

**Subject: CHEMISTRY**

**Organic Chemistry**

**PAPER II**

**II semester**

**A. Multiple Choice Questions**

1. Which of the following is not an electrophile?

- (a)  $\text{NO}_2^+$  ( )
- (b)  $\text{AlCl}_3$  ( )
- (c)  $\text{Br}^+$  ( )
- (d)  $\text{NH}_3$  ( )

2. Which of the following is not a nucleophile?

- (a)  $\text{CN}^-$  ( )
- (b)  $\text{BF}_3$  ( )
- (c)  $\text{HSO}_3^-$  ( )
- (d)  $\text{OH}^-$  ( )

3. Which of the following ranges best represents the strength of H-bonding?

- (a) 5 – 10 kcals ( )
- (b) 100 – 120 kcals ( )
- (c) 80 – 100 kcals ( )
- (d) 60 – 80 kcals ( )

4. Atoms which lose electrons toward a carbon atom are said to have a

- (a) +I effect ( )
- (b) +M effect ( )
- (c) –I effect ( )
- (d) –M effect ( )

5. Which alkyl free radical is the most stable?

- (a) methyl ( )
- (b) primary ( )
- (c) secondary ( )
- (d) tertiary ( )

6. Lewis bases can be regarded as

- (a) nucleophiles ( )
- (b) electrophiles ( )
- (c) free radicals ( )
- (d) None of the above ( )

7. The rate law for catalytic halogenation of benzene is often of the form

- (a)  $\text{Rate} = k[\text{PhH}][\text{X}_2]^2[\text{L.A.}]$  ( )

- (b) Rate =  $k[\text{PhH}][\text{X}_2][\text{L.A.}]$  ( )  
 (c) Rate =  $k[\text{PhH}]^2[\text{X}_2][\text{L.A.}]$  ( )  
 (d) Rate =  $k[\text{PhH}][\text{X}_2]$  ( )
8. The carbon atoms in a benzene ring are  
 (a) *sp* hybridized ( )  
 (b) *sp*<sup>3</sup> hybridized ( )  
 (c) *sp*<sup>2</sup> hybridized ( )  
 (d) *dsp*<sup>2</sup> hybridized ( )
9. Characteristic reactions of aromatic hydrocarbons are initiated by  
 (a) nucleophiles ( )  
 (b) uncharged molecules ( )  
 (c) free radicals ( )  
 (d) electrophiles ( )
10. Toluene reacts with chlorine in presence of  $\text{AlCl}_3$  to give  
 (a) *o*- & *p*-chlorotoluene ( )  
 (b) *o*- & *m*-chlorotoluene ( )  
 (c) *o*- chlorotoluene ( )  
 (d) *m*- & *p*-chlorotoluene ( )
11. The reaction between aldehyde and HCN to form Cyanohydrin is an example of  
 (a) Nucleophilic substitution ( )  
 (b) Nucleophilic addition ( )  
 (c) Addition elimination ( )  
 (d) Elimination ( )
12. The correct order of acidic strength is  
 (a) Phenol < Ethanol < Chloroacetic acid < Acetic acid ( )  
 (b) Ethanol < Phenol < Chloroacetic acid < Acetic acid ( )  
 (c) Ethanol < phenol < acetic acid < Chloroacetic acid ( )  
 (d) Chloroacetic acid < Acetic acid < Phenol < Ethanol ( )
13. Correct order of decreasing reactivity of nucleophilic addition reaction is  
 (a)  $\text{CH}_3\text{COCH}_3 > \text{CH}_3\text{CHO} > \text{HCHO}$  ( )  
 (b)  $\text{HCHO} > \text{CH}_3\text{CHO} > \text{CH}_3\text{COCH}_3$  ( )  
 (c)  $\text{CH}_3\text{COCH}_3 > \text{HCHO} > \text{CH}_3\text{CHO}$  ( )  
 (d)  $\text{CH}_3\text{CHO} > \text{HCHO} > \text{CH}_3\text{COCH}_3$  ( )
14. Which of the following compound is most reactive towards nucleophilic addition reaction?  
 (a) Acetaldehyde ( )  
 (b) Acetone ( )  
 (c) Benzene ( )  
 (d) Benzaldehyde ( )

15. What is the product on oxidation of primary alcohols?  
 (a) Aldehydes ( )  
 (b) Amines ( )  
 (c) Ketone ( )  
 (d) Benzene ( )
16. The hybridization state of nitrogen atom of ammonia is  
 (a)  $sp^3$  ( )  
 (b)  $sp^2$  ( )  
 (c)  $sp^3d$  ( )  
 (d)  $dsp^2$  ( )
17. Schiff's base can be obtained by reacting  $1^\circ$  amine with  
 (a) cyanide ( )  
 (b) alcohol ( )  
 (c) carboxylic acid ( )  
 (d) aldehyde ( )
18. Aniline reacts with nitrous acid at low temperatures to give  
 (a) nitrile ( )  
 (b) N-nitrosoamine ( )  
 (c) diazonium salt ( )  
 (d) cyanide ( )
19. The reaction of amine with  $C_6H_5COCl$  is known as  
 (a) sulphonation ( )  
 (b) benzylation ( )  
 (c) benzoylation ( )  
 (d) None of the above ( )
20. The major product obtained on nitration of aniline with a mixture of nitric acid and sulphuric acid is  
 (a) *m*-Nitroaniline ( )  
 (b) *o*-Nitroaniline ( )  
 (c) *p*-Nitroaniline ( )  
 (d) None of the above ( )
21.  $SN_2$  reaction is always followed by  
 (a) Retention of configuration ( )  
 (b) Formation of carbocation ( )  
 (c) Inversion of configuration ( )  
 (d) None of the above ( )
22.  $SN_1$  reaction is favoured by  
 (a) Primary haloalkane ( )  
 (b) Secondary haloalkane ( )  
 (c) Tertiary haloalkane ( )

- (d) All of the above ( )
23. Nucleophiles are always
- (a) Lone pair donor ( )
- (b) Electron poor ( )
- (c) Lewis acid ( )
- (d) Negatively charged ions ( )
24. Select the correct statement
- (a)  $\text{SN}_2$  reaction follows second order kinetics ( )
- (b) No intermediate is involved in  $\text{SN}_2$  mechanism ( )
- (c)  $\text{SN}_2$  reaction are one-step reaction ( )
- (d) All of the above ( )
25. The reactivity order of alkyl halide in  $\text{SN}_2$  reaction is
- (a)  $\text{CH}_3\text{X} > 1^\circ > 2^\circ > 3^\circ$  ( )
- (b)  $\text{CH}_3\text{X} > 2^\circ > 1^\circ > 3^\circ$  ( )
- (c)  $\text{CH}_3\text{X} > 3^\circ > 1^\circ > 2^\circ$  ( )
- (d)  $\text{CH}_3\text{X} > 3^\circ > 2^\circ > 1^\circ$  ( )

### B. Fill Up the Blanks

- The phenomenon in which two or more structures can be written for a substance which involve identical positions of atoms is called \_\_\_\_\_
- According to Huckle Rule, a cyclic  $\pi$  molecular orbital formed by overlap of p orbitals must contain \_\_\_\_\_  $\pi$  electrons.
- When benzene is treated with methyl chloride in presence of  $\text{AlCl}_3$ , \_\_\_\_\_ is formed.
- Amines converted into amides by treatment with aromatic acid chlorides or sulphonyl chlorides in presence of base, the reaction is also called \_\_\_\_\_ reaction.
- When aniline is heated with  $\text{CHCl}_3$  and alc.  $\text{KOH}$ , the product is \_\_\_\_\_
- Hinsberg reagent is \_\_\_\_\_
- The product of heterolytic fissions are \_\_\_\_\_.
- The more hyperconjugation structures that can be written for a species, the \_\_\_\_\_ is the species.
- Electromeric effect involves the \_\_\_\_\_ of a double or triple bond.
- In aldehydes and ketones, carbon of the carbonyl group is \_\_\_\_\_ hybridised.
- $\text{HCHO}$  is known as \_\_\_\_\_
- Benzoic acid reacts with ammonia gives \_\_\_\_\_
- A primary halide will react with \_\_\_\_\_ mechanism.
- A low concentration of nucleophile favours \_\_\_\_\_ reaction.
- Reaction of alcohol with  $\text{SOCl}_2$  is \_\_\_\_\_ mechanism.

**Key Answers**

**A. Multiple choice questions**

1. (d)      2. (b)      3. (a)      4. (b)      5. (d)      6. (a)      7. (b)  
8. (c)      9. (d)      10. (a) 11. (a) 12. (c) 13. (b) 14. (c)  
15. (a) 16. (a) 17. (d) 18. (c) 19. (b) 20. (a) 21. (c)  
22. (c) 23. (d) 24. (d) 25. (a)

**B. Fill Up the Blanks**

1. Resonance
2.  $4n+2$
3. Toluene
4. Scotten-Baumen
5. Phenylisocyanide
6. Toluene sulphonyl chloride
7. Ions
8. More stable
9.  $\Pi$  electrons
10.  $sp^2$
11. formaldehyde
12. Benzamide
13.  $SN_2$
14.  $SN_1$
15.  $SN_i$