TDC (CBCS) Odd Semester Exam., 2023

CHEMISTRY

(Honours)

(3rd Semester)

Course No. : CHMHCC-302T

(Organic Chemistry)

Full Marks : 50
Pass Marks : 20

Time : 3 hours

The figures in the margin indicate full marks for the questions

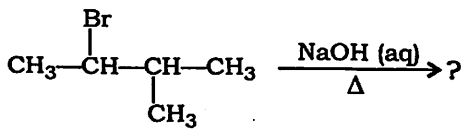
SECTION—A

Answer *ten* questions, taking any *two* from each Unit : 2×10=20

UNIT—I

1. Allyl chloride generally obeys S_N1 reaction during nucleophilic substitution reaction. Explain with proper reason.

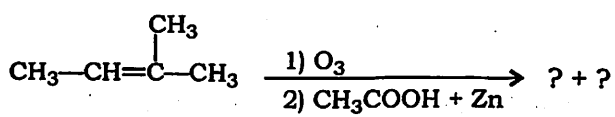
2. Write the product of the reaction given below and justify it :

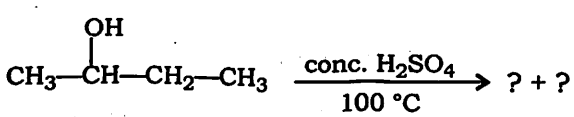


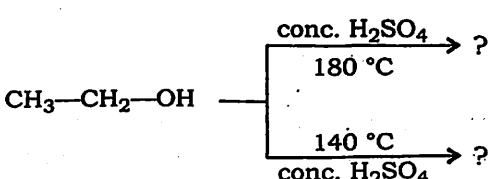
3. Explain why racemization takes place in S_N1 reaction.

UNIT—II

Write the products of the following reactions (any *two*) :

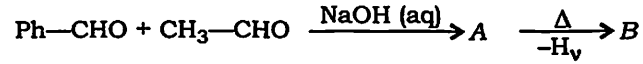
4. 

5. 

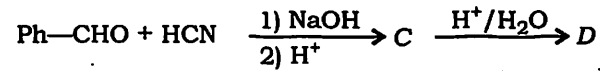
6. 

UNIT—III

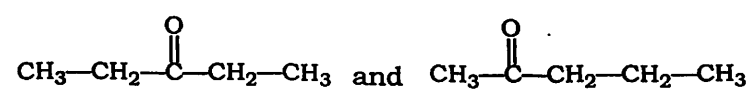
7. Identify *A* and *B* :



8. Identify *C* and *D* :



9. Which one of the following compounds will react with I_2 in presence of NaOH? Also write the product of the reactions.

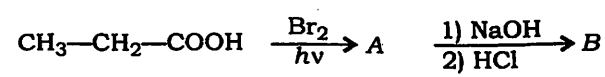


UNIT—IV

10. What happens when maloic acid is treated with alkaline permanganate?

11. What happens when oxalic acid is heated with conc. H_2SO_4?

12. Identify *A* and *B* :



UNIT—V

13. Describe briefly the nature of the bond between carbon and magnesium in Grignard reagent.

14. What happens when ethane thiol is treated with acetic acid in presence of conc. H_2SO_4?

15. What happens when propyne is treated first with CH_3MgBr and followed by ethyl bromide?

SECTION—B

Answer *five* questions, taking *one* from each Unit : 6×5=30

UNIT—I

16. *(a)* Benzyl bromide is more reactive than cyclohexylmethyl bromide towards NaOH (aq) under the conditions of S_N1 process. Provide explanation. 3

(b) With the help of suitable example, write the mechanism and the stereochemistry of S_N2 reactions. 3

17. *(a)* How the rate expression for S_N1 and S_N2 reactions differ? 2

(b) With suitable example, describe the mechanism of S_Ni reaction. 2

(c) $CH_3—CH=CH—Cl$ is very unreactive towards nucleophile. Explain. 2

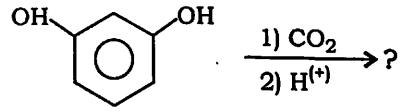
UNIT—II

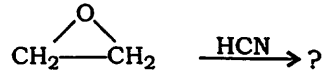
18. *(a)* What happens when diethyl ether is treated with BF_3? 2

(b) How will you prepare picric acid from phenol? 2

(c) What happens when glycol is treated with acidic potassium permanganate? 2

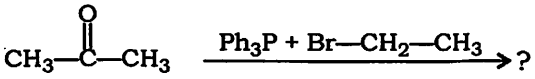
19. Write the product and the mechanism of the reactions given below : 3+3=6

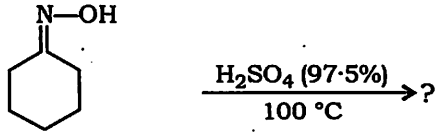
(i) 

(ii) 

UNIT—III

20. Complete the following reactions and also write the mechanisms : 3×2=6

(i) 

(ii) 

21. Explain the following reactions with mechanism : 3×2=6

(a) Baeyer-Villiger oxidation

(b) Perkin reaction

(c) Clemmensen reduction

UNIT—IV

22. Describe the following reactions with mechanism : 3×2=6

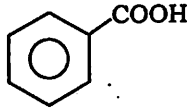
(a) Reformatsky reaction

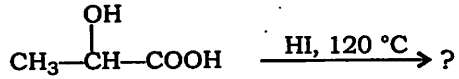
(b) Hofmann bromamide degradation

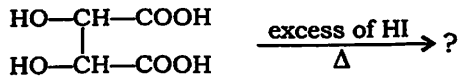
23. Complete the following reactions : 1×6=6

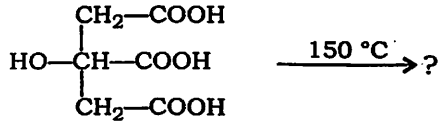
(i) $HCOOH \xrightarrow{\text{Fehling solution}} ?$

(ii) $CH_3CH_2COOH \xrightarrow[2)\ P_2O_5,\ \Delta]{1)\ NH_3,\ \Delta} ?$

(iii)  $\xrightarrow[\text{Ether}]{LiAlH_4} ?$

(iv) 

(v) 

(vi) 

UNIT—V

24. Starting from ethyl acetoacetate, obtain—

(a) 3-methylpentan-2-one;

(b) propanoic acid. 3×2=6

25. Starting from diethyl malonate, obtain—

(a) crotonic acid;

(b) cyclopropane. 3×2=6

★★★