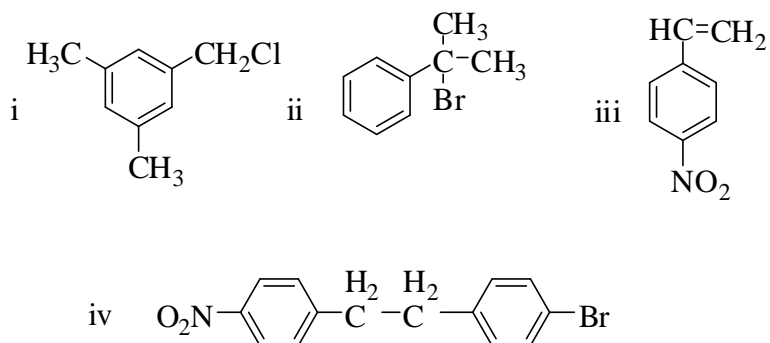


Section A Question 1 COMPULSORY (30 marks)

- A. Name the four major classes of organic reactions giving an example for each (8 marks)
- B. In thermodynamics of bonding, what does bond dissociation energy (BDE) mean and when is it positive or negative? (3 marks)
- C. Separate the following species into electrophiles and nucleophiles: (2 marks)
- CH_3OH , SO_3 , NO_2^+ , RSH , H_2S , NH_3 , OH^- , H_3O^+ , Br^+
- D. Does 2-bromopentane have a chirality center? If so, write three-dimensional structures for each enantiomer. (3 marks)
- E. Suggest a name for each of the following compounds: (4 marks)



- F. Describe four properties of diastereomers (4marks)
- G. By drawing Newman projection, show how the potential energy changes occur in propane when the molecule is rotated around one of the C-C bond through a complete cycle. (6 marks)

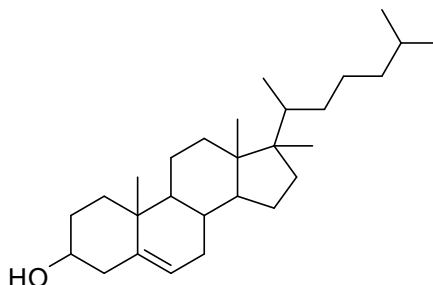
Section B: This section contains FOUR questions. Answer ONLY TWO questions.

QUESTION 2 (20 marks)

- A. Compound A which is optically active was found to have lost its optical activity after standing in water containing acid a few drops of acid. Explain. (4 marks)

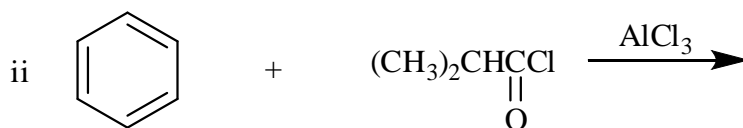


- B. Circle all the chiral carbon atoms in cholesterol (below) and state its possible number of optical isomer: (4 marks)



- C. How is benzene obtained from coal tar? (4 marks)

- D. Complete the following reactions: (4 marks)

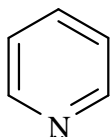


- E. Explain four major properties of enantiomers. (4 marks)

QUESTION 3 (20 marks)

- A. Define the Huckel rule and anti-aromatic compounds. (6 marks)

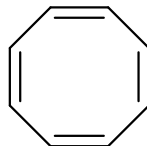
- B. Indicate whether and why the following compounds are aromatic, non-aromatic or anti-aromatic: (6 marks)



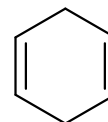
i



ii



iii



iv

- C. Illustrate the difference between hemolytic and heterolytic bond cleavage in a chemical reaction. (4 marks)
- D. Define the term Chirality and give an example of a chiral center. (4 marks)

QUESTION 4 (20 marks)

- A. Describe the necessary conditions and reagents required to convert benzene into each of the following: (8 marks)
- Nitrobenzene
 - Cyclohexane
 - Benzaldehyde
 - Chlorobenzene
- B. Offer an explanation for the following observations: (4 marks)
- Toluene requires lower temperature (30°) than benzene (55°) for nitration.
 - Chlorobenzene is less reactive than benzene.
- C. Name and define three intermediates encountered in chemical reactions. (6 marks)
- D. With an example explain what conformational isomers are? (2 marks)

QUESTION 5 (20 marks)

- A. Illustrate the three major steps in photo chlorination of methane. (6 marks)
- B. Briefly describe the working principles of a polarimeter. (8 marks)
- C. What is specific rotation as used in chemistry? (2 marks)
- D. Differentiate between Resolution and Racemization as applied in stereochemistry. (4 marks)

-END-