Exam. Code: 0005
Sub. Code: 0452

2012

B.A./B.Sc. (General) Fifth Semester

Chemistry

Paper – XVIII: Organic Chemistry – A

(Same for B. Sc. Microbial and Food Technology)

Time allowed: 3 Hours

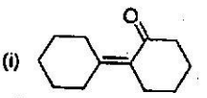
Max. Marks: 22

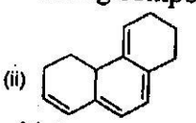
NOTE: *Attempt five questions in all, including Question No. 9 (Section-E) which is compulsory and selecting one question each from Section A-D.*

x-x-x

Section-A

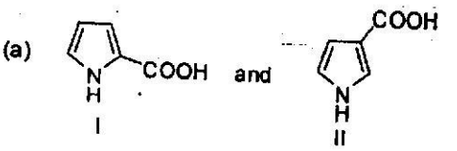
1. (a) Calculate the λ_{max} the UV spectrum of the following compounds; (3)





(b) Amongst aniline and anilinium ion, in which auxochromic effect is more pronounced and why? (1)

2. (a) Which of the following pairs of molecules is expected to absorb at longer wavelength and why? (2)



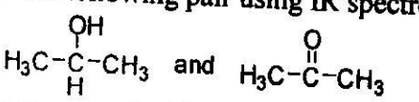
(b) CH_3Cl and CH_3I

(b) Discuss different types of electronic transitions possible in organic molecules. (2)

Section-B

3. (a) How can one establish whether a carbonyl group is part of aldehyde, ester or ketone by using IR spectroscopy? (2)

(b) How do you differentiate the following pair using IR spectroscopy; (2)



4.(a) Deduce the structure of a compound with molecular formula of $C_9H_{10}O_2$ displaying following spectral data;

UV: 268 and 262 nm

IR: 1745, 1225 cm^{-1}

^1H NMR: δ7.22, 5.0, 2.0 with intensity ratio 5:2:3 (3)

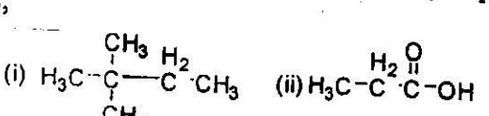
(b) Why is methanol a good solvent for UV but not for IR determination? (1)

Section-C

5. (a) Why do NMR signals split? Explain in detail. (2)

(b) Propose the structure consistent with the NMR data of the compound C_9H_{12} δ 1.2 (d, 6H), 2.9 (septet, 1H), 7.2 (s, 5H). Give reason for each assignment. (2)

6. (a) Predict the splitting pattern in each set of chemically equivalent protons in following molecules; (3)



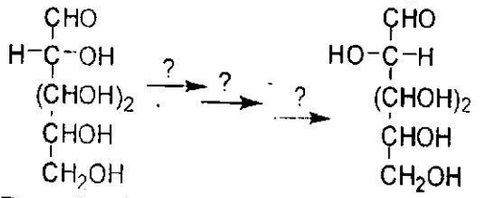
(b) How will you distinguish between 1-chloropropoane and 2-chloropropane from their NMR spectra? (1)

Section-D

7. (a) Why two isomeric forms of D-glucose exist? Write their structures along with their names. (2)

P.T.O.

(b) Give the mechanism for following conversion; (2)



8. (a) Describe the Killiani-Fischer synthesis any aldohexose from aldopentose. (3)

(b) Explain why sucrose, a disaccharide, is a non-reducing sugar; while maltose (also a disaccharide) is a reducing sugar? (1)

Section-E

9. (a) Why broad absorption bands are observed in an ultraviolet spectrum instead of sharp peaks?

(b) Amongst ortho- and para-hydroxybenzoic acids, whose C=O stretching will be observed at higher wave number and why?

(c) Why there is need of using internal standard for NMR spectra?

(d) What are limitations of open chain structure of glucose?

(1.5 mark each)

x-x-x