

(7 pages)

Reg. No. : .....

Code No. : 20462 E Sub. Code : CMCH 21

B.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2023.

Second Semester

Chemistry — Core

ORGANIC CHEMISTRY — I

(For those who joined in July 2021–2022)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. Arrange the following groups in the determining order of -I effect
- (a)  $CN > F > Br > Cl < COOH > I > H$   
(b)  $COOH > CN > F > Br > Cl > I > H$   
(c)  $H > COOH > CN > I > Br > F > Cl$   
(d)  $CN > COOH > F > Cl > Br > I > H$

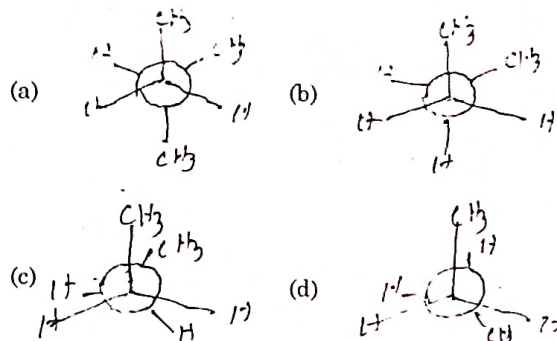
5. Which of the following decrease the reactivity of aldehyde?
- (a) +E effect (b) -I effect  
(c) +I effect (d) - Effect
6. Carbonyl compounds undergo nucleophilic addition because of \_\_\_\_\_
- (a) more stable anion with negative charge on oxygen atom and less stable carbonium ion  
(b) electromeric effect  
(c) electro negativity difference of carbon and oxygen atoms  
(d) none of the above
7. Hinsberg reagent is \_\_\_\_\_
- (a) sulphanal  
(b) benzene sulphonyl chloride  
(c) toluene sulphonic acid  
(d) benzene sulphonic acid
8. The reaction of carbon dioxide with Grignard reagent initially gives \_\_\_\_\_
- (a)  $CH_3CH_2OH$   
(b)  $CH_3CHO$   
(c) Magnesium salt of carboxylic acid  
(d) None of these

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2. Organic compounds undergoing homolytic cleavage will lead to the formation of which chemical species?
- (a) free radical (b) anion  
(c) cation (d) all
3. Markovnikov rule can apply when addition of \_\_\_\_\_
- (a) unsymmetrical reagent and symmetrical alkene  
(b) symmetrical reagent and unsymmetrical alkene  
(c) symmetrical reagent and symmetrical alkene  
(d) unsymmetrical reagent and unsymmetrical alkene
4. Why are aryl halides less reactive towards nucleophilic substitution reactions as compared to alkyl halides?
- (a) longer carbon-hydrogen bond  
(b) formation of less stable carbanion  
(c) inductive effect  
(d)  $SP^2$  hybridized carbon attached to the halogen

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9. Which of the following statement regarding chair cyclohexane is wrong?
- (a) the dihedral angle of the two axial bonds on adjacent carbon is  $180^\circ$   
(b) the dihedral angle between the axial and equatorial bond on adjacent carbon is  $120^\circ$   
(c) the dihedral angle of the two equatorial bonds on adjacent carbon is  $60^\circ$   
(d) the axial hydrogen atoms on C1, C3 and C5 form an equatorial triangle
10. The most stable conformation of n-butane among the following is \_\_\_\_\_



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[P.T.O.]

PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Discuss the IUPAC rules for naming cycloalkanes. Illustrate with example.

Or

- (b) Why tertiary carbonium ions are more stable than primary carbonium ions? Explain with examples.

12. (a) HI do not give anti-Markovnikov products in the presence of peroxides? Why?

Or

- (b) State and explain Hofmann rule.

13. (a) Formaldehyde is more reactive than acetone. Explain.

Or

- (b) Explain Blanc's rule with example.

14. (a) What is Reformatsky reaction? Explain with suitable example.

Or

- (b) Write any two reactions of benzene sulphonyl chloride.

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15. (a) Discuss Coulson-Moffitt concept of maximum overlap of carbon orbitals with example.

Or

- (b) Write note on conformation of n-butane.

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain inductive effect. What causes the inductive effect? What is meant by +I effect and -I effect? Illustrate with suitable example.

Or

- (b) Describe homolytic and heterolytic fission of covalent bonds. How do they lead to the formation of carbonium ion and carbonion?

17. (a) Explain the effect of nucleophile and leaving group in  $S_N1$  reaction.

Or

- (b) Write note on :

- (i) Markovnikov rule  
(ii) Kharasch peroxide effect

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18. (a) What is Hell-Volhard-Zelinsky reaction? Explain with suitable example.

Or

- (b) Explain the influence of substituents on the acidity of carboxylic acids with suitable examples.

19. (a) How are the following prepared from Grignard reagent?

- (i) Methyl amine  
(ii) Methyl cyanide  
(iii) 2-butyne

Or

- (b) Write note on :

- (i) Sulphonal  
(ii) Mustard gas

20. (a) Write in detail Bayer's strain theory.

Or

- (b) Starting from ethyl acetoacetate, how would you prepare the following compounds?

- (i) Crotonic acid  
(ii) Butanone  
(iii) Adipic acid

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