

Because of Today Tomorrow Will Be better



# RK Academy

One step Ahead to Your Success...

SUB: - CHEMISTRY

FM: - 36

TIME: - 1HR 15MIN

## SEC A 1 MARK

- Which one of the following pairs will form an ideal solution?  
(a) Chloroform and acetone      (b) Ethanol and acetone      (c) n-hexane and n-heptane  
(d) Phenol and aniline
- Value of Henry's constant  $K_H$   
(a) increases with decrease in temperature.      (b) decreases with increase in temperature.  
(c) increases with increase in temperature.      (d) remains constant.
- Low concentration of oxygen in the blood and tissues of people living at high altitude is due to  
(a) high atmospheric pressure.      (b) low temperature      (c) low atmospheric pressure.  
(d) both low temperature and high atmospheric.

The following questions, two statements are given one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

(a) Both Assertion (A) and Reason (R) are correct statements, and Reason (R) is the correct explanation of the Assertion (A).

(b) Both Assertion (A) and Reason (R) are correct statements, but Reason (R) is not the correct explanation

(c) Assertion (A) is correct, but Reason (R) is incorrect statement.

(d) Assertion (A) is incorrect, but Reason (R) is correct statement.

- Assertion (A): Thionyl chloride are preferred over Phosphorus chlorides (tri and penta) for the preparation of alkyl chlorides from alcohols.

Reason(R): Thionyl chloride give pure alkyl halides.

- Assertion (A):  $-\text{NH}_2$  group is o- and p-directing in electrophilic substitution reactions.

Reason (R): Aniline cannot undergo Friedel-Crafts reaction.

- Assertion (A): Acetylation of aniline gives a monosubstituted product.

Reason (R): Activating effect of  $-\text{NHCOCH}_3$  group is more than that of amine group.

- Which of the following compounds will dissolve in an alkali solution after it undergoes reaction with Heinsberg's reagent?

(a)  $(\text{CH}_3)_3\text{N}$       (b)  $\text{CH}_3\text{NH}_2$       (c)  $(\text{C}_2\text{H}_5)_2\text{NH}$       (d) none of these

- Methylamine reacts with  $\text{HNO}_2$  to form

(a)  $\text{CH}_3\text{-O-N=O}$       (b)  $\text{CH}_3\text{-O-CH}_3$       (c)  $\text{CH}_3\text{OH}$       (d) none of these

- Define vapour pressure.

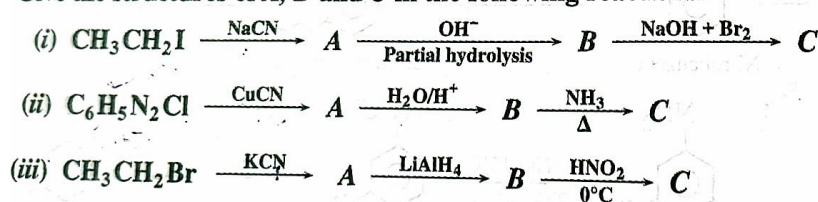
## SEC-B (2\*4=8)

10. How will you convert (Any two)
- Benzene into N,N-dimethylaniline
  - Chloroethane to butane
  - Benzene to diphenyl
  - Aniline to phenylisocyanide
11. (A) Arrange the following in increasing order of their basic strength:  
(i)  $\text{C}_2\text{H}_5\text{NH}_2$ ,  $\text{C}_6\text{H}_5\text{NH}_2$ ,  $\text{NH}_3$ ,  $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$ ,  $(\text{C}_2\text{H}_5)_2\text{NH}$
- B. Arrange the compounds of each set in order of reactivity towards  $\text{S}_\text{N}2$  displacement:  
(i) 2-Bromo-2-methylbutane, 1-Bromopentane, 2-Bromopentane.
12. Give one chemical test to distinguish between the following pairs of compounds:
- Ethylamine and aniline
  - Aniline and Phenylisocyanide
13. Write the following reaction.
- Coupling reaction
  - $\text{S}_\text{N}2$  reaction

## SEC-C (3\*5=15)

14. Account for the following
- Although amino group is o and p – directing in aromatic electrophilic substitution reactions, aniline on nitration gives a substantial amount of m-nitroaniline.
  - Aniline does not undergo Friedel-Crafts reaction.
  - The dipole moment of chlorobenzene is lower than that of cyclohexyl chloride?
15.  $\text{H}_2\text{S}$ , a toxic gas with a rotten egg like smell, is used for the qualitative analysis. If the solubility of  $\text{H}_2\text{S}$  in water at STP is 0.195 m, calculate Henry's law constant.
16. Boiling point of water at 750 mm Hg is  $99.63^\circ\text{C}$ . How much sucrose is to be added to 500 g of water such that it boils at  $100^\circ\text{C}$
17. Concentrated nitric acid used in laboratory work is 68% nitric acid by mass in aqueous solution. What should be the molarity of such a sample of the acid if the density of the solution is 1.504 g/ml?
- 18.

Give the structures of A, B and C in the following reactions:



## 19. SEC-D (4 marks) Case based study.

Amines have a lone pair of electrons on nitrogen atom due to which they behave as Lewis base. Larger the value of  $K_b$  or smaller the value of  $pK_b$ , stronger is the base. Amines are more basic than alcohols, ethers, esters, etc. The basic character of aliphatic amines should increase with the increase of alkyl substitution. But it does not occur in a regular manner as a secondary aliphatic amine is unexpectedly more basic than a tertiary amine in solutions. Aromatic amines are weaker bases than ammonia and aliphatic amines. Electron-donating groups such as  $-\text{CH}_3$ ,  $-\text{OCH}_3$ ,  $-\text{NH}_2$ , etc., increase the basicity while electron-withdrawing substituents such as  $-\text{NO}_2$ ,  $-\text{CN}$ , halogens, etc. decrease the basicity of amines. The effect of these substituents is more at *p*- than at *m*-positions.

- Arrange the following in increasing order of their basic strength:  
 $\text{C}_2\text{H}_5\text{NH}_2$ ,  $\text{C}_6\text{H}_5\text{NH}_2$ ,  $\text{NH}_3$ ,  $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$ ,  $(\text{C}_2\text{H}_5)_2\text{NH}$
- Arrange the following compounds in increasing order of their acidic strength:  
Methylamine, dimethylamine, aniline, N-methylaniline
- $(\text{CH}_3)_2\text{NH}$  is more basic than  $(\text{CH}_3)_3\text{N}$  in an aqueous solution. Give reason.

OR

Which is more acidic, aniline or ammonia?