

**B.Sc. BIOTECHNOLOGY
THIRD SEMESTER (REPEAT)
CHEMISTRY-I**

BBT-303

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs.

Full Marks: 70

Time: 30 mins.

(Objective)

Marks: 20

Choose the correct answer from the following:

1×20=20

1. Which of the following are Oxidation processes?

1. An alcohol is converted to aldehyde
2. An acid is converted to alcohol
3. An aldehyde is converted to acid
4. An acid is converted to ester

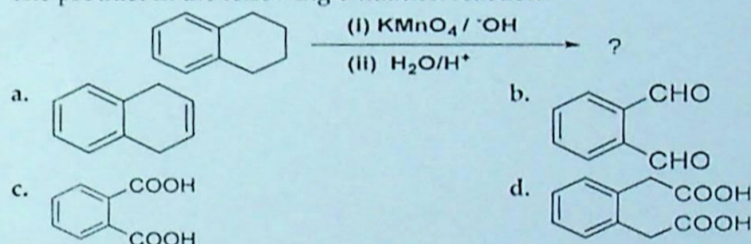
- a. 1 & 3
- b. 2 & 3
- c. 3 & 4
- d. 1, 2 & 3

2. Which of the following is/are reducing agents?

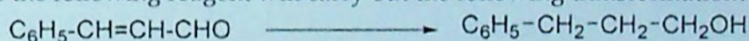
1. Na and C₂H₅OH
2. K₂Cr₂O₇
3. PCC
4. NaBH₄

- a. 1 & 2
- b. 2 & 3
- c. 3 & 4
- d. 1 & 4

3. The product in the following oxidation reaction

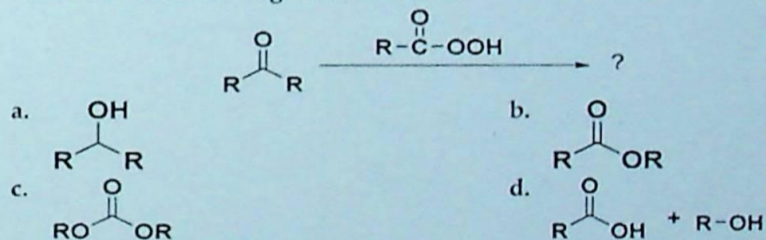


4. Which of the following reagent will carry out the following transformation?



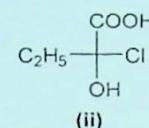
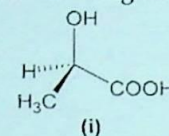
- a. Na in EtOH
- b. NaBH₄
- c. LiAlH₄
- d. PCC

5. Product in the following reaction will be:

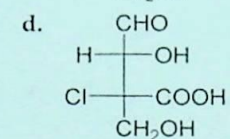
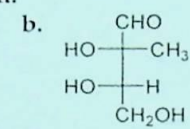
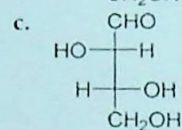
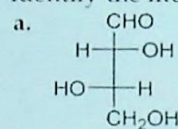


6. The reagent used in Clemmensen Reduction is:
- Zn/Hg and HCl
 - NH₂NH₂ and NaOH
 - Zn and HCl
 - NH₂NH₂ and EtONa
7. The total number of asymmetric carbon & stereoisomers of the following compound will be
- "Me₂CH-CHCl-CH(OH)-CHCl-COOH"
- 3 & 6
 - 2 & 4
 - 1 & 2
 - 3 & 8

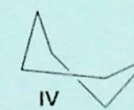
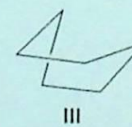
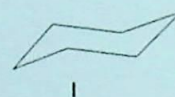
8. The configurations of following molecules (i) and (ii) are respectively



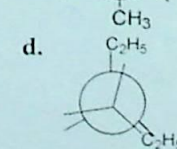
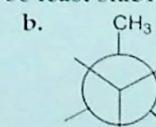
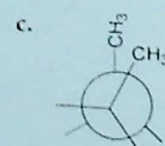
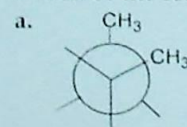
- S and R
 - R and S
 - S and S
 - R and R
9. Identify the molecule with D-configuration:



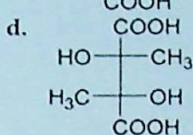
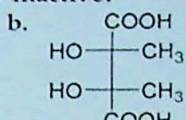
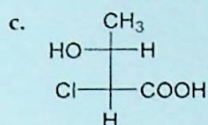
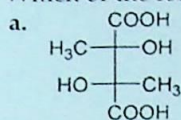
10. Cyclohexane has the following interconvertible conformations (I to IV). The most and the least stable of these are respectively



- I & II
 - I & IV
 - II & IV
 - IV & II
11. Which of the following conformations will be least stable?



12. Which of the following molecule is optically inactive?



13. Brady's reagent is:

- a. R-Mg-X
- c. 2,4-Dinitrophenylhydrazone

- b. 2,4-Dinitro phenylhydrazine
- d. None of the above

14. Knoevenogel reaction is the synthesis of:

- a. α,β -Saturated acids
- c. α,β -Unsaturated acids

- b. β -Unsaturated acids
- d. β -Saturated acids

15. CH_3OH is an example of:

- a. Aprotic polar solvent
- c. Aprotic non-polar solvent

- b. Protic polar solvent
- d. Non-polar solvent

16. E^2 elimination reaction follow:

- a. One step mechanism
- c. Three step mechanism

- b. Two step mechanism
- d. Four step mechanism

17. In Cannizaro reaction aldehyde undergo:

- a. Self-oxidation-reduction
- c. Only self-reduction

- b. Only self-oxidation
- d. Condensation

18. A low concentration of nucleophile favors which of the following?

- a. $\text{S}_{\text{N}}2$ reaction
- c. Both $\text{S}_{\text{N}}1$ & $\text{S}_{\text{N}}2$

- b. $\text{S}_{\text{N}}1$ reaction
- d. None

19. In Aldol condensation reaction the substrate must have:

- a. One β -H
- c. One β -C

- b. One α -H
- d. One β -F

20. $\text{S}_{\text{N}}2$ stands for:

- a. Substitution nucleophilic bimolecular
- c. Substitution electrophilic bimolecular

- b. Substitution nucleophilic unimolecular
- d. Substitution electrophilic unimolecular

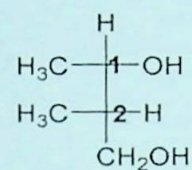
(Descriptive)

Time : 2 hr. 30 mins.

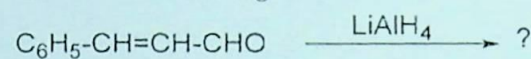
Marks : 50

[Answer question no.1 & any four (4) from the rest]

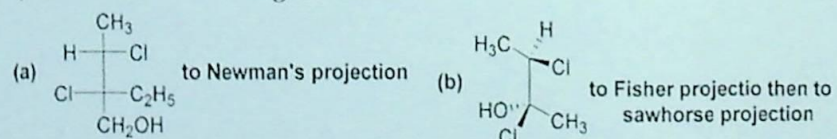
1. a) Mention (R/S) configurations of chiral centres 1 and 2 in the following molecule 3



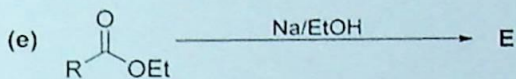
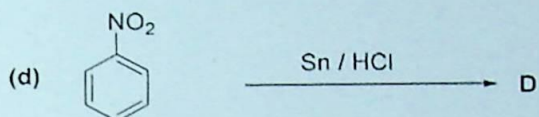
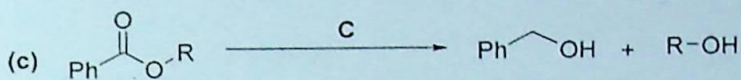
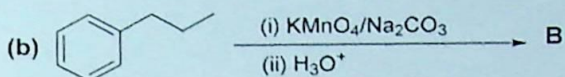
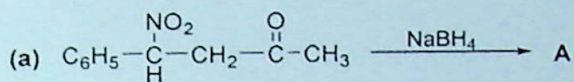
- b) The product in the following oxidation reaction 2



- c) Define aldol condensation, Cannizzaro reaction. Show its proper mechanism for both the reaction. 5
2. a) What is the difference between conformations and configurations of molecules? Illustrate with examples. 5
- b) Draw different conformations of n-butane. Indicate the most stable and least stable conformers of n-butane. Draw energy vs dihedral angle diagram for the conformers of n-butane. 5
3. a) Why chair conformation of cyclohexane is more stable than boat conformation? Give reason. Draw Newman's projection for both these forms. Indicate axial and equatorial bonds in chair form and flagpole bonds in boat form. 5
- b) Methyl group in methyl cyclohexane can exist in axial or equatorial bond. Explain. 2
- c) Convert the following structures: 3

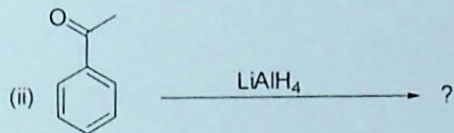
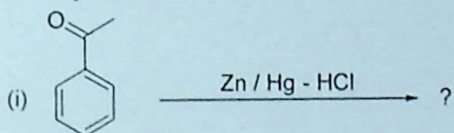


4. Write down the structures of the products/reagent A, B, C, D and E in the following reactions. 2×5=10



5. a) Write down the products with mechanism.

2+2=4



3×2=6

b) Write notes on: (any two)

- i) Wolff-Kishner reduction
- ii) Rosenmund reduction
- iii) Oppenauer oxidation.

6. Write down five differences between $\text{S}_\text{N}1$ and $\text{S}_\text{N}2$ reactions. Draw the energy profile diagram for $\text{S}_\text{N}1$ and $\text{S}_\text{N}2$ reaction mechanism. Give an example of aprotic polar solvent.

5+4+1=10

7. a) Complete the following reaction:

5×1=5