

**B.Sc. MICROBIOLOGY
THIRD SEMESTER (SPECIAL REPEAT)
CHEMISTRY-I
BMB-305**

(Use Separate Answer Scripts for Objective & Descriptive)

Duration : 3 hrs.

Full Marks : 70

[PART-A: Objective]

Time : 30 min.

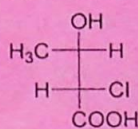
Marks : 20

Choose the correct answer from the following:

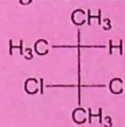
1×20=20

- Which of the following statements is not correct?
 - Stereo isomers differ in arrangement of atom/groups in space.
 - Diastereomers are mirror image structures.
 - Enantiomers have same physical properties.
 - Study of optical isomerism requires plane polarised light.

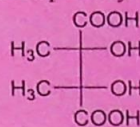
- Which of the following molecule/s is/are optically inactive



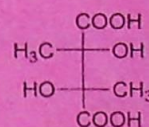
(A)



(B)



(C)



(D)

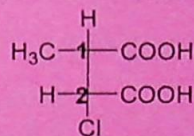
a. A & B

c. C & D

b. B & C

d. A & C

- The configurations of chiral centres 1 and 2 in the following molecule are respectively



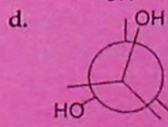
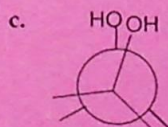
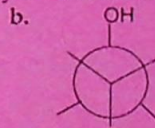
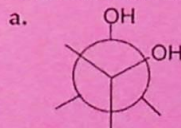
a. S and R

c. S and S

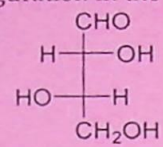
b. R and S

d. R and R

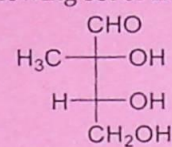
- Which of the following conformations of ethylene glycol will be most stable?



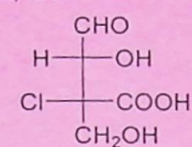
5. D-configuration in the following set of molecules, are



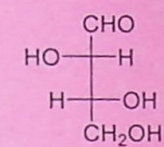
(A)



(B)



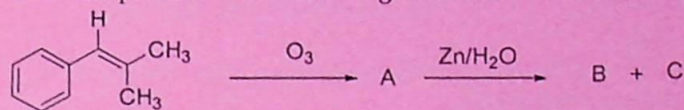
(C)



(D)

- a. A & B
c. B & D
b. B & C
d. C & D
6. Which of the following statement is not correct.
a. An p-alcohol is oxidised to aldehyde
b. Carboxylic acids on oxidation give ketones.
c. Ketones on reduction can give a s-alcohol.
d. A carboxylic acid on reduction can produce a p-alcohol.
7. Which of the following is an oxidising agent?
a. Zn(Hg)/HCl
c. PCC
b. Na in ethanol
d. LiAlH₄
8. Bouveault-Blanc reduction involves conversion of
a. Acid to alcohol
c. Ester to alcohol
b. Acid chloride to aldehyde
d. Acid chloride to alcohol
9. Wulff- Kishner reduction uses the reducing agent
a. Na/C₂H₅OH
c. NaOH and NH₂NH₂
b. Zn(Hg)/HCl
d. AgNO₃/NH₄OH
10. The following reduction reaction
- $$\text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{Cl} \xrightarrow[\text{Pd-BaSO}_4]{\text{H}_2} \text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{H} + \text{HCl}$$
- is
- a. Rosenmund reduction
c. Wolff-Kishner reduction
b. Clammensen reduction
d. Bouveault-Blanc reduction
11. Which of the following reagent will carry out the following transformation.
 $\text{C}_6\text{H}_5-\text{CH}=\text{CH}-\text{CHO} \longrightarrow \text{C}_6\text{H}_5-\text{CH}=\text{CH}-\text{CH}_2\text{OH}$
 a. Na in EtOH
c. LiAlH₄
b. NaBH₄
d. PCC
12. Benzaldehyde can be converted to toluene using.
a. NH₂NH₂ and NaOH
c. LiAlH₄
b. Zn/Hg and HCl
d. both (a) and (c)
13. The solution which is used to detect the presence of aldehyde or ketone is-
a. 2,4-dinitrophenylhydrazine
c. Tollens reagent
b. Benzene solution
d. None of these

14. The compound which reacts with hydroxylamine but doesn't react with Tollens reagent is
- CH_3CH_3
 - HCHO
 - $\text{CH}_3\text{CH}_2\text{OH}$
 - CH_3COCH_3
15. Methanal (HCHO) reacts with NaOH solution to form-
- Methanol
 - Sodium methanoate
 - Both CH_3OH and HCOONa
 - None
16. Aldehyde are-----reactive than ketone towards nucleophilic addition reaction.
- More
 - Less
 - Equally
 - None of these
17. Reaction of alkene with OsO_4 results in the formation of -
- trans diol
 - Cis diol
 - Epoxide
 - None of these
18. Which of the following compounds when treated with Br_2 water or KMnO_4 solution would not be able to decolorize their colour-
- Cyclohexene
 - Butene
 - Benzene
 - Hexene
19. Write the product of the following chemical transformations-



- $\text{A} = \text{Ozonide}$; $\text{B} = \text{two aldehyde}$
 - $\text{A} = \text{Ozonide}$; B and C are two different aldehyde
 - Epoxide and two alcohols
 - $\text{A} = \text{Ozonide}$; $\text{A} = \text{aldehyde}$ $\text{B} = \text{ketone}$
20. What type of reaction takes place upon treatment of a ketone with HCN to form a cyanohydrin?
- Nucleophilic addition
 - Nucleophilic substitution
 - Electrophilic addition
 - Electrophilic substitution

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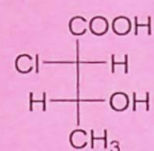
(PART-B : Descriptive)

Time : 2 hrs. 40 min.

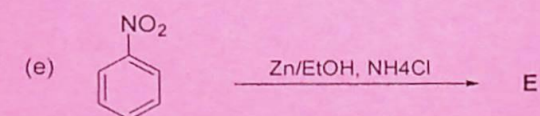
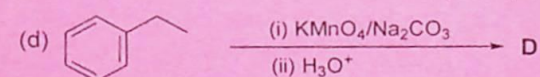
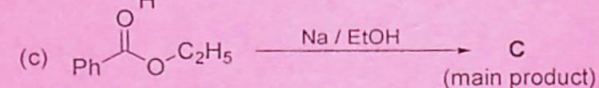
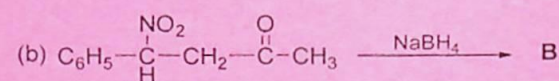
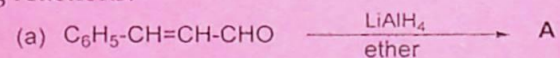
Marks : 50

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

1. a. What is the difference between conformations and configurations of molecules? Illustrate with examples. 3
- b. Discuss in details with possible reagents, oxidation of different classes of alcohols. 4
- c. Write notes on reduction of aromatic nitro compounds. 3
2. a. Draw the (i) Newman's projection, (ii) saw-horse projection and (iii) wedge structure for the following molecule. 6



- b. Write notes on Clammensen reduction. 4
3. Write down the structures of the products/reagent A, B, C, D and E in the following reactions. 2×5=10



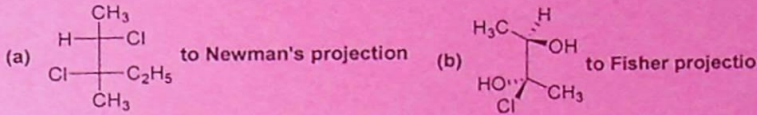
4. a. Cyclohexane molecule exist as chair and boat conformations, which conformation is more stable and why? Draw Newman's projection for both these forms. Indicate axial and equatorial bonds in chair form and flagpole bonds in boat form. 5

b. Methyl group in methyl cyclohexane can exist in axial or equatorial bond. Which form is more stable and why.

2

c. Convert the following structures:

3



5. a. Illustrate with example, geometrical and optical isomerism in organic molecules.

4

b. Define oxidation and reduction reaction processes. Oxidation and reduction take place simultaneously - Illustrate.

3

c. What is Saytzeff rule? Explain the rule with 2-chloro butane.

3

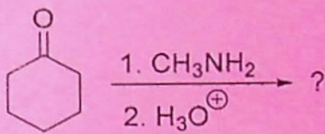
6. a. What happens when aldehyde is treated with (i) NaHSO_3

6

(ii) Hydroxyl amine (iii) NH_3 ?

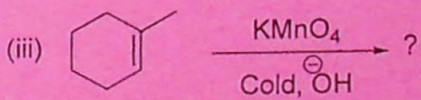
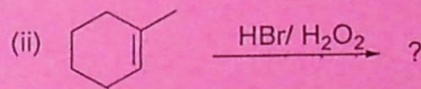
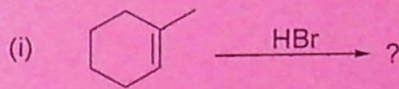
b. Write the product of the following reaction-

4



7. a. Write the product of the following reactions-

1.5×2+2
=5



[5]

- b. Why alkynes less reactive than alkenes towards electrophilic addition reaction? 2
- c. How could you distinguish between aldehyde and ketone ? Explain with chemical equation. 3
8. a. Write the name of the intermediate involves in- 3
(i) Markonicovs addition (ii) Anti-Markonicovs addition
- b. Write short notes on- 5
(i) Simple aldol condensation and cross aldol condensation
(ii) Cannizaro reaction
- c. What happen when a ketone is treated with Grignard reagent followed by hydrolysis in presence of an acid? 2

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