PG Odd Semester (CBCS) Exam., December—2017

CHEMISTRY

(3rd Semester)

Course No. : CH–302

(Organic Chemistry—III)

Full Marks : 75
Pass Marks : 30

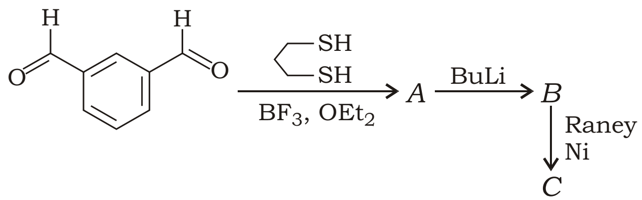
Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer **five** questions, taking **one** from each Unit

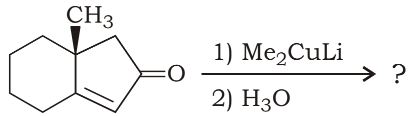
UNIT—I

1. *(a)* Explain umpolung. Complete the following reaction with plausible mechanism : 2+3=5

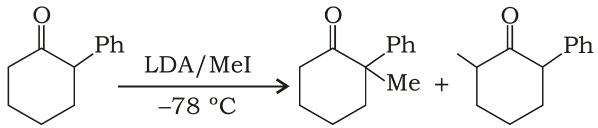


(b) What is Peterson's olefination? Provide an example with mechanism. 2+2=4

(c) How is Gilman reagent prepared? Complete the following reaction with mechanism : 1+2=3

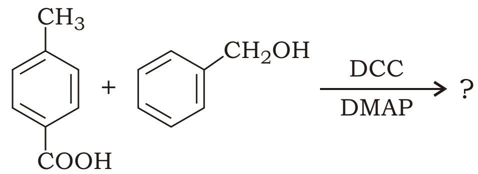


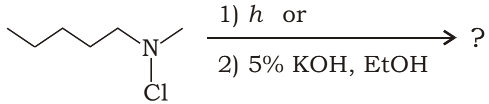
(d) Suggest a plausible mechanism for the following reaction : 3

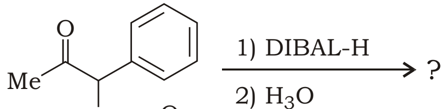


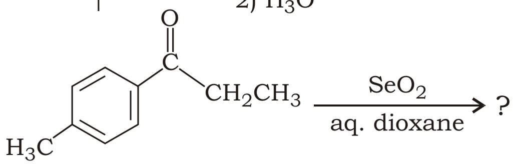
Minor Major

2. *(a)* Predict the product and show the mechanism : 3×4=12

(i) 

(ii) 

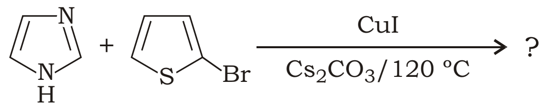
(iii) 

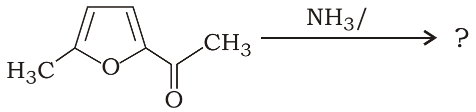
(iv) 

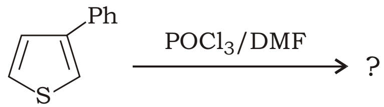
(b) Provide the reaction and mechanism for the dehydrogenation of 1,4-dihydropyridine derivative with DDQ. 3

UNIT—II

3. (a) Predict the product and show the mechanism : 2×3=6

(i) 

(ii) 

(iii) 

(b) Discuss Shapiro reaction with mechanism. 3

(c) What is a -lactum ring? Provide the structure of an antimicrobial compound containing -lactum ring. Write one method of synthesis of -lactum ring. 1+1+2=4

(d) Provide one general method of synthesis of diazines. 2

4. (a) How can imidazole be used as an acylating agent? 2

(b) Provide one method of synthesis of the following compounds (with mechanism) : 2×3=6

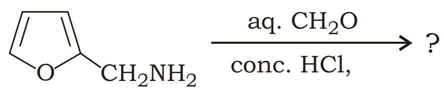
(i) Azetidine

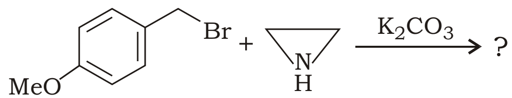
(ii) Thiazole

(iii) Pyrazine

(c) With necessary reaction and mechanism, explain Chichibabin reaction. 2

(d) Predict the products (with mechanism) : 2½×2=5

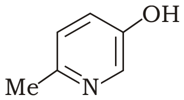
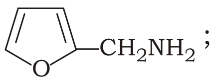
(i) 

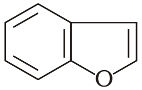
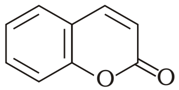
(ii) 

UNIT—III

5. (a) Describe the synthesis of 1-methyl isoquinoline from phenylethylamine following Bischler-Napieralski method. 5

(b) How can you obtain (with reaction mechanism)—

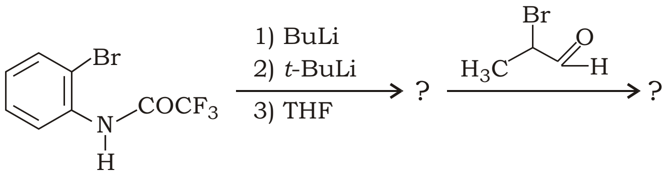
(i)  from  ;

(ii)  from  ?

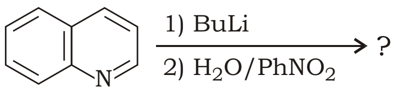
2½+2½=5

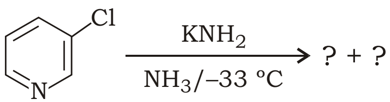
(c) How can 3-bromobenzothiophene be synthesized from benzothiophene? 2

(d) Complete the following reaction with supporting mechanism : 3



6. (a) Complete the following reactions and depict the mechanism : 2×3=6

(i) 

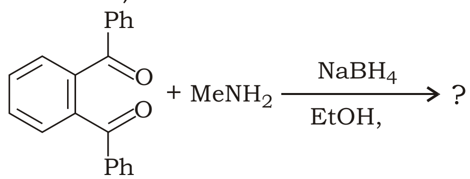
(ii) 

(iii) 

(b) Provide the mechanism of Skraup quinoline synthesis. 3

(c) What happens when quinoline is treated with oleum at 90 °C, 170 °C and 300 °C? 3

(d) Complete the following reaction (with mechanism) : 3



UNIT—IV

7. (a) Derive Michaelis-Menten equation of enzyme kinetics. 4

(b) Discuss the mechanism of action of the enzyme chymotrypsin. 5

(c) Outline the biosynthesis and lab synthesis of -carotene. 2+3=5

(d) Why is (+)- -ephedrine more stable than (–)-ephedrine? 1

8. (a) Discuss the synthesis of ( )-quinine and hence convert it to ( )-quinotoxine. 5+1=6 *(b)* Outline the mechanism of action of lysozyme. 5

(c) How can enzymes be extracted and purified? 2+2=4

UNIT—V

9. *(a)* State Chargaff's law with example. 2

(b) What are essential fatty acids? Emphasize on their stereochemistry by taking the structure of any essential fatty acid. Mention the sources and functions of the suggested essential fatty acid. 2+2+2=6

(c) Provide an overview on the replication of DNA. 3

(d) Outline the lab synthesis of adenosine. 4

10. *(a)* Discuss the reaction between oxygen and polyunsaturated fats and oils stating the products formed. 4

(b) Outline the Merrifield synthesis of the tripeptide Gly-Ala-Gly. 4

(Turn Over)

(c) Provide one chemical method each for N- and C-terminal amino acid sequencing of protein. 2+2=4

(d) Write briefly about the genetic code. What are the generalizations of the genetic code? 3

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