QH-5232

M. Sc. (Sem. I) Examination,
December - 2023

Chemistry

Paper - 1.2

CHEM - 512

(Organic Chemistry)

Time allowed : Three Hours

Maximum Marks : 70
Min. Pass Marks : 28

Note : This question paper contains two sections as under :

Section-A *Max. Marks-20*

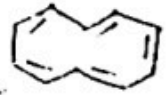
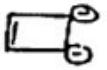
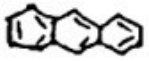
This section will have 10 questions, having 02 questions from each unit with no internal choice. Answer in about 20 words. All questions will have equal marks. (10×2=20)

Section-B *Max. Marks-50*

This section will have 10 questions, having 02 questions from each unit, one question to be attempted from each unit. Words limit approximately 400-500 words. Questions may have sub divisions. All questions will have equal marks. (10×5=50)

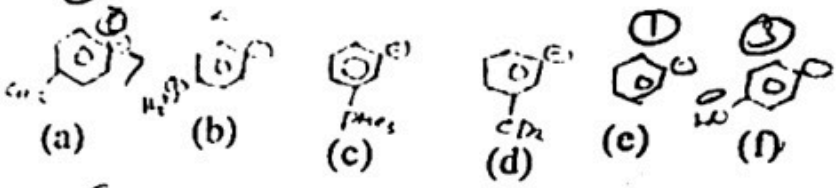
SECTION - A

1. (i) Identify the aromatic, antiaromatic, homoaromatic, nonaromatic and quasi aromatic compound in the following

(a) 
(b) 
(c) 
(d) 
(e) 
(f) 
(g) 
(h) 

(ii) Draw the resonance structure for vinyl chloride and furan.

(iii) Arrange the following carbanion in order of increasing stability :



(a) (b) (c) (d) (e) (f)

(iv) Write down the Taft equation and explain.

(v) The specific rotation of optically active pure (R) - 2 - bromo butane is −112.0°. A given sample of 2 bromobutane exhibited the specific rotation of −82.88°. What is the percentage of S-(t) enantiomer present in the sample?

(vi) What are epimer? Give suitable example.

(vii) Explain neighbouring group participation by T_1 - bond.

(viii) Explain regioselectivity with suitable example.

(ix) State whether the following compounds are ortho/para and meta orientation :



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

(x) Explain Diazonium coupling.

SECTION - B

2 Write notes on :

(i) Cryptands

(ii) Homo-aromaticity

(iii) Crown ether

(iv) Huckel rule.

$2\frac{1}{2} \times 4 = 10$

OR

(i) Discuss aromaticity in benzenoid and non-benzenoid system. 5

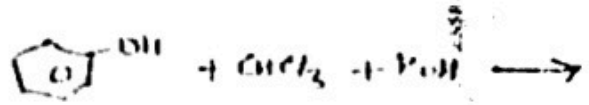
(ii) construct molecular orbital diagram of allyl system by the use of perturbation theory. 5

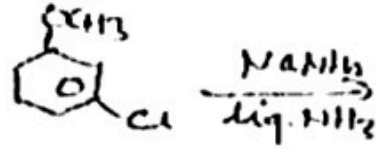
3 (i) Give two methods of generation of carbene and nitrene. 5



(ii) Give the structure of the product and outline the mechanism involved in each of the following reactions :

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(a) 

(b) 

$$2\frac{1}{2}\times 2 = 5$$

OR

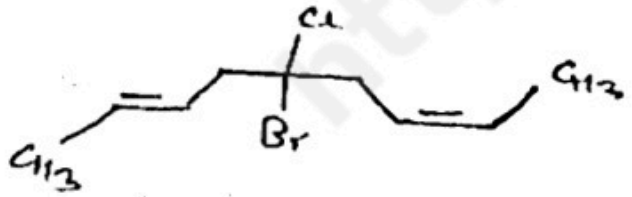
Discuss the primary and secondary kinetic isotope effect by taking suitable examples.

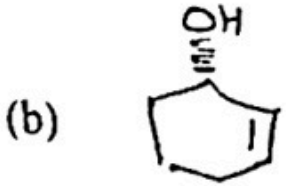
5+5

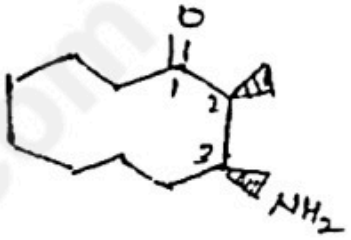
4 (i) Taking example of cyclohexane and some of its derivatives, discuss the effect on chemical reactivity.

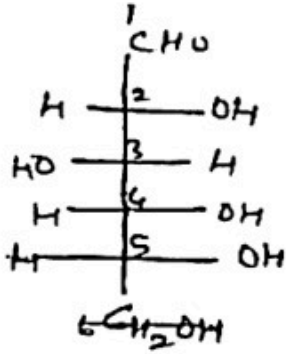
5

(ii) Give the R and S nomenclature of the following compounds with denoting the chiral centre.

(a) 

(b) 

(c) 

(d) 

5

OR

(i) Write a three-dimensional structure for each of the following names :

(a) (4R, 6S) - 4-Ethyl - 6 - methylnonane

(b) (2R) -2, 3 dihydroxy propanol

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(c) (1R, 3R) - 3 - methyl
-1- cyclohexanol

(d) Methyl (2R) - 2 aminopropanoate.

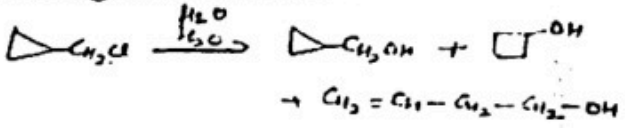
5

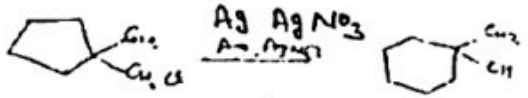
(ii) Explain stereospecific and stereo selective synthesis with suitable example.

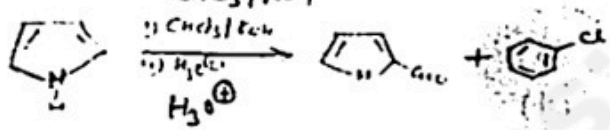
$2\frac{1}{2} \times 2 = 5$

Unit-4

5 Sketch a suitable mechanism scheme for each of following transformation :

(a) 

(b) 

(c) 

3+3+4

OR

Give brief notes on the following :

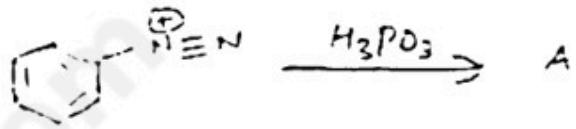
(a) Ambident nucleophile

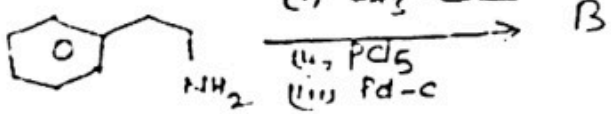
(b) Phase transfer catalyst

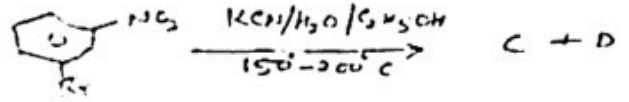
(c) Sommlet - Houser rearrangement.

10

6 Complete the following reactions with mechanism :

(a) 

(b) 

(c) 

3+3+4

OR

Give brief notes on following :

(1) Ortho/para ratio

(2) Leaving group

(3) Fries rearrangement

(4) SE_i mechanism.

$2\frac{1}{2} \times 4 = 10$

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