

B.Sc. DEGREE EXAMINATION, APRIL 2022  
BRANCH IV - CHEMISTRY  
SECOND SEMESTER

COURSE : MAJOR – CORE  
PAPER : ORGANIC CHEMISTRY - I  
TIME : 3 HOURS

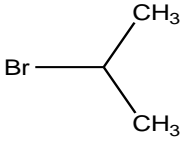
MAX. MARKS : 100

SECTION – A

ANSWER ALL THE QUESTIONS.

(30x1=30)

I Choose the correct answer.

- The number of optically active forms of glucose is \_\_\_\_\_  
a) 4                                      b) 16                                      c) 2                                      d) 8
- The reaction with one of the following reagents is an example for anti addition  
a) Br<sub>2</sub>                                      b) BH<sub>3</sub>                                      c) OsO<sub>4</sub>                                      d) H<sub>2</sub>/Pd
- Which one of the following is m-directing group?  
a) –OH                                      b) –NR<sub>3</sub>                                      c) –CN                                      d) –OCH<sub>3</sub>
- An activating group among the following is \_\_\_\_\_  
a) -CHO                                      b) -CN                                      c) –COOH                                      d) -NH<sub>2</sub>
- Intermediate formed in E1cb reaction is  
a) carbocation                                      b) six membered cyclic transition state  
c) carbanion                                      d) benzyne
- β-hydroxy esters are prepared using \_\_\_\_\_ reaction  
a) Claisen condensation                      b) Reformatsky                      c) Perkin                      d) Knoevenagel
- The reagent used for dehydrohalogenation of  is  
a) C<sub>2</sub>H<sub>5</sub>ONa/ C<sub>2</sub>H<sub>5</sub>OH                      b) HOCl                      c) Conc. H<sub>2</sub>SO<sub>4</sub>                      d) NaBH<sub>4</sub>
- Reagent used in Aldol reaction is \_\_\_\_\_  
a) NaBH<sub>4</sub>                                      b) Ba(OH)<sub>2</sub>                                      c) Na<sub>2</sub>CO<sub>3</sub>                                      d) EtOH
- Number of stereoisomers of cyclopropane-1,2 dicarboxylic acid is \_\_\_\_\_  
a) 2                                      b) 3                                      c) 4                                      d) nil
- Inert solvent commonly used in hydroboration reaction is \_\_\_\_\_  
a) THF                                      b) DMF                                      c) Water                                      d) DMSO

**II Fill in the blanks:**

11. The reagent used for epoxidation is \_\_\_\_\_
12. Number of optically inactive form/s of tartaric acid is \_\_\_\_\_
13. Benzyne is an intermediate in \_\_\_\_\_ reaction
14. Example for a stereospecific reaction is \_\_\_\_\_
15. The electrophile for halogenation reaction is \_\_\_\_\_
16. The intermediate in  $S_N1$  reaction is \_\_\_\_\_
17. Catalytic hydrogenation involves \_\_\_\_\_ addition.
18. Fischer projection of erythrose is \_\_\_\_\_
19. Rearrangement of carbocation is possible in \_\_\_\_\_ type of elimination reaction.
20. Addition of HOCl is to an alkene yields \_\_\_\_\_ product.

**III State whether true or false:**

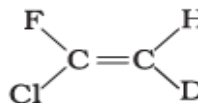
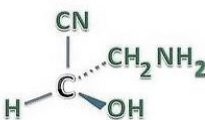
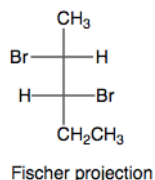
21.  $\alpha$ ,  $\beta$ -unsaturated acid is formed as the product in Perkin reaction.
22.  $-Cl$  is o, p-directing and activating.
23. Configurational isomers can be separated.
24. The rate of the reaction in  $S_N2$  depends on the concentration of both the substrate and base.
25.  $AlBr_3$  can be used as catalyst in Friedel-Crafts reaction.

**IV Answer in a line or two:**

26. Name any two solvents that can be used for  $S_N2$  reaction.
27. What is specific rotation?
28. Give any one method of preparation of acrolein.
29. What is Walden inversion?
30. What is Hofmann rule?

**Section – B****Answer any five questions.****(5 x 6 = 30)**

31. a) Assign R/S or E/Z configuration to the following compounds:



- b) Methyl group in toluene is o,p directing whereas trifluoromethyl group in trifluoromethyl benzene is meta directing. Explain. (3+3)

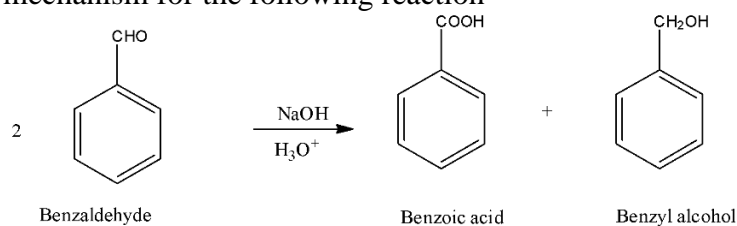
32. Differentiate between a) Meso and racemic forms  
b) Conformational and Configurational isomerism (3+3)

33. Discuss the conformational analysis of cyclohexane.

34. Identify whether the groups attached to the benzene ring are activating or deactivating and justify the answers.



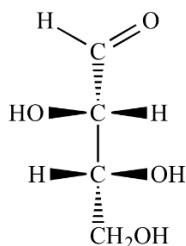
35. Outline the mechanism for the following reaction



36. a) The following data is obtained for the different substrates in E2 reaction. Justify the answer.

Substrate	PhCH <sub>2</sub> CH <sub>2</sub> Cl	PhCH <sub>2</sub> CH <sub>2</sub> Br	PhCH <sub>2</sub> CH <sub>2</sub> I
Rate	0.007x10 <sup>3</sup>	4.2x10 <sup>3</sup>	27x10 <sup>3</sup>

b) Represent the following compound in Fischer projection and convert it to Newmann and Sawhorse projection



(2+4)

37. Outline the mechanism of hydroxylation reaction of alkene with OsO<sub>4</sub> and KMnO<sub>4</sub>.

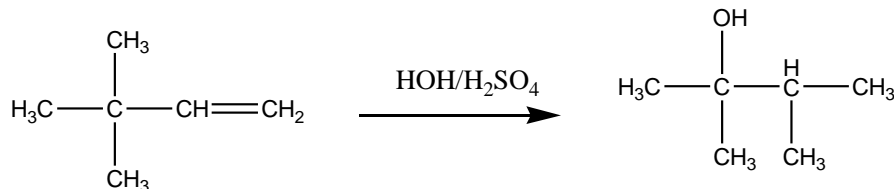
## Section – C

Answer any two questions.

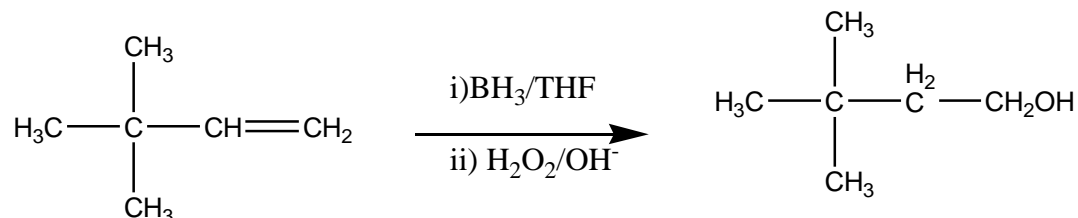
(2 x 20 = 40)

38. a) Explain why rearranged product is obtained in the first reaction but not in the second reaction:

i)



ii)



b) Discuss the various conformations and the relative stabilities of n-butane.

c) Compare E1 and E2 mechanisms in detail with appropriate examples.

(5+5+10)

39. Discuss the mechanisms of the following reactions:

a) Haloform reaction      b) Aldol Condensation      c) Friedel-Crafts Acylation

b) Knoevenagel reaction

(4x5 marks each )

40. a) Addition of Br<sub>2</sub> to cis and trans-2-butene is stereospecific . Explain with detailed mechanism .b) Discuss in detail the kinetics, stereochemistry and factors that influence S<sub>N</sub>1 mechanism.c) The addition of Br<sub>2</sub> to 1,3-butadiene yields the 1,2 –product which is kinetically controlled and the 1,4-product which is thermodynamically controlled. Explain.

(6+8+6)





