

1059
B.E. (Biotechnology) Second Semester
CH-202: General Chemistry

Time allowed: 3 Hours

Max. Marks: 50

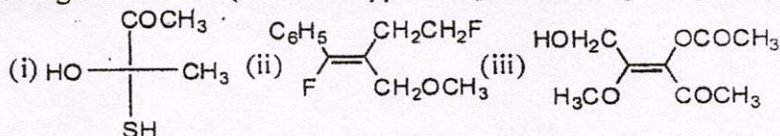
NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

- Q.(1) (i) In the trigonal bipyramidal arrangement, why does a lone pair occupy an equatorial position rather than an axial position? (2)
- (ii) Define Crystal Field Stabilization Energy. (1)
- (iii) In monosubstituted cyclohexanes, why does a substituent prefer to occupy an equatorial position? (2)
- (iv) Why aromatic compounds generally undergo substitution reactions rather than addition reactions? (2)
- (v) Why Phenols are more acidic than alcohols? (2)
- (vi) Why electrophilic substitution in pyrrole occurs at C₂ and not C₃? (1)

SECTION-A

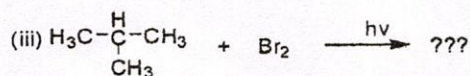
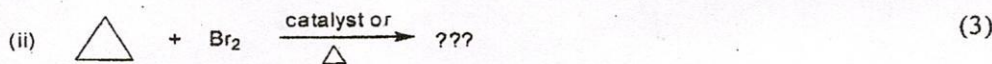
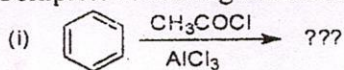
- Q.(2) (a) Discuss the geometry of the molecule having one lone pair and four bond pairs. (3)
- (b) Draw the molecular orbital diagram of N₂ molecule with the help of MO diagram. (4)
- (c) The geometry of CH₄ could be square planar, with the four H atoms at the corners of a square and the atom at the center of the square. Sketch this geometry and compare its stability with that of a tetrahedral CH₄ molecule. (3)
- Q.(3) (a) Explain Crystal Field splitting in octahedral complexes. (7)
- (b) How Crystal field theory is helpful in understanding the magnetic properties of metal complexes? (3)
- Q.(4)(a) Assign R/S or E/Z (wherever applicable) to following compounds; (2)



- (b) Draw the Newman projection for different conformations possible for n-butane. Give the conformational analysis for n-butane also. (5)
- (c) Define following compounds with example; (3)
- (i) enantiomers (ii) diastereomers (iii) meso compounds

SECTION-B

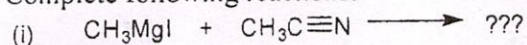
Q.(5)(a) Complete following reactions;



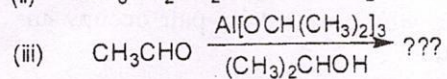
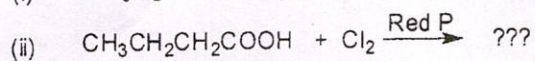
- (b) Explain the acidic nature of acetylenic hydrogen. Compare its acidic strength with ethane and ethene. (3)
- (c) Discuss the effect of temperature on 1,2- and 1,4- addition in buta-1,3-diene. (4)
- Q.(6)(a) Explain Benzoin condensation with mechanism in benzaldehyde. (4)

(2)

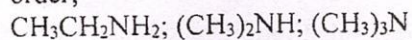
(b) Complete following reactions:



(3)



(c) Arrange the following in increasing order of basicity and give reason for same order;

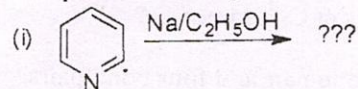


(3)

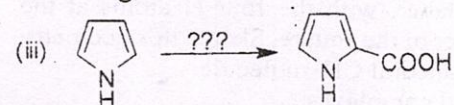
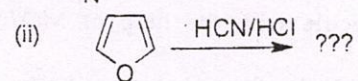
Q.(7)(a) Give Skraup's synthesis for quinolone.

(4)

(b) Complete following reactions:



(3)



(c) Give the order of basic strength of pyridine, piperidine and pyrrole. Explain this order.

(3)

x-x-x