

BSC. PART - II EXAMINATION - 2013

CHEMISTRY HONOURS ORGANIC

1. Choose the correct answer from the following:

(i) Order of stability of carbonium ion is:

(a) Triphenyl methyl carbonium ion > Benzyl carbonium ion > Allyl carbonium ion > Isopropyl carbonium ion

(b) Isopropyl carbonium ion > Allyl carbonium ion > Benzyl carbonium ion > Triphenyl methyl carbonium ion

(c) Benzyl carbonium ion > Triphenyl methyl carbonium ion > Allyl carbonium ion > Isopropyl carbonium ion

(ii) Order of reactivity of carbene is:

(a) :CH₂ > :CHCl > :CCl₂ > :CBr₂ (b) :CBr₂ > :CCl₂ > :CHCl > :CH₂

(c) :CHCl > :CCl₂ > :CBr₂ > :CH₂

(iii) The order of reactivity of double bonds to electrophilic additions is:

(a) CH₂ = CH - COOH > CH₂ = CH₂ > CH₃ - CH = CH₂ > $\begin{array}{c} \text{CH}_3 \\ \diagdown \\ \text{C} = \text{CH}_2 \\ \diagup \\ \text{CH}_3 \end{array}$

(b) $\begin{array}{c} \text{CH}_3 \\ \diagdown \\ \text{C} = \text{CH}_2 \\ \diagup \\ \text{CH}_3 \end{array}$ > CH₃ - CH = CH₂ > CH₂ = CH₂ > CH₂ = CH - COOH

(c) CH₂ = CH - COOH > $\begin{array}{c} \text{CH}_3 \\ \diagdown \\ \text{C} = \text{CH}_2 \\ \diagup \\ \text{CH}_3 \end{array}$ > CH₃ - CH = CH₂ > CH₂ = CH₂

(iv) In writing the absolute configuration of lactic acid (IUPAC name), the priority of groups and atoms is: (a) OH > COOH > CH₃ > H

(b) H > CH₃ > COOH > OH

(c) CH₃ > H > OH > COOH

(v) When absorption band shifts towards longer wavelength in conjugation, shift is called: (a) Hypochromic shift (b) Bathochromic shift (c) Hypsochromic shift

(vi) Nitration of benzoic acid gives:

(a) m-nitrobenzoic acid (b) o-nitrobenzoic acid (c) o-and p-nitrobenzoic acid

(vii) A lactone is obtained from:

(a) α -hydroxy acid (b) β -hydroxy acid (c) γ -hydroxy acid

(viii) Resorcinol, when treated with CH_3CN in presence of anhydrous ZnCl_2 and dry HCl gas under Houben-Hoesch reaction conditions, gives:

(a) 2, 3 - dihydroxy acetophenone (b) 2, 4 - dihydroxy acetophenone
(c) 2, 5 - dihydroxy acetophenone

(ix) Reduction of m-dinitrobenzene, with $\text{Fe} + \text{HCl}$, gives:

(a) m- nitroaniline (b) m- aminoaniline (c) m-nitrophenyl hydroxyl amine

(x) Increasing order of the acid strength of the following acids is:

(a) $\text{Cl} - \text{CH}_2 - \text{COOH} > \text{CH}_3\text{COOH} > \text{C}_6\text{H}_5\text{COOH}$

(b) $\text{CH}_3\text{COOH} > \text{Cl} - \text{CH}_2 - \text{COOH} > \text{C}_6\text{H}_5\text{COOH}$

(c) $\text{C}_6\text{H}_5\text{COOH} > \text{CH}_3\text{COOH} > \text{Cl} - \text{CH}_2 - \text{COOH}$

2. What are active methylene compounds? Explain the mechanism of formation of ethylacetoacetate from ethylacetate. Starting from acetoacetic ester, how would you prepare the following:

(a) Crotonic acid (b) Glutaric acid (c) 4 - Methyl - 7, 8-dihydroxy coumarin
(d) β -aminocrotonic ester

3. (i) With the help of chemical reactions how would you prove that:

(a) Lactic acid contains a secondary alcoholic group.

(b) Citric acid contains a hydroxyl group

(c) Citric acid is a tribasic acid

(d) Lactic acid contains a straight chain of three carbon atoms.

(ii) How would you obtain citric acid from lemon juice?

OR, (i) Establish the constitution of citric acid.

(ii) Give a total synthesis of citric acid

4. What are objections raised against the open chain structure of glucose? Establish ring structure of glucose.

5. Explain the following:

(a) Prefix D - is given to fructose even though it is laevorotatory.

(b) Difference between tautomerism and resonance

(c) Bromination of phenol occurs exclusively at o and p- positions, in the presence of non-polar solvents like CCl_4 or CS_2

(d) Formic acid is stronger acid than acetic acid.

6. What is diazotization? How benzene diazonium chloride is prepared in the laboratory? Starting from benzene diazonium chloride how would you prepare the following?

(a) Fluorobenzene (b) Anisole (c) Phenylhydrazine (d) p-hydroxyazobenzene

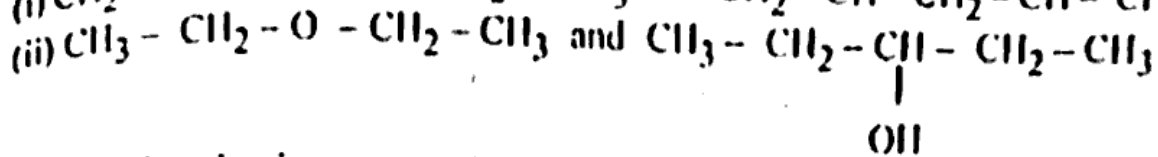
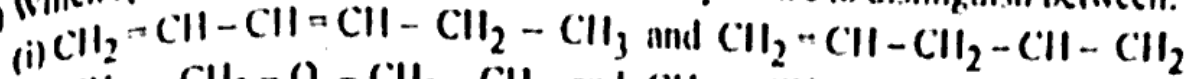
7. Show your acquaintance with any four of the following:

(a) Kolbe's reaction (b) Houben-Hoesch reaction (c) Gatterman's synthesis

(d) Reformatsky reaction (e) Sandmeyer's reaction (f) Friedel-Crafts reaction
Discuss the mechanism of reaction in each case.

8. (a) What specific information can be obtained from UV and IR spectroscopy about the structure of organic compounds?

(b) Which spectroscopic method (UV or IR) will you use to distinguish between:



Give explanation in support of your answer.

(c) The compound _____ exists in equilibrium with its tautomer. Its solution shows a strong UV absorption at 272 nm. What is the structure of the tautomer? How could IR spectroscopy be used to confirm your suggestion?

(d) Name the unit in which UV and IR spectral information is commonly reported.

9. Write notes on the following: (a) Oil and fats (b) Soap and detergents (c) Chain growth polymerization and vinyl polymerization (d) Resins

OR, How would you bring out the following transformation?

- (a) Benzene to diphenylmethane (b) Benzene to BHC
(c) Toluene to Benzaldehyde (d) Aniline to m-nitroaniline