Organic chemistry

2015-17

Time : 3 hours

Full Marks : 80

Candidates are required to give their answers in their own words as far as practicable.
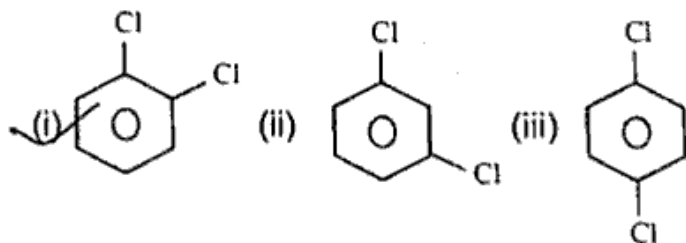
परीक्षार्थी यथासंभव अपने शब्दों में ही उत्तर दें।

The figures in the marign indicate full marks.

Answer any **four** questions, including question no. **1** which is compulsory.

1. Select the correct answer : $2\frac{1}{2} \times 8 = 20$

   (a) Which one has the greatest dipole moment

   (i)   (ii)   (iii)

   (b) Which statement is correct

   (i) Stability of carbocation $\propto +I$ power of the group

   (ii) Stability of carbocation $\propto -I$ power of the group

   (iii) Stability of carbocation

   $\propto \dfrac{1}{+I \text{ power of the group}}$

   (c) Arrange pH of the given compounds in decreasing order

   (a) Phenol

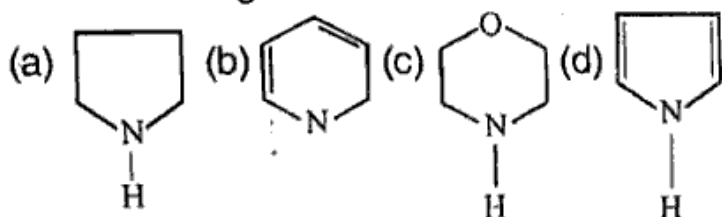   (b) Ethalcohol

   (c) Formic acid

   (d) Benzoic acid :

   (i) a > b > c > d

   (ii) b > a > d > c

   (iii) c > b > d > a

   (iv) d > c > a > b

(d) Consider the following compounds order of basicity of these compounds in decreasing order

(a) [pyrrolidine structure with N–H] (b) [pyridine structure with N] (c) [morpholine structure with O and N–H] (d) [pyrrole structure with N–H]

(i) d > a > b > c

(ii) a > c > d > b

(iii) b > c > d > a

(iv) a > c > b > d

(e) In which compound carbon-carbon double bond length is maximum :

(i) Ethene

(ii) Propene

(iii) 2-butene

(iv) 2,3, di methyl-2butene

(f) In toluene methyl group has neither -ve charge nor lone pair (lp) even then it is o, p-directing group in ArSE reaction due to:

(i) Inductive effect

(ii) Electromeric effect

(ii) Hyperconjugation

(iv) Mesomeric effect

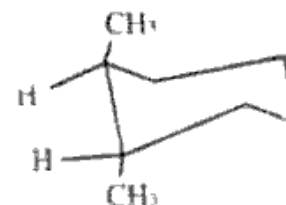(g) The number of delocalised π electrons in the given compound is :

[cyclopentadienyl anion structure]

(i) 4

(ii) 6

(iii) 8

(iv) 2

(h) Geometry of the given compound is :

[cyclohexane ring structure with CH₃ and H substituents]

(i) Cis

(ii) Trans

(iii) Cis as well as Trans

(iv) No geometrical isomerism

2. Write notes on any **two** : $10 \times 2 = 20$

(a) Hyperconjugation

(b) Resonance

(c) Alternant & non alternant hydrocarbon

3. (a) Describe different methods of resolution of dl mixture or racemic mixture.   12

(b) Write Hammet equation and relationship with substituent & reaction constants.   8

4. Write notes on any **two** of the following :

$10 \times 2 = 20$

(i) Biphenyls

(ii) Allens

(iii) Elements of Symmetry

5. Give the mechanism of the following reactions

$10 \times 2 = 20$

(i) Wittig reaction

(ii) Benzoin Condensation

6. Discuss reduction of Carbonyl Compounds with various reducing agents such as :

$4 \times 5 = 20$

(i) HI/P

(ii) $NaBH_4$

(iii) Aluminium Isopropoxide

(iv) Grignard reagent

(v) Mg/ether

$10 \times 2 = 20$

7. Write notes on :

(i) Saytreff rule

(ii) Hoffmann rule

How these rules help in determination of orientation of the products in elimination reaction.

8. Discuss effect of substituent on the reactivity and orientation in electrophitc aromatic substitution reactions.

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