Assertion and Reason

Q.No.1:
Two statements are given- one labeled Assertion (A) and the other labeled Reason (R). Which of the following options is correct for the given statements?
Assertion (A): Mass of a body increases slightly when it is negatively charged.
Reason (R): Charging is due to transfer of protons only.

- **A.** Both A and R are true, and R is the correct explanation of the assertion.
- **B.** Both A and R are true, and R is not the correct explanation of the assertion.
- **C.** A is true, but R is false.
- **D.** A is false, but R is true.

Q.No.2:
Two statements are given- one labeled Assertion (A) and the other labeled Reason (R). Which of the following options is correct for the given statements?
Assertion: All free charges are integral multiples of a basic unit of charge i.e. charge on an electron or a proton.
Reason: Electric field lines start from negative charge and terminate at positive charge.

- **A.** Both A and R are true, and R is the correct explanation of the assertion.
- **B.** Both A and R are true, and R is not the correct explanation of the assertion.
- **C.** A is true, but R is false.
- **D.** A is false, but R is true.

Q.No.3:
Two statements are given- one labeled Assertion (A) and the other labeled Reason (R). Which of the following options is correct for the given statements?
Assertion: A finite size charged body may behave like a point charge if it produces an inverse square electric field.
Reason: Two charged bodies may be considered as point charges if their distance of separation is very large as compared to their dimensions.

- **A.** Both A and R are true, and R is the correct explanation of the assertion.

B. Both A and R are true, and R is not the correct explanation of the assertion.

C. A is true, but R is false.

D. A is false, but R is true.

Q.No.4:

Two statements are given- one labeled Assertion (A) and the other labeled Reason (R). Which of the following options is correct for the given statements?

Assertion: The sum of total current entering a junction is equal to the sum of total current leaving the junction.

Reason: Kirchhoff's junction rule is based on the law of conservation of charge.

A. Both A and R are true, and R is the correct explanation of the assertion.

B. Both A and R are true, and R is not the correct explanation of the assertion.

C. A is true, but R is false.

D. A is false, but R is true.

Q.No.5:

Two statements are given- one labeled Assertion (A) and the other labeled Reason (R). Which of the following options is correct for the given statements?

Assertion: Potentiometer wire is generally made up of constantan - manganin alloy.

Reason: Constantan - manganin has a very high-temperature coefficient.

A. Both A and R are true, and R is the correct explanation of the assertion.

B. Both A and R are true, and R is not the correct explanation of the assertion.

C. A is true, but R is false.

D. A is false, but R is true.

Q.No.6:
Two statements are given- one labeled Assertion (A) and the other labeled Reason (R). Which of the following options is correct for the given statements?
Assertion: Magnetic field is produced by moving charge(s).
Reason: The magnetic field in the central region of the solenoid is uniform.

- **A.** Both A and R are true, and R is the correct explanation of the assertion.
- **B.** Both A and R are true, and R is not the correct explanation of the assertion.
- **C.** A is true, but R is false.
- **D.** A is false, but R is true.

Q.No.7:
Two statements are given- one labeled Assertion (A) and the other labeled Reason (R). Which of the following options is correct for the given statements?
Assertion: Parallel currents attract and anti parallel currents repel each other (in conductor).
Reason: Magnetic force always acts on a currying conductor in the direction of flow of current.

- **A.** Both A and R are true, and R is the correct explanation of the assertion.
- **B.** Both A and R are true, and R is not the correct explanation of the assertion.
- **C.** A is true, but R is false.
- **D.** A is false, but R is true.

Q.No.8:
Two statements are given- one labeled Assertion (A) and the other labeled Reason (R). Which of the following options is correct for the given statements?
Assertion: Net capacitance decreases in the series combination of capacitors.
Reason: The charges gets divided and reduced in the series combination.

- **A.** Both A and R are true, and R is the correct explanation of the assertion.
- **B.** Both A and R are true, and R is not the correct explanation of the assertion.
- **C.** A is true, but R is false.
- **D.** A is false, but R is true.

Q.No.9:
Two statements are given- one labeled Assertion (A) and the other labeled Reason (R). Which of the following options is correct for the given statements?
Assertion (A): Magnetic moment is a scalar quantity.

Reason (R): Magnetic lines of force emanate from N-pole and enter into S-pole outside the magnet.

- **A.** Both A and R are true, and R is the correct explanation of the assertion.
- **B.** Both A and R are true, and R is not the correct explanation of the assertion.
- **C.** A is true, but R is false.
- **D.** A is false, but R is true.

Q.No.10:
Two statements are given- one labeled Assertion (A) and the other labeled Reason (R). Which of the following options is correct for the given statements?
Assertion (A): Eddy currents can be used in induction brakes.
Reason (R): The direction of eddy currents can be obtained by using Lenz's law.

- **A.** Both A and R are true, and R is the correct explanation of the assertion.
- **B.** Both A and R are true, and R is not the correct explanation of the assertion.
- **C.** A is true, but R is false.
- **D.** A is false, but R is true.

Q.No.11: Two statements are given- one labeled Assertion (A) and the other labeled Reason (R). Which of the following options is correct for the given statements?
Assertion: The resistance of an ideal ammeter should be zero.
Reason: The shunt resistance is always connected in series.

- **A.** Both A and R are true and R is the correct explanation of A
- **B.** Both A and R are true but R is NOT the correct explanation of A
- **C.** A is true, but R is false.
- **D.** A is false, but R is true.

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 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.

$$\mathrm{N_2\left(g\right)\ +\ 3H_2\left(g\right)\ \xrightarrow[Mo\ (s)]{Fe\ (s)}\ 2\,NH_3\ \left(g\right)}$$

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, $\mathrm{F—F}$ bond in $\mathrm{F_2}$ 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 S_N1 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 : RI> RBr> RCl > 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.