U-5232

M. Sc. (Sem.-I) Examination, 2021

CHEMISTRY

Paper-1.2

CHEM-512

ORGANIC CHEMISTRY

Time allowed : **Three Hours**

Maximum Marks : **70**
Min. Pass Marks : **28**

Note : This question paper will be divided into three sections as under :

Section-A ***Max. Marks-10***

*Will carry **10** marks with **01 compulsory** question comprising **10** short answer type questions (maximum 20 words answer) taking two questions from each unit. Each question shall be of one mark.*

Section-B ***Max. Marks-25***

*Will carry **25** marks equally divided into five long answer type questions (answer about in 250 words) . Students are instructed to attempt five questions by selecting one question from each unit.*

Section-C ***Max. Marks-35***

Will carry 35 marks with five long answer type qustions comprising one compulsory question of 15 marks and four questions of 10 marks each. Students are instructed to attempt total three questions with one compulsory question (answer about in 500 words) and any two more questions (answer about in 400 words) out of remaining four questions.

SECTION - A

1 (i) Draw the resonating structure of Aniline.

(ii) Find out number of π-electrons in Anthracene.

(iii) Define thermodynamic aspect of chemical reaction.

(iv) Draw the sturcture of tatric acid and indicate chiral carbon.

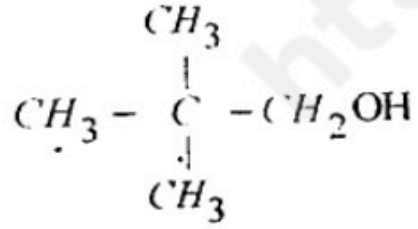
(v) What is the effect of Steric hindrance on SN^2 reaction ?

(vi) Allene is optically active although it is not having chiral carbon. Explain.

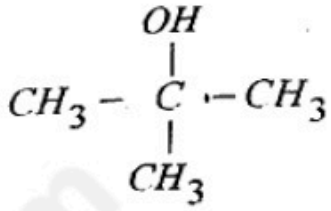
(vii) What is the key difference between classical and non classical carbocation ?

(viii) Give two examples of ambient nucleophle.

(ix) Which alcohol will give E_1 reaction :

(a) 

(b) $CH_3-CH_2-CH_2OH$

(c) 

(d) CH_3-CH_2-OH

(x) What will be the reaction intermediate of E_1 reaction

(a) Carbocation

(b) Carbanion

(c) Carbene

(d) Free-radical

$1\times10=10$

SECTION - B

UNIT - I

2 Discuss aromaticity in benzenoid and non-benzenoid system.

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

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3 Write note on :

(1) Crown ether complexes

(2) Conjugation and Hyper-Cojugation

2+1+2=5

UNIT - II

4 Discuss about kinetically and thermodynamic controlled product formation by taking example of reaction between Butadiene and Hydrogen bromide.

5

5 How Taft equation correlates the structure reactivity with field effect and steric factor ? Explain.

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5

UNIT - III

6 Taking example of cyclohexane and some of its derivative, discuss the effect of conformation on chemical reactivity.

5

7 Answer the following :

(a) Conformation of cis and trans decalins

(b) Elements of symmetry

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

UNIT - IV

8 Discuss with suitable examples

(a) Neighbouring group participation

(b) Nucleophilic substitution at an Allylic carbon.

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

9 Write short notes on :

(i) Phase transfer catalysis

(ii) Regioselectivity

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

https://pyqlelo.com

UNIT - V

10 Explain Arenium ion mechanism of aromatic electrophilic substitution with evidences.

3+2=5

11 Explain following reactions with mechanism

(a) Vilsmeier – Haack Reaction

(b) Reimer – Tiemann Reaction

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

SECTION - C

12 Explain the following

(i) Huckel Molecular Orbital theory for aromatic and anti-aromatic compounds.

(ii) Construct molecular orbital diagram of allyl-system and 1,3 - butadiene by the use of perturbation theory.

5+5=10

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

5+5=10

14 Explain the following :

(i) Asymmetric synthesis with example

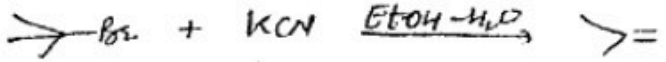
(ii) Reactivity effect of substrate structure in aliphatic and aromatic nucleophilic substitutions.

(iii) Sommelet - Hauser and Smiles re-arrangements.

4+7+4=15

15 Explain the following reactions:

(a) 

(b) 

(c) $Et-OH+HCN \rightarrow$ No reaction

(d) $Et-OH+HI \rightarrow EtI$

3+3+2+2=10

16 Discuss the following :

(i) Orientation and reactivity in beneze ring

(ii) Leaving group and the solvent polarity in aliphatic electrophilic substitution reaction.

5+5=10