



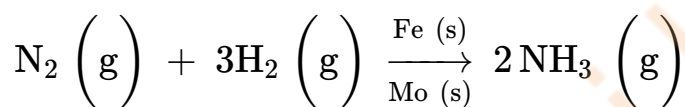
Assertion and Reason

Solution 1

Electrophilic substitution in haloarenes occurs at *o*, *p*-positions due to resonance. The halogens tend to stabilise the carbocation and electron density increases more at *ortho*- and *para*-positions than at *meta*-positions. Usually, *para* product predominates in an electrophilic substitution reaction due to less steric hindrance. Hence, correct answer is option B.

Solution 2

Promoters are substances that enhance the activity of a catalyst and molybdenum acts as a promoter for iron in the manufacture of ammonia.



Hence, the correct answer is option A.

Solution 3

Due to the small size of fluorine, there is relatively large electron-electron repulsion among the lone pairs in F_2 molecule. Therefore, $\text{F}-\text{F}$ bond in F_2 molecule is weak.

Hence, the correct answer is option A.

Solution 4

Molarity is defined as the number of moles of solute dissolved in one litre of solution and volume is dependent on the temperature.

Hence, the correct answer is option A.

Solution 5

Alcohols and phenols can be distinguished by treating with NaOH . Phenols react with NaOH to produce sodium phenoxide because phenols are acidic and alcohols are neutral. Both assertion and reasons are true and reason is the correct explanation.

Hence, the correct answer is option A.

Solution 6

All amino acids possess amino group as well as the carboxylic group. The -NH_2 group is basic while -COOH group is acidic. In aqueous solution, the carboxyl group can lose a proton and amino group can accept a proton, giving rise to a dipolar ion known as zwitter ion. Therefore, they behave as zwitter ion (dipolar ion).

Hence, the correct answer is option A.

Solution 7

Benzyl bromide, when kept in acetone water, produces benzyl alcohol, as it undergoes hydrolysis. Also, this reaction follows the $\text{S}_{\text{N}}1$ mechanism.

Hence, the correct answer is option C.

Solution 8

For the same alkyl group, the boiling points of alkyl halides increase with the increase in size and mass of halogen atom because the magnitude of van der Waal forces increases. Therefore, the order of boiling points is : $\text{RI} > \text{RBr} > \text{RCI} > \text{RF}$.

Fluorine is the most electronegative atom in the periodic table.

Hence, the correct answer is option B.

Solution 9

Molality is regarded as a better criterion for measurement of concentration because it is independent of temperature. This is because its formula does not involve the volume term and we know that volume changes with temperature.

Hence, the correct answer is option A.

Solution 10

Glycine is a non-essential amino acid, i.e. it can be synthesised in the body and need not be obtained through diet.

Hence, the correct answer is option D.

Solution 11

An alcohol is an organic molecule containing an -OH group. Any molecule which has a hydrogen atom attached directly to an oxygen or a nitrogen is capable of hydrogen bonding. Ethers lack the hydroxyl groups of alcohols. Without the strongly polarized O-H bond, ether molecules cannot engage in hydrogen bonding with each other. Therefore, assertion and reason both are correct and reason is the correct explanation for assertion.

Hence, the correct answer is option A.

Solution 12

At the freezing point of a substance, the solid phase is in dynamic equilibrium with the liquid phase. A solution will freeze when its vapour pressure equals the

vapour pressure of the pure solid solvent. According to Raoult's law, when a non-volatile solute such as NaCl is added to a volatile solvent such as water, its vapour pressure decreases and now it would become equal to that of solid solvent at lower temperature. Thus, it leads to a depression in freezing point of the solution.

Hence, the correct answer is option A.

Solution 13

Oxygen forms $p\pi-p\pi$ multiple bonds due to the small bond length and its small size but $p\pi-p\pi$ bonding is not possible in sulphur due to its larger size.

Hence, the correct answer is option A.

Solution 14

The high boiling points of alcohols are mainly due to the presence of intermolecular hydrogen bonding in them which is lacking in ethers.

Hence, the correct answer is option A.

Solution 15

The molecular solids can be polar, non-polar or hydrogen-bonded. These solids are held together by weak forces of attraction such as London dispersion forces, dipole-dipole interactions and hydrogen bonds. Therefore, they are characterised by low melting points as less amount of energy is required to break the bonds.

Hence, the correct answer is option C.