\text{PV}_m = RT + Pb$
325. Assertion : Na_2CO_3 gives Na_2O & CO_2 on heating.	Reason : Na_2CO_3 is more covalent.	335. Assertion : The p-orbital is dumb-bell shaped.
326. Assertion : 32 g of O_2 and 48 g of O_3 have same number of atoms.	Reason : Number of moles of O_2 and O_3 are different.	Reason : Electrons present in p-orbital can have any one of the three values of magnetic quantum number i.e., +1, 0, -1.
327. Assertion : At NTP 64g of SO_2 and 80g of SO_3 will occupy same volume.	Reason : At NTP 1 mol of any gas occupies 22.4 litre.	336. Assertion : Energy of 3d-orbital is more than 4s-orbital.
328. Assertion : In the reaction $\text{A} + 2\text{B} \longrightarrow \text{C} + 2\text{D}$ 1 gram equivalent of A reacts with 2 gram equivalent of B.	Reason : Reactants react according to different equivalent.	Reason : Orbital energy is calculated $(n+\ell)$ rule.
329. Assertion : 35 g and 35.0 g both have two significant figure.	Reason : Zeros are never significant.	337. Assertion : Most of the α - particles striking gold foil in Rutherford's experiment were deflected.
330. Assertion : Dalton's law of partial pressure is not of applicable for reactive gases.	Reason : The average kinetic energy of a gas is directly proportional to the absolute temp.	Reason : The size of nucleus is very small as compared to the size of atom.
331. Assertion : The vander Waal's gas constants 'a' and 'b' are depend on nature of gases.	Reason : Volume of ideal gas is less than the volume of real gas.	338. Assertion : 2p-orbitals do not have any spherical node.
332. Assertion : Universal gas constant does not depend upon the unit of measurment.	Reason : Graham's diffusion law is applicable for reacting gases.	Reason : The number of spherical nodes in p-orbitals is given $(n-2)$, where n is principal quantum number.
		339. Assertion : KMnO_4 acts as oxidant only.
		Reason : Mn is in its highest oxidation state.
		340. Assertion : When Zn strip is added to a solution of CuSO_4 , blue colour of CuSO_4 disappears.
		Reason : Zn reduces $\text{Cu}_{(aq)}^{2+}$ to $\text{Cu}_{(aq)}^+$ ions.
		341. Assertion : Both KMnO_4 , KClO_4 act as oxidant only while HNO_2 , HNO_3 act as reductant only.
		Reason : In these molecules central atom is in its highest oxidation state.
		342. Assertion : In H_2SO_5 , O.N. of S is +6.
		Reason : There is one peroxide linkage.

343. Assertion : HClO_4 is a stronger acid than HClO_3 .

Reason : Oxidation state of Cl in HClO_4 is +7 and in HClO_3 +5.

344. Assertion : Decrease in Gibb's free energy causes spontaneous reaction.

Reason : Spontaneous reactions are invariably exothermic.

345. Assertion : Heat of neutralization of HF is more than that of HCl.

Reason : HCl is stronger acid than HF.

346. Assertion : Standard enthalpy of formation of diamond is taken as zero.

Reason : In its most stable form the standard enthalpy of formation is taken as zero.

347. Assertion : Hess's law is an extension of I law of thermodynamics.

Reason : It is used to calculate the energy of steps which are practically impossible.

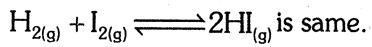
348. Assertion : Combustion of N_2 to given NO is endothermic.

Reason : N≡N bond is very strong and so has high bond energy.

349. Assertion : Dissolution of CaO is disfavoured at high temperature.

Reason : The dissolution is exothermic.

350. Assertion : Value of K_p and K_c for the reaction



Reason : Because Δn is zero for this reaction.

351. Assertion : There is no effect of pressure on the dissociation equilibrium.

Reason : High pressure favours that reaction in which number of moles increases.

352. Assertion : At high pressure melting of ice is favoured.

Reason : Density of ice is less than water.

353. Assertion : Mixing of inert gas at constant volume does not effect the equilibrium.

Reason : At constant volume concentration of reactant and product remain unchanged.

354. Assertion : 0.1 M NaCN + 0.05 MHCl solution on mixing in equal volume forms a buffer solution.

Reason : The solution is a mixture of salt and acid, thus acts as a buffer.

355. Assertion : The pH of pure water is less than 7 at 60° C.

Reason : As the temperature increases, pure water becomes slightly acidic.

356. Assertion : Heat of neutralization of CH_3COOH vs NaOH is numerically less than 57.1 kJ/eq.

Reason : Some heat is used to ionise weak acetic acid.

357. Assertion : If a solution with pH = 3 is diluted to double the volume, then pH of the solution will fall to 2.699

Reason : pH is inversely proportional to the volume of the solution.

358. Assertion : Addition of NaCN to a saturated solution of AgCN increases the solubility of AgCN.

Reason : NaCN produces common ion effect when added to a saturated solution of AgCN.

359. Assertion : Amorphous solids are isotropic.

Reason : Amorphous solids lack a regular three dimensional arrangement of atoms.

360. Assertion : For fluorite structure, the F^- ions occupy tetrahedral void and Ca^{+2} ions are in CCP.

Reason : The radius ratio of fluorite structure is 0.414.

361. Assertion : In NaCl structure, Na^+ ions occupy octahedral holes and Cl^- ions occupy CCP.

Reason : The distance between nearest neighbours in NaCl structure is $a/2$ where a is the edge length of the cube.

362. Assertion	: Crystalline solids exhibit long range order.
Reason	: Crystalline solids have irregular arrangement of particles.
363. Assertion	: Strength and Normality are two different methods of expressing the concentration of a solution.
Reason	: Strength is always equal to normality of a solution.
364. Assertion	: If 100 cc of 0.1 N HCl is mixed with 100 CC of 0.2 N HCl, the normality of the final solution will be 0.30.
Reason	: Normality of Similar solution like HCl can be added
365. Assertion	: NaCl in water and organic acids in benzene show abnormal molecular mass.
Reason	: Abnormal molecular mass is obtained when the substance in the solution undergoes dissociation or association.
366. Assertion	: The boiling point of 0.1 m urea solution is less than that of 0.1 m KCl solution.
Reason	: Elevation of boiling point is directly proportional to the number of solute species present in the solution.
367. Assertion	: If a liquid solute more volatile than the solvent, is added to the solvent, the vapour pressure of the solution may increases i.e. $P_S > P_{\text{solvent}}^{\circ}$.
Reason	: In the presence of a more volatile liquid solute, only the solute will form the vapours and solvent will not.
368. Assertion	: In a multistep reaction, the molecularity of over all reaction has no significance.
Reason	: In multistep reaction molecularity refers to the order of rate determining step.
369. Assertion	: Hydrolysis of ethyl acetate in acidic medium is pseudo unimolecular first order reaction.
Reason	: $\text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O} \xrightarrow{\text{H}^{\oplus}} \text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH}$. water does not take part in this reaction

370. Assertion	: Fraction of total molecules having energy equal to or greater than activation energy = $\frac{K}{A} = e^{-E_a/RT}$
Reason	: Activation energy of a chemical reaction is always constant at a given temperature.
371. Assertion	: Temperature coefficient of the reaction lie between 2 to 3.
Reason	: The rate of a reaction increase between 2 to 3 times by 10°C rise in temperature.
372. Assertion	: In first order reaction successive half lives are equal.
Reason	: Half life of first order reaction does not depend on initial concentration of reactants.
373. Assertion	: 1 Faraday charge liberates 5.6 litre O_2 at S.T.P., during the electrolysis of water.
Reason	: Equivalent volume of O_2 is 11.2 litre at S.T.P.
374. Assertion	: Lead storage battery is a secondary cell.
Reason	: It works as galvanic cell while discharging and electrolytic cell while recharging.
375. Assertion	: In electrolysis the quantity of electricity needed for depositing 1 mole of silver is different from that required for 1 mole of copper.
Reason	: The molecular weights of silver and copper are different.
376. Assertion	: According to Kohlrausch's law, the molarconductance of a strong electrolyte at infinite dilution is sum of molar conductances of its ions.
Reason	: The current carried by cation and anion in always equal.
377. Assertion	: For the Daniell cell,
	$\text{Zn} \text{Zn}^{2+} \parallel \text{Cu}^{2+} \text{Cu}$
	with $E_{\text{Cell}}^{\circ} = 1.1$ volt, the application of opposite potential greater than 1.1 volt, results into flow of electrons from cathode to anode.
Reason	: Zn is deposited at anode and Cu is dissolved at cathode.

378. Assertion : Monochlorination of Iso pentane gives tertiary product as a major product.

Reason : Selectivity of chlorination is less than that of bromination.

379. Assertion : $\text{CH}_3-\text{C}\equiv\text{CH} \xrightarrow{\text{Na+Liq.NH}_3} \text{CH}_3\text{CH}=\text{CH}_2$ (Major)

Reason : Birch reduction is completed via carbocation intermediate.

380. Assertion : Cis-alkene on reaction with alkaline KMnO_4 (1%) gives Meso compound.

Reason : Meso form is optically inactive due to internal compensation .

381. Assertion : $\text{R}-\text{C}\equiv\text{CH} + \text{I}_2 \xrightarrow{\text{CCl}_4} \text{R}-\underset{\substack{| \\ (\text{Excess})}}{\text{C}}=\text{CH}$ (Major)

Reason : Due to large size of iodine only diiodo product with alkyne is formed.

382. Assertion : Rate of halogenation of benzene is equal to deutero benzene.

Reason : C-H bond Energy is less than that of C-D bond Energy.

383. Assertion : ter-butyl chloride preferably undergo hydrolysis by SN^1 mechanism.

Reason : SN^1 mechanism completed in two steps.

384. Assertion : CHCl_3 more acidic than that of CHF_3 .

Reason : CCl_3^{\ominus} is stabilised by back bonding.

385. Assertion : Aryl halide easily undergo nucleophilic substitution reaction.

Reason : Due to partial double bond character nucleophilic substitution reaction becomes easier.

386. Assertion : Ethanolic brine water on electrolysis given chloroform as a major product.

Reason : All primary alcohol gives haloform test.

387. Assertion : SN^2 reactions lead to Walden inversion.

Reason : During transition state formation nucleophile attacks the side opposite to that where halide is attached.

388. Assertion : Acetyl chloride is more reactive than ethyl acetate towards nucleophilic substitution reaction.

Reason : Leaving ability of Cl^- is more than that of OC_2H_5 group.

389. Assertion : Anisole gives iodo benzene and methyl alcohol on reaction with HI .

Reason : Reaction with HI , the larger iodine always remains with small group.

390. Assertion : Formic acid reduce tollen's reagent.

Reason : Tollen's reagent is Ammonical silver nitrate containing few drops of alkali.

391. Assertion : Phenoxide ion is more reactive for electrophilic substitution reaction than phenol.

Reason : O^- have $+I$ and $+M$ effect where as $-\text{OH}$ group have $-I$ and $+M$ effect.

392. Assertion : Boiling point of tert - butyl alcohol is more than that of n-butyl alcohol.

Reason : Boiling point increases with branching.

393. Assertion : m-dinitro benzene on reduction with ammonium sulphide gives m-phenylene diamine.

Reason : $(\text{NH}_4)_2\text{S}$ is strong reducing agent.

394. Assertion : Dimethyl amine is stronger base than that of trimethyl amine in aqueous medium.

Reason : In tertiary amine inductive effect is more than that of secondary amine.

395. Assertion : 2-methyl-2-nitro propane is insoluble in NaOH .

Reason : Nitro group is strong deactivating and meta-directing group.

396. Assertion : Total possible structural amine of $C_4H_{11}N$ are eight.

Reason : Primary secondary and tertiary amine are functional isomer to each other.

397. Assertion : Nitration of aniline gives m-nitro aniline as one of the major product.

Reason : Aniline gives anilinium ion in acidic medium which is metadirecting (strong deactivating in nature).

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	A	B	A	C	D	A	D	B	B	A	C	D	B	D	A
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	C	D	D	C	A	B	A	B	A	D	C	C	D	C	C
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	A	A	A	C	D	A	C	A	A	C	A	A	C	B	A
Que.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	A	A	B	A	D	A	B	C	B	A	D	B	A	A	A
Que.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Ans.	C	C	D	D	A	D	A	D	D	D	A	A	B	D	
Que.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Ans.	A	B	A	A	B	C	C	C	A	A	A	A	C	A	A
Que.	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
Ans.	C	B	D	B	D	C	B	C	D	D	A	C	D	C	D
Que.	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Ans.	C	D	A	C	D	A	D	A	A	A	A	D	D	C	A
Que.	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135
Ans.	A	A	D	B	A	D	C	C	A	C	A	A	B	A	A
Que.	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
Ans.	B	C	B	B	C	C	A	C	B	A	C	C	D	A	A
Que.	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165
Ans.	C	D	C	D	B	A	D	C	A	A	C	D	D	A	C
Que.	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
Ans.	A	C	C	B	C	A	A	B	B	D	A	C	A	A	C
Que.	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195
Ans.	D	C	D	D	A	B	B	D	B	B	A	D	D	D	C
Que.	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210
Ans.	D	D	B	A	B	A	D	C	A	C	D	A	C	B	B
Que.	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225
Ans.	C	B	B	B	A	A	A	D	A	D	B	B	C	C	D
Que.	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
Ans.	C	B	B	B	D	D	D	D	B	B	A	C	A	D	B
Que.	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255
Ans.	B	D	D	C	C	B	C	D	C	C	A	C	D	D	
Que.	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270
Ans.	B	D	D	D	A	D	D	A	D	D	A	C	B	D	A
Que.	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285
Ans.	D	D	C	B	B	C	A	C	B	C	B	D	B	C	B
Que.	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
Ans.	D	A	B	B	B	A	A	D	B	A	B	C	A	B	B
Que.	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315
Ans.	A	D	D	D	D	B	B	D	D	C	A	A	A	B	
Que.	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330
Ans.	D	D	A	C	A	A	A	A	C	D	D	A	D	D	B
Que.	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345
Ans.	C	D	C	B	B	A	D	A	A	C	D	A	B	C	B
Que.	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360
Ans.	D	C	A	A	A	D	A	A	C	C	A	D	D	A	C
Que.	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375
Ans.	B	C	C	D	A	A	C	C	C	B	A	A	C	A	C
Que.	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390
Ans.	C	B	D	D	B	A	B	B	A	D	C	A	A	D	B
Que.	391	392	393	394	395	396	397								
Ans.	A	D	D	B	B	B	A								

IMPORTANT NOTES