

2019

(CBCS)

(5th Semester)

CHEMISTRY

SIXTH PAPER

(Organic Chemistry—II)

Full Marks : 75

Time : 3 hours

(PART : A—OBJECTIVE)

(Marks : 25)

The figures in the margin indicate full marks for the questions

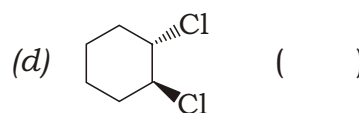
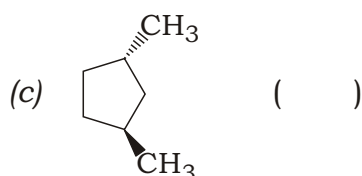
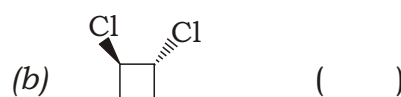
SECTION—A

(Marks : 10)

Tick (✓) the correct answer in the brackets provided :

1×10=10

1. Which of the following compounds is chiral?



2. A reaction, in which two or more constitutional isomers could be obtained as a product but one of them predominates is called

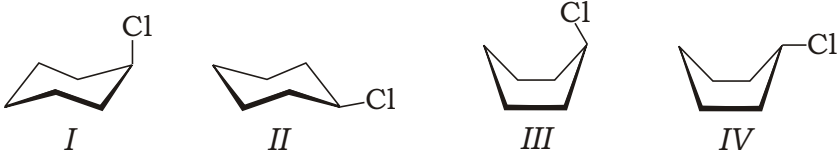
(a) chemoselective () (b) regioselective ()

(c) stereoselective () (d) stereospecific ()

3. Which is the least stable conformation of butane?

- (a) Antiperiplanar () (b) Anticlinical ()
(c) Synclinal () (d) Synperiplanar ()

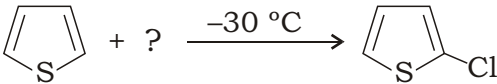
4. The most stable conformation of 1-chlorocyclohexane is

- 
(a) I () (b) II ()
(c) III () (d) IV ()

5. The order of aromaticity is

- (a) furan > pyrrole > thiophene ()
(b) pyrrole > furan > thiophene ()
(c) thiophene > furan > pyrrole ()
(d) thiophene > pyrrole > furan ()

6. What reagent should we use for the following transformation?

- 
(a) Cl₂ () (b) CuCl ()
(c) SOCl₂ () (d) SO₂Cl₂ ()

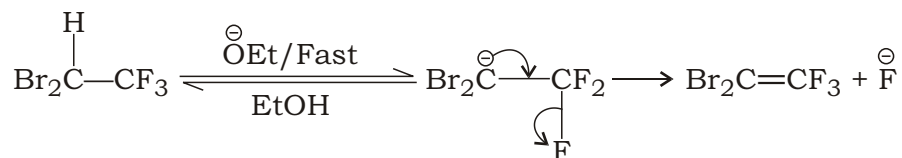
7. The reagent used in Clemmensen reduction is

- (a) NH₂NH₂ () (b) Na/C₂H₅OH ()
(c) LiAlH₄ () (d) Zn-Hg ()

8. Acetone reacts with another molecule of acetone in the presence of base catalyst to give , -unsaturated carbonyl compound. This type of reaction is known as

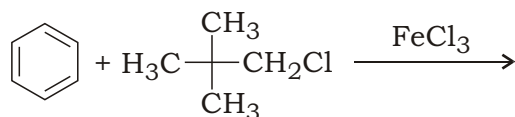
- (a) Mannich reaction ()
(b) benzoin condensation ()
(c) aldol condensation ()
(d) Claisen-Schmidt reaction ()

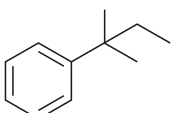
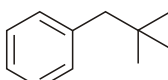
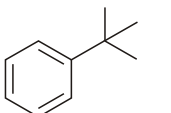
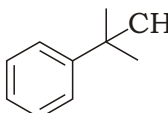
9. In the following reaction, 2-dibromo-1-trifluoroethane is treated with alcoholic alkali to give an alkene as a final product :



This type of reaction may be regarded as

- (a) substitution reaction ()
 (b) addition reaction ()
 (c) elimination reaction ()
 (d) rearrangement ()
10. What will be the product for the following transformation?



- (a)  () (b)  ()
 (c)  () (d)  ()

SECTION—B

(Marks : 15)

Answer the following questions :

3×5=15

1. What are metamers? Give examples.

OR

2. Write a short note on the stability of geometrical isomerism.
3. What do you mean by axial and equatorial bonds? Draw the most stable conformers of 1-methylcyclohexane.

OR

4. Differentiate between configuration and conformation.

5. Explain with mechanism why nitration of furan takes place at C-2 position.

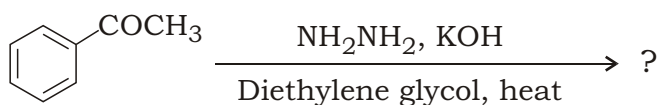
OR

6. Compare the basicity of pyrrole and pyridine.

7. What are active methylene compounds? Give examples.

OR

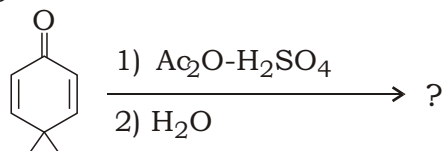
8. Complete the following reaction with mechanism :



9. Write a brief note on the formation of carbon-carbon double bond.

OR

10. Complete the following reaction with mechanism :

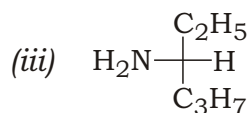
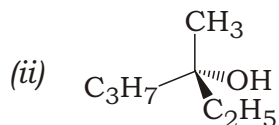
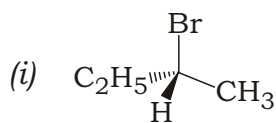


(PART : B—DESCRIPTIVE)

(Marks : 50)

The figures in the margin indicate full marks for the questions

1. (a) Assign *R*- or *S*-configuration to the following isomers : 1×3=3

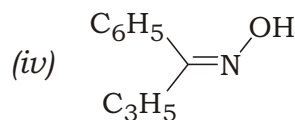
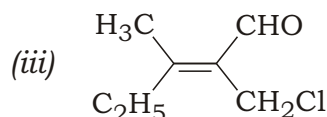
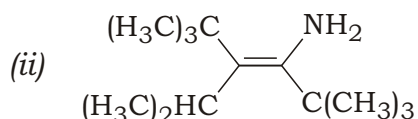
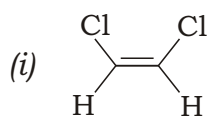


(b) What are *meso*-compounds? Explain with examples. 2+1=3

- (c) Write short notes on the following : 2×2=4
 (i) Centre of symmetry
 (ii) Geometrical isomerism

OR

2. (a) What do you mean by racemization? Explain how racemization can occur under S_N1 reaction. 2+2=4
 (b) What are diastereomers? Give examples. 1+1=2
 (c) Assign *E* or *Z* notation to the following compounds : 1×4=4



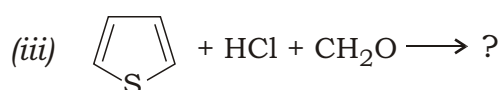
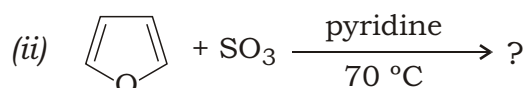
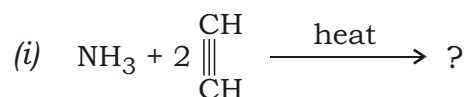
3. (a) Draw and explain all the possible conformations of butane. Also draw its energy diagram showing energy differences between various conformations of butane. 2+2+1=5
 (b) Draw the most stable conformation of *t*-butylcyclohexane showing all the axial and equatorial hydrogens. 3
 (c) Draw all the possible conformations of ethane using Sawhorse and Newman projection. 2

OR

4. (a) Explain why axial-1-chlorocyclohexane is more stable than equatorial-1-chlorocyclohexane. 3
 (b) Write a short note on the conformation of propane. Draw all the possible conformations of propane using Sawhorse and Newman projection. 2+2=4

(c) Draw the chair and boat conformations of 1-methylcyclohexane showing all the axial and equatorial hydrogens. 3

5. (a) Complete the following reactions (without mechanism) : 1×3=3

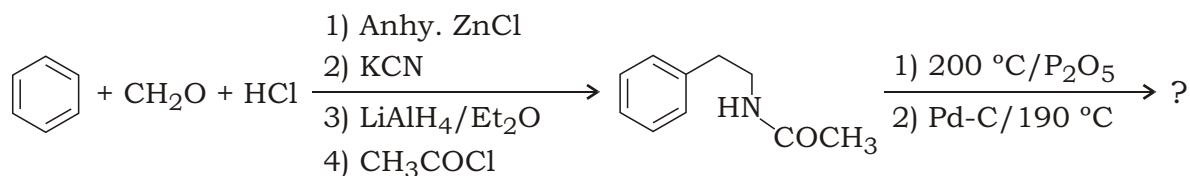


(b) Explain giving example why nitration of pyridine takes place at C-3. 2+1=3

(c) How will you synthesize quinoline using Skraup synthetic method? Write down the reaction with suitable mechanism. 1+3=4

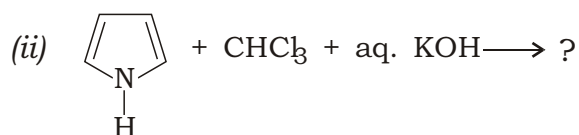
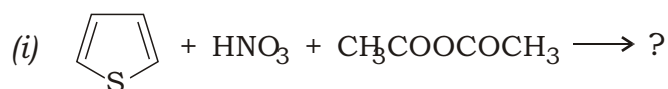
OR

6. (a) Complete the following reaction with mechanism : 4



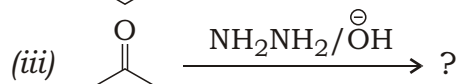
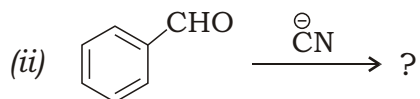
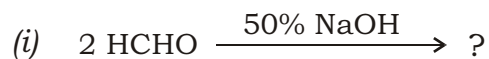
(b) Write a brief note on the molecular orbital picture of pyridine. 2

(c) Complete the following reactions with mechanism : 2×2=4



7. (a) Explain keto-enol tautomerism giving suitable examples. 2

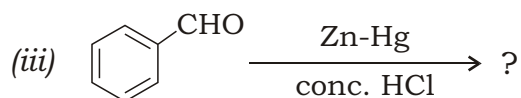
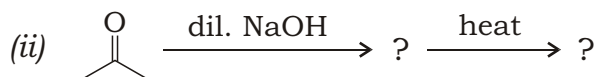
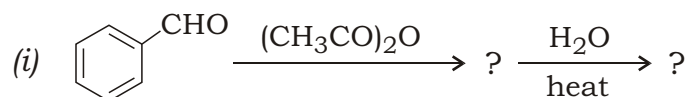
(b) Complete the following reactions giving suitable mechanism and name the reaction (any two) : 4×2=8



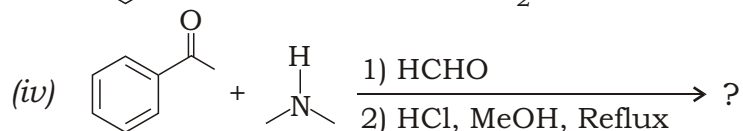
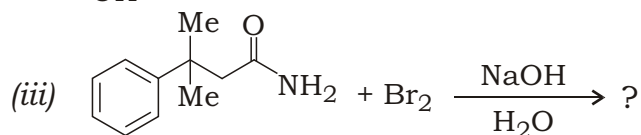
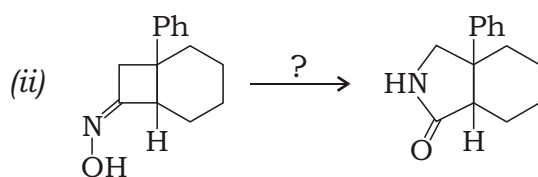
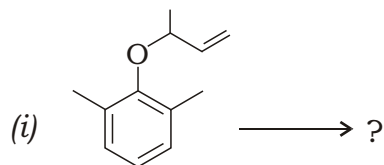
OR

8. (a) Differentiate between tautomerism and resonance. 3

(b) Write the product of the following reactions giving suitable mechanism (any two) : 3½×2=7



9. (a) Complete the following reactions with mechanism (any three) : 3×3=9

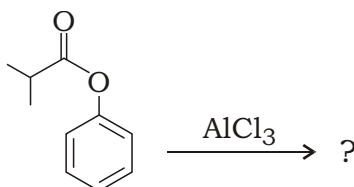


(b) What are carbocations?

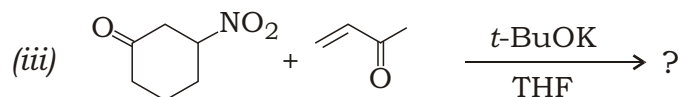
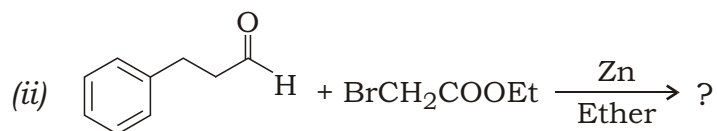
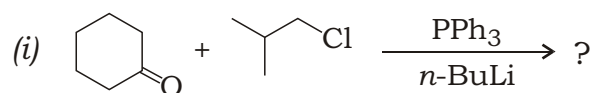
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OR

10. (a) What is Fries rearrangement? What will be the products for the following reaction? 1+2=3



(b) Complete the following reactions with mechanism (any two) : 3×2=6



(c) What are acetals?

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