PG – 550

I Semester M.Sc. Examination, January 2017
(CBCS)
CHEMISTRY
C – 102 : Organic Chemistry – I

Time : 3 Hours | Max. Marks : 70

***Instruction** : Answer Question No. 1 and **any five** of the remaining.*

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

a) Cyclo pentadienyl anion is aromatic while cyclopentadiene is not. Explain.

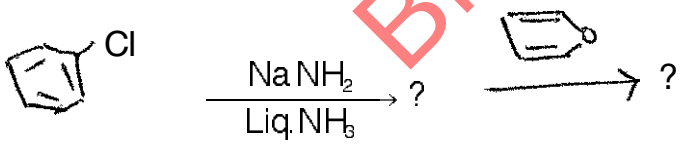
b) Which of the following is stronger acid and why ?
3-Bromopropanoic acid and 2-Bromopropanoic acid.

c) Arrange the following carbocations in the increasing order of their stability.

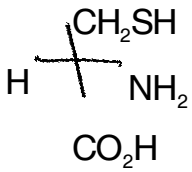
$(CH_3)_3\overset{+}{C}$, $Cl_3\overset{+}{C}$, $(CH_3)_2\overset{+}{C}H$ and $C_6H_5\overset{\oplus}{C}H_2$

d) What are ambident nucleophiles ? Give examples.

e) Predict the product in the following.



f) Assign the R and S-configuration to the following.



g) Write the stable conformations for the following sugars.

i) α – D – Galactopyranose

ii) α – D – Fructose.

h) How stereochemical studies are used to differentiate between SN^1 and SN^2 reactions ?

i) Draw the structure of ascorbic acid and mention its deficiency diseases.

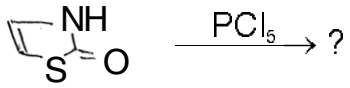
P.T.O.

j) Predict the product in the following and propose a mechanism for its formation.

Imidazole $\xrightarrow[100^{\circ}C]{\text{Oleum}}$?

k) Explain the biological importance of vitamin E.

l) Predict the product and propose a mechanism.



2. a) What are meso-ionic compounds ? Explain the aromaticity of N-Phenyl sydnone.

b) What are antiaromatic and homo-aromatic compounds ? Give examples.

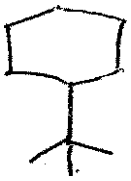
c) Explain Curtin-Hammett principle and give its significance. **(3+3+4=10)**

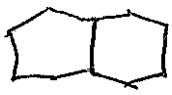
3. a) With suitable examples explain how isotope labelling studies are useful in determining the mechanism of organic reactions.

b) Explain briefly the effect of structure on the strength of acids and bases.

c) Explain briefly how the nature of nucleophile and reaction medium effect the rate of SN^1 and SN^2 reactions. **(3+4+3=10)**

4. a) Write all possible conformations of the given compounds and comment on their stability.

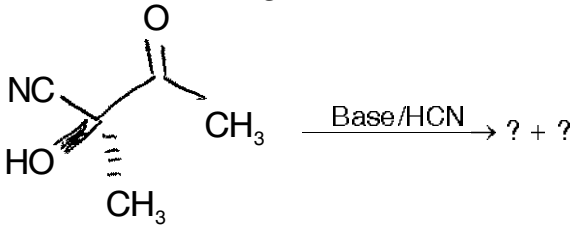
ii) 

ii) 

iii) 

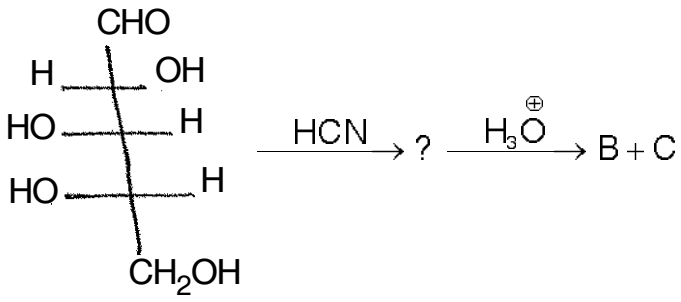
b) Write briefly on Cahn-Ingold-Prelog rules. **(6+4=10)**

5. a) Using a suitable model bring out the relation between the face attacked by $CN^{\ominus}$ and R/S-configuration of the isomers obtained in the following reaction :



b) How the structure of sucrose is established ? **(5+5=10)**

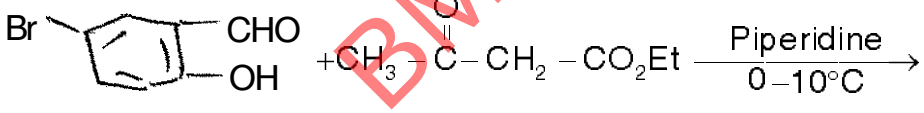
6. a) The intermediate obtained from L(+)-Arabinose upon acid hydrolysis yields B and C. Suggest suitable structures for (B) and (C) and indicate their stereochemical relationship.



b) Write briefly on
   i) Deoxysugars
   ii) Diastereotopic groups. **(4+6=10)**

7. a) Formulate one method for synthesis of
   i) Pyrimidine
   ii) Purine.

b) Predict the product formed and explain the mechanism.



(6+4=10)

8. a) Outline the synthesis of biotin.

b) Explain the important biological functions of Vitamin B_6.

c) Give any one synthesis of pyrazole and explain its chemical reactivity.

(4+3+3=10)
