Q.P. Code : 61902

First Semester M.Sc. Degree Examination, January/February 2020

(CBCS – New Scheme – Freshers)

Chemistry

Paper CH 102 – ORGANIC CHEMISTRY – I

Time : 3 Hours] *[Max. Marks : 70*

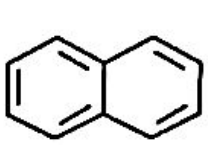
*Instructions to Candidates : Answer Q. No. 1 and any **FIVE** of the remaining.*

1. Answer any **TEN** of the following : **(10 × 2 = 20)**

   (a) Illustrate hyper conjugation with suitable example.

   (b) Sketch the MO diagram for [6]-annulene.

   (c) Using the starring approach, indicate the alternant and non-alternant hydrocarbons in :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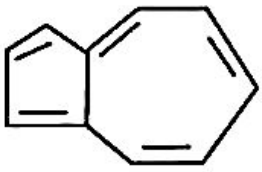


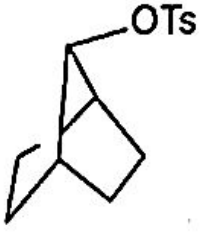
   (d) Give an example for a non-classical carbocation. Highlight its exceptionality.

   (e) Arrange in decreasing order of acidity :

   HCOOH ; Cl_3CSO_3H ; CH_3COOH and $F_3C\text{-}SO_3H$

   (f) Highlight the structural differences between naturally occurring ribose and deoxyribose.

   (g) Which among the following compounds exhibits faster rate of reaction with NaOAc/AcOH? Give reasons.



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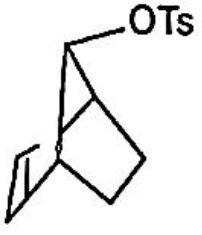
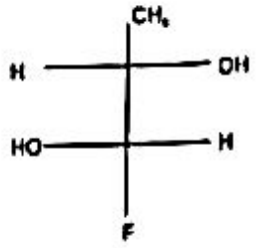
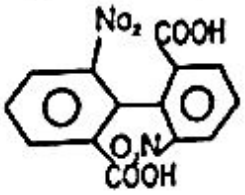


(h) Convert the following compound into flying wedge, sawhorse and Newman projection formulae. Indicate the most stable conformation.



(i) Which among the following are optically active and why?



and

(j) Convert O-phenylene diamine to benzimidazole.

(k) Draw the conformational structure of gentiobiose and highlight its biological importance.

(l) Sketch the Si/Re faces of acetophenone.

2. (a) Discuss Huckel's rules of aromaticity.

(b) What are mesoionic compounds? Highlight their importance and sketch any one synthesis of a syndrome.

(c) Write a note on receptors with multiple hydrogen bonding sites. **(4 + 3 + 3)**

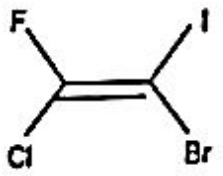
3. (a) Outline the generation, structure, stability and reactivity of carbanions.

(b) Illustrate any two methods to determine cross-over products.

(c) Describe the effect of +I and –I groups on the strengths of bases. **(4 + 3 + 3)**

4. (a) Highlight the Cahn-Ingold-Prelog rules to assign the absolute configuration of asymmetric carbons.

(b) Assign E/Z-nomenclature for the following :



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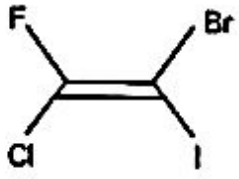

(c) Draw the most stable conformational structure of trans-decalin. **(4 + 3 + 3)**

5. (a) Give reagents and equations for the conversion of β – D-glucose to :

(i) Glucanic acid

(ii) Sorbitol and

(iii) Gluconic acid

Mention the class to which each product would belong.

(b) Outline the Hantzsch-Widman method for nomenclature of fused heterocyclic compounds. (6 + 4)

6. (a) Define tautomerism. Citing suitable examples, illustrate :

(i) Keto-enol

(ii) Enamine-imine and

(iii) Nitroso-oxime tautomerizations.

(b) What are crown ethers? Give examples and highlight their utility in organic syntheses. (6 + 4)

7. (a) Discuss HSAB theory.

(b) Define asymmetric synthesis. Citing an example, formulate Cram's rule of asymmetric induction. (5 + 5)

8. (a) Describe the structural elucidation of sucrose.

(b) Write short notes on :

(i) Fischer's indole synthesis

(ii) Synthesis of coumarins (4 + 6)