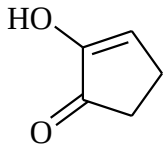
B.Sc. Part II
Organic Chemistry

Multiple Choice

Q.1 What is the value of λ_{max} for given compound –



(a) 247 nm (b) 338 nm (c) 357 nm (d) 280 nm

Q.2 Which group is the example of chromophore :

(a) $>C=C<$ (b) $-C\equiv C-$ (c) $>C=\ddot{S}:$ (d) $-\ddot{N}=\ddot{N}-$

Q.3 What is the formula of Pinacolone

(a) $H_3C-C(CH_3)(OH)-C(CH_3)(OH)-CH_3$ (b) $CH_3-C(CH_3)_2-C(=O)-CH_3$

(c) $CH_2(OH)-CH(OH)-CH_2(OH)$ (d) None of these

Q.4 Laderer-Manasse reaction is widely used in-

(a) Bakelite formation (b) Vanillin synthesis

(c) Phenetol synthesis (d) m-nitrophenol synthesis

Q.5 What is the formula of crotonic acid

(a) C_6H_5–CH=CH–COOH (b) CH_3–CH=CH–COOH

(c) $R-CH=C(COOH)_2$ (d) $CH_2(ZnBr)-COOC_2H_5$

Q.6 What is the product of benzoin condensation

(a) $C_6H_5-C(=O)-C(=O)-C_6H_5$ (b) $C_6H_5-C(=O)-C(H)(OH)-C_6H_5$

(c) $H_5C_6-C(C_6H_5)(OH)-C(=O)-OH$ (d) None of these

Q.7 α-hydroxy acids on heating gives –

(a) Lactide (b) β-Lactone (c) malic acid (d) Tartonic acid

Q.8 What type of intermediate form in Hofmann's degradation (Hofmann bromamide reaction)

(a) Carbocation (b) Carbanion (c) Nitrene (d) Carbene

Q.9 Which reducing agent used in selective reduction of aromatic nitro compound.

(a) $LiAlH_4$ (b) Ni/H_2 (c) $NaBH_4$ (d) $(NH_4)_2S$

Q.10 Hybridization of nitrogen in nitroalkanes –

(a) sp^3 (b) sp^2 (c) sp (d) dsp^3

Short Answer Questions

1. What happens when acetyl chloride is subjected to Rosenmund's reaction.
2. How UV spectroscopy is helpful in identification of geometrical isomers.
3. The boiling point of ethanol is higher than that of methoxy methane. Why?
4. Write the Hofmann's separation method of mixture of primary, secondary and tertiary amines.
5. Aldehydes undergo nucleophilic addition reaction whereas alkenes show electrophilic addition reactions. Why?
6. How is phenol prepared commercially.
7. Arrange the following compounds in order of decreasing reactivity towards the addition of HCN :

   acetaldehyde, acetone, di-t-butylketone, methyl-t-butyl ketone.
8. By using 1,3-dithiane how will you obtain acetone from acetaldehyde ?

9. Why the lower members of carboxylic acids are soluble in water, but higher members are insoluble in water?
10. Discuss in brief the effect of substituents on the acidity of carboxylic acids.
11. Esters are less reactive as compared to acid chlorides and anhydrides towards nucleophiles. Why ?
12. What is the effect of substituents on nitration?
13. Write note on charge-transfer complexes.
14. Why aliphatic amines are more basic than ammonia?
15. Phenols are stronger acids than alcohols but are weaker nucleophiles. How ?

Long Answer Questions

1. Explain the following:

   (i) Hypochromic shift

   (ii) Hypsochromic shift

   (iii) Beer-Lambert's law and its limitations

2. Explain the mechanism of pinacol-pinacolone rearrangement.
3. Give the mechanism of following reactions:

   (i) Gattermann synthesis

   (ii) Laderer-manesse reaction

   (iii) Hauben-Hoessch reduction

4. Describe the mechanism of Mannich reaction.
5. What is the action of heat on dicarboxylic acids when two carboxyl groups are separated by one, two and three carbon atoms.

6. (a) Write the mechanism of acid catalyzed hydrolysis of ester.

(b) How can the acid derivatives be inter converted into each other.

7. What are halonitroarenes ? What is the effect of nitro group on the reactivity of halogen atom in these compounds ? Explain

8. How will you synthesize following from diazonium salt.

(i) Chlorobenzene

(ii) Phenylhydrazine

(iii) Benzoic acid

(iv) p-aminodiazobenzene

9. (a) With the help of IR spectroscopy how will you distinguish the compound in the following pair:

(i) $CH_3–CH_2–NH_2$ and $CH_3–CONH_2$

(ii) CH_3COOH and $H–COOC_2H_5$

(b) Explain the effect of hydrogen bonding in IR spectroscopy with suitable examples.

10. Discuss the mechanism of acid and base catalysed cleavage of epoxides.