V/CHEM (v)

2016

(5th Semester)

CHEMISTRY

FIFTH PAPER (CHEM–351)

(Organic Chemistry—II)

Full Marks : 55

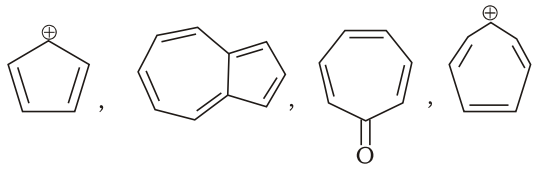
Time : 2½ hours

(PART : B—DESCRIPTIVE)

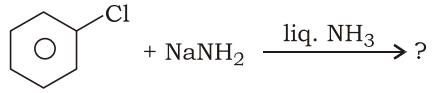
(*Marks* : 35)

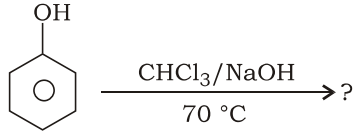
The figures in the margin indicate full marks for the questions

1. *(a)* What is Hückel rule? Which of the following species satisfy Hückel rule? Explain briefly. 1+2=3



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

(i) 

(ii) 

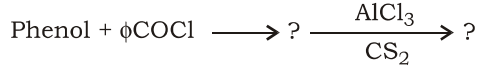
OR

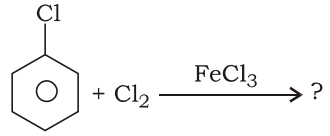
2. *(a)* "*o*-nitrophenol has much lower boiling point than its *m*- and *p*-isomers." Explain. 1

(b) Arrange the following in their increasing order of acidity. Explain. 2

phenol, *p*-chlorophenol, *p*-cresol

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

(i) 

(ii) 

3. *(a)* Give one chemical test to distinguish between aldehydes and ketones. 1

(b) Explain keto-enol tautomerism by using suitable example. 2

(c) Write the product(s) of the following reactions with suitable mechanism : 2×2=4

(i) $\phi CHO + (CH_3CO)_2O \xrightarrow[\Delta]{CH_3COONa} ?$

(ii) $\phi-\overset{\overset{O}{\|}}{C}-CH_3 \xrightarrow[CHCl_3,\ \Delta]{CH_3CO_3H} ?$

OR

4. *(a)* How will you obtain CH_3COCH_3 from CH_3COCl? Give chemical equation. 2

(b) Arrange the following in their increasing order of acidity. Explain. 2

p-NO_2-benzoic acid, *p*-methylbenzoic acid, *o*-hydroxy benzoic acid, benzoic acid

(c) Complete the following reactions with suitable mechanism : 1½×2=3

(i) $CH_3CH=CH_2 \xrightarrow[2)\ Zn/dil.\ AcOH]{1)\ O_3} ?$

(ii) $CH_3COOH + C_2H_5OH \xrightarrow{H^+} ?$

5. *(a)* Explain Hofmann's method for the separation of a mixture of 1°, 2° and 3°-amines. 3

(b) Arrange the following in their decreasing order of basicity. Explain. 2½

NH_3, $(CH_3)_2NH$, CH_3NH_2, $(CH_3)_3N$

(c) What are active methylene compounds? Give an example. 1½

OR

6. *(a)* Complete the following reactions : 1×2=2

(i) $\phi-NH_2 + \phi COCl \xrightarrow{NaOH} ?$

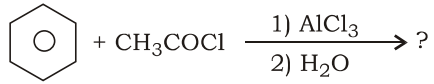
(ii) $R-NH_2 + CHCl_3 + 3KOH \longrightarrow ?$

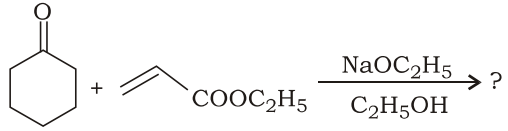
(b) Carry out the following conversion : 2½×2=5

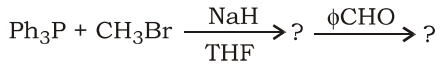
(i) $CH_3COCH_2COOC_2H_5 \longrightarrow CH_3COCH_2CH_3$
(Ethylacetoacetate) (Butan-2-one)

(ii) $CH_2(COOC_2H_5)_2 \longrightarrow CH_3CH_2COOH$
(Diethylmalonate) (Propanoic acid)

7. *(a)* Complete the following reactions with suitable mechanism (any *two*) : 2½×2=5

(i) 

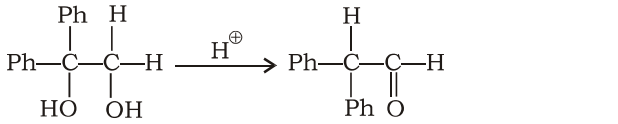
(ii) 

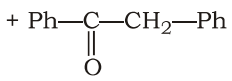
(iii) 

(b) Explain the $A_{AC}2$ mechanism for the hydrolysis of an ester. 2

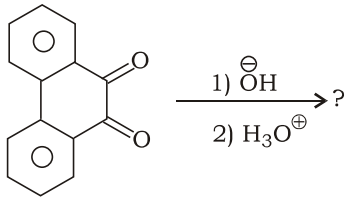
OR

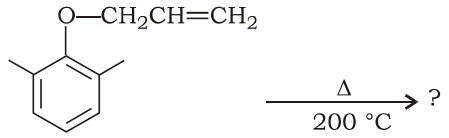
8. *(a)* Which is the major product and why? 2

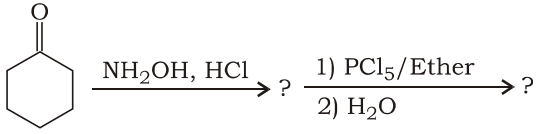




(b) Complete the following reactions with suitable mechanism (any *two*) : 2½×2=5

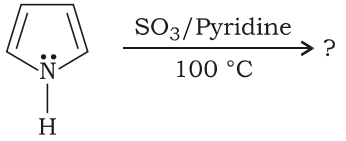
(i) 

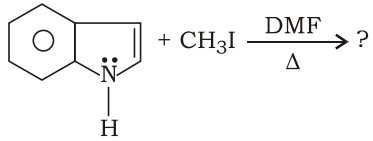
(ii) 

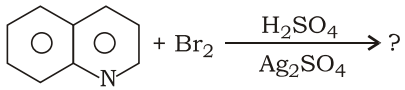
(iii) 

9. *(a)* Draw the resonance molecular orbital picture of pyrrole. 2

(b) Complete the following reactions with suitable mechanism (any *two*) : 2½×2=5

(i) 

(ii) 

(iii) 

OR

10. *(a)* How will you prepare quinoline by Skraup method? Give chemical equation. 3

(b) Electrophilic substitution of indole takes place primarily at C-3 rather than C-2. Explain. 2

(c) Complete the following reaction (mechanism not required) : 2

$$\phi\text{-NHNH}_2 + CH_3COCOOH \longrightarrow A \xrightarrow[ZnCl_2]{\Delta} B$$

$$\xrightarrow{\Delta,\ -CO_2} C \xrightarrow{\Delta,\ ZnCl_2} D$$

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Subject Code : V/ CHEM (v)

Booklet No. A

Date Stamp .....

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To be filled in by the Candidate

DEGREE 5th Semester
(Arts / Science / Commerce / .....) Exam., **2016**

Subject .....
Paper .....

INSTRUCTIONS TO CANDIDATES

1. **The Booklet No. of this script should be quoted in the answer script meant for descriptive type questions and vice versa.**
2. **This paper should be ANSWERED FIRST and submitted within** *45 minutes* **of the commencement of the Examination.**
3. **While answering the questions of this booklet, any cutting, erasing, over-writing or furnishing more than one answer is prohibited. Any rough work, if required, should be done only on the main Answer Book. Instructions given in each question should be followed for answering that question only.**

To be filled in by the Candidate

DEGREE 5th Semester
(Arts / Science / Commerce / .....) Exam., **2016**

Roll No. .....
Regn. No. .....

Subject .....
Paper .....

Descriptive Type
Booklet No. B .....

Signature of Scrutiniser(s) *Signature of Examiner(s)* *Signature of Invigilator(s)*

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2016

(5th Semester)

CHEMISTRY

FIFTH PAPER (Chem–351)

(Organic Chemistry—II)

(PART : A—OBJECTIVE)

(*Marks* : 20)

The figures in the margin indicate full marks for the questions

SECTION—I

(*Marks* : 5)

Put a Tick (✓) mark against the correct answer in the brackets provided : 1×5=5

1. Side chain halogenation takes place by

(a) electrophilic substitution mechanism ( )

(b) nucleophilic substitution mechanism ( )

(c) free radical mechanism ( )

(d) electrophilic addition mechanism ( )

2. Relative reactivity order of the following carboxylic acid derivatives is

(a) acid chloride > anhydride > ester > amide ( )

(b) acid chloride > amide > ester > anhydride ( )

(c) amide > ester > anhydride > acid chloride ( )

(d) anhydride > ester > amide > acid chloride ( )

3. Schiff's bases are formed when aniline reacts with

(a) aromatic ketones ( )

(b) aromatic aldehydes ( )

(c) aryl halide ( )

(d) aryl alcohols ( )

4. The product obtained in Mannich reaction is

(a) α-hydroxy carbonyl compounds ( )

(b) β-amino carbonyl compounds ( )

(c) β-hydroxy carbonyl compounds ( )

(d) 1°-amine ( )

5. Electrophilic substitution of furan takes place primarily at

(a) C-2 ( )

(b) C-3 ( )

(c) C-4 ( )

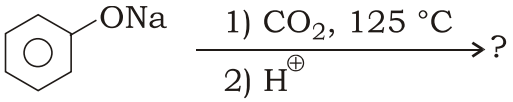
(d) 0-1 ( )

SECTION—II

(*Marks* : 15)

Answer the following questions in not more than *6* sentences each : 3×5=15

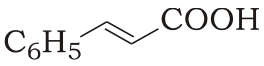
1. Complete the reaction with suitable mechanism :



2. "Aldehydes are more reactive than ketones towards nucleophile." Explain.

3. What will happen when 1°, 2° and 3°-amines react with nitrous acid? Write chemical equation.

4. How will you obtain



from C_6H_5CHO? Give the mechanism.

5. Compare the basicity of—

(a) pyrrole and pyridine;

(b) pyridine and piperidine.

★ ★ ★