Amines

Assertion & Reason Type Questions

consists of two statements, one is Assertion (A) and the other is Reason (R). Give answer:
a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
b. Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
c. Assertion (A) is true but Reason (R) is false.
d. Assertion (A) is false but Reason (R) is true.

Q 1. Assertion (A): Acylation of amines gives a monosubstituted product whereas alkylation of amines gives polysubstituted product.
Reason (R): Acyl group sterically hinders the approach of further acyl groups.

Answer : (c) Assertion (A) is true but Reason (R) is false.

Q 2. Assertion (A): Acetylation of aniline gives a monosubstituted product.
Reason (R): Activating effect of -$NHCOCH_3$ group is more than that of amino group.

Answer : (c) Acetylation of aniline gives a monosubstituted product Hence assertion is true but reason is false i.e., activating effect of -$NHCOCH_3$ group is less than that of amino group.

Q 3. Assertion (A): Tertiary amines are more basic than corresponding secondary and primary amines in gaseous state.
Reason (R): Tertiary amines have three alkyl groups which cause +1 effect.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q 4. Assertion (A): Hoffman bromamide reaction is given by primary amines.
Reason (R): Primary amines are more basic than secondary amines.

Answer : (c) Assertion (A) is true but Reason (R) is false.

Q 5. Assertion (A): N, N-Diethylbenzene sulphonamide is insoluble in alkali.
Reason (R): Sulphonyl group attached to nitrogen atom is strong electron withdrawing group.

Answer : (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).

Q 6. Assertion (A): --NH_2 group is o- and p-directing in electrophilic substitution reactions.
Reason (R): Aniline cannot undergo Friedel-Crafts reaction.

Answer : (b) -NH_2 group is o and p-directing in electrophilic substitution reactions due to excess of electron or negative charge over o and p-positions because of its various resonating structures.

Q 7. Assertion (A): Monobromination of aniline can be conveniently done by protecting the amino group by acetylation.
Reason (R): Acetylation decreases the activating effect of the amino group.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q 8. Assertion (A): Aromatic 1° amines can be prepared by Gabriel Phthalimide Synthesis.
Reason (R): Aryl halides do not undergo nucleophilic substitution with anion formed by phthalimide.

Answer : (d) Aromatic 1° amines cannot be prepared by Gabriel phthalimide synthesis because aryl halides do not undergo nucleophilic substitution with the anion formed by phthalimide.

Q 9. Assertion (A): $(C_2H_5)_2NH$ is more basic than $(C_2H_5)_3N$ in aqueous solution.
Reason (R): In $(C_2H_5)_2NH$, there is more steric hindrance and +1 effect than $(C_2H_5)_3N$.

Answer : (a) $(C_2H_5)_2NH$ is more basic than $(C_2H_5)_3N$ in aqueous solution because there is an interplay of the +1 effect, solvation effect and steric hindrance of the alkyl group which decides the basic strength of alkyl amines in the aqueous state.

Q10. Assertion: Aromatic 1°amines can be prepared by Gabriel phthalimide synthesis.
Reason: Aryl halides undergo nucleophilic substitution with anion formed by phthalimide.

Q11. Assertion: Only a small amount of HCl is required in the reduction of nitro compounds with iron scrap and HCl in the presence of steam.
Reason: $FeCl_2$ formed gets hydrolysed to release HCl during the reaction.

Q12. Assertion: Amines are basic in nature.
Reason: Amines have lone pair of electrons on nitrogen atom.

Q13. Assertion: Acetanilide is less basic than aniline.
Reason: Acetylation of aniline results in decrease of electron density on nitrogen.

Q14. Assertion: Nitration of aniline can be conveniently done by protecting the amino group by acetylation.
Reason: Acetylation increases the electron-density in the benzene ring.

Q15. Assertion: Aniline does not undergo Friedel-Crafts reaction.
Reason: –NH2 group of aniline reacts with AlCl3 (Lewis acid) to give acid-base reaction.

Q16. Assertion: Acylation of amines gives a monosubstituted product whereas alkylation of amines gives poly-substituted product.
Reason: Acyl group sterically hinders the approach of further acyl groups

Q17. Assertion: Nitrating mixture used for carrying out nitration of benzene consists of conc. HNO_3 conc. H_2SO_4

Reason: In presence of H_2SO_4, HNO_3 acts as a base and produces NO_2^+ ions.

ANSWER KEY 10 to 17

Q10 : (a) **Q11 :** (d)

Q12 : (a) Amines are basic due to the presence of a lone pair of electrons on nitrogen atom. The lone pair can be easily donated.

Q13 : (d)

Q14 : (c) Acetylation decreases the electron-density in the benzene ring thereby preventing oxidation.

Q15 : (a) **Q16 :** (c) **Q17 :** (a)