

B.Sc. 5th Semester (Honours) Examination, 2019-20

CHEMISTRY

Course ID : 51412

Course Code : UG/CHEM/502/C-12

Course Title: Organic Chemistry-V

Time: 1 Hour 15 Minutes

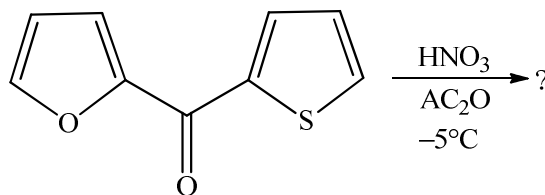
Full Marks: 25

*The figures in the right hand side margin indicate marks.
Candidates are required to give their answers in their own words
as far as practicable.*

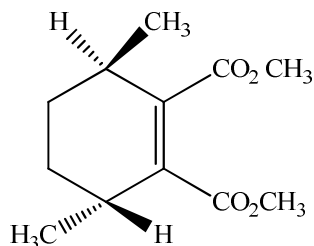
1. Answer any five questions:

1×5=5

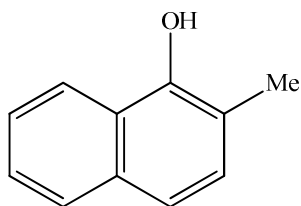
- (a) Write the structure of a disaccharide which is a reducing sugar.
(b) Give the product(s) of the following reaction:



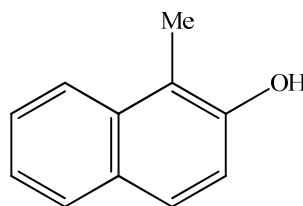
- (c) What form of glycine would you expect to predominate at (I) pH below 2-3 and (II) pH above 9-6?
(d) Write down the structure of a L-amino acid which is a R-enantiomer.
(e) Draw the structure of the sugar moiety in DNA with appropriate configuration.
(f) Predict the diene and dienophile that would give the following Diels-Alder product:



- (g) Draw the preferred conformation of *cis*-cyclohexane-1,3-diol.
(h) Which of the two compounds will react with benzenediazoniumchloride under basic condition to give an azo-dye?



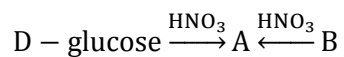
(A)



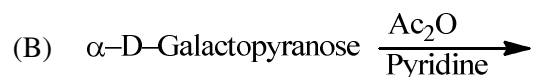
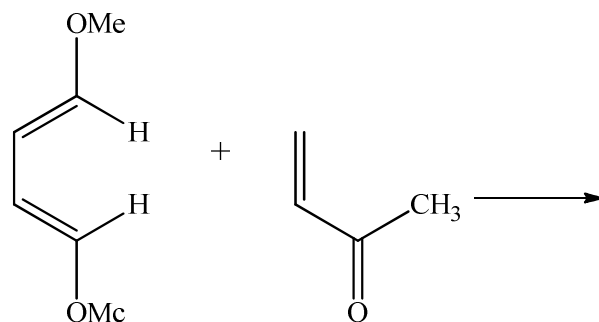
(B)

2. Answer any two questions:

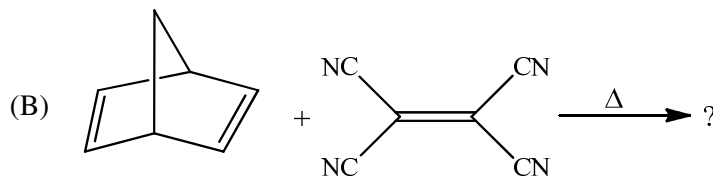
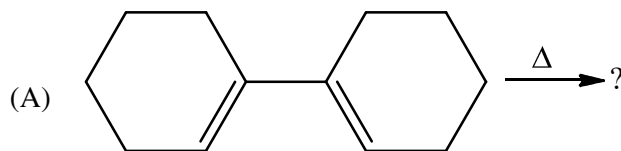
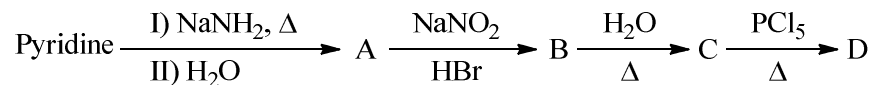
5×2=10

(a) (i) Draw Fischer projection of compounds A and B in the following equation: $2+(1\frac{1}{2}+1\frac{1}{2})=5$ 

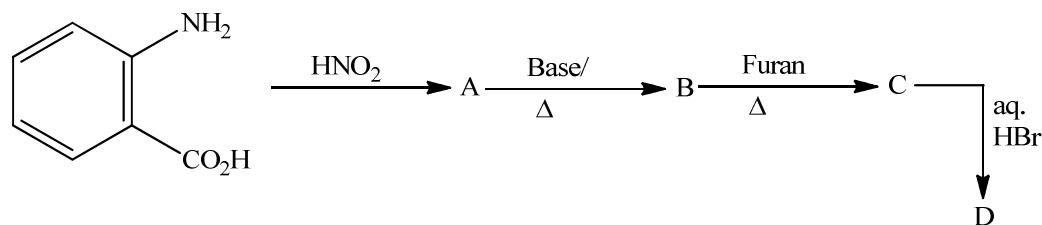
(ii) Draw the structure of the compound formed in each of the following reactions:

(b) (i) Use endo rule to predict the product of the following reaction. Draw the FMO of the transition state. $3+(1+1)=5$ 

(ii) Predict the products of the following reactions:

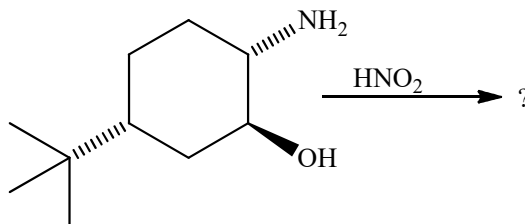
(c) (i) Write structures for compounds A – D. $2+2+1=5$ 

(ii) Identify the missing compounds A – D.



(iii) Why naphthalene has relatively less aromatic character as compared to benzene.

(d) (i) Predict the product(s) and suggest a mechanism for the following reaction: 3+2=5



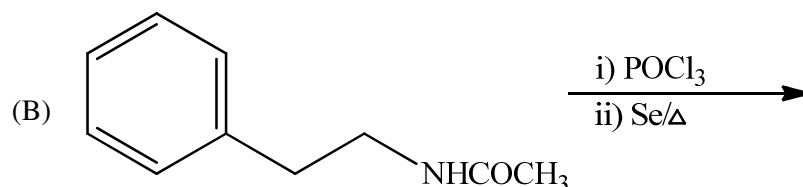
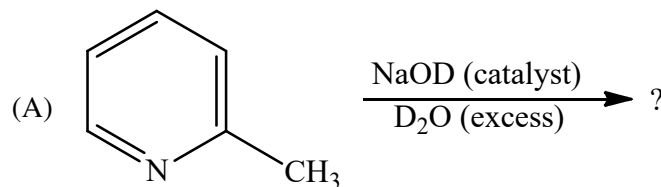
(ii) Draw the twist boat and half chair conformations of cyclohexane. Which is less stable and why?

3. Answer *any one* question:

10×1=10

(a) (i) Predict the products and explain your choice.

(1½+1½)+5=10



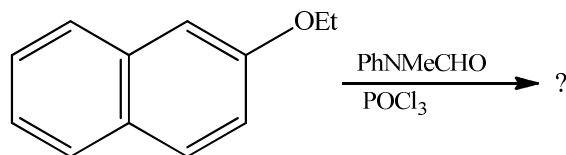
(ii) 9, 10-positions in anthracene are very reactive towards electrophilic substitution. Why?

(iii) Outline Kiliani-Fischer synthesis of epimeric aldotetroses (A and B) starting with D-threose (use Fischer-projections). A can be oxidized with HNO_3 to an optically inactive aldaric acid while similar oxidation of B yields an optically active product. Identify A and B.

(b) (i) What is Sanger's reagent? How can you detect the N-terminal amino acid of a peptide with this reagent? (1+2)+2+2+2+1=10

(ii) Proline produces yellow color with ninhydrin. —Explain.

(iii) Complete the reaction:



(iv) According to Watson and Crick model draw the base pairs showing all the H-bonds in them.

(v) Give the major product formed by the photochemical reaction of (2E, 4Z, 6E)-decatriene.
