Total No. of Printed Pages—8

3 SEM TDC CHMH (CBCS) C 6

2020

(Held in April–May, 2021)

CHEMISTRY

(Core)

Paper : C–6

(Organic Chemistry)

Full Marks : 53
Pass Marks : 21

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Select the correct answer / Answer the following : 1×5=5

(a) Which one is more reactive towards S_N1 reaction?

(i) $C_6H_5CH_2—Br$

(ii) $C_6H_5—CH(C_6H_5)Br$

(iii) $C_6H_5CH(CH_3)Br$

(iv) $C_6H_5C(CH_3)(C_6H_5)Br$

(b) The electrophile involved in the Reimer-Tiemann reaction is

(i) $:CCl_2$

(ii) $\overset{\oplus}{C}HCl_2$

(iii) $\overset{+}{C}HO$

(iv) $\overset{\ominus}{C}Cl_3$

(c) Among the following compounds, the most susceptible to nucleophilic attack at the carboxyl group is

(i) $CH_3—\overset{O}{\overset{\|}{C}}—Cl$

(ii) $CH_3—\overset{O}{\overset{\|}{C}}—H$

(iii) $CH_3—\overset{O}{\overset{\|}{C}}—OCH_3$

(iv) $CH_3—\overset{O}{\overset{\|}{C}}—O—\overset{O}{\overset{\|}{C}}—CH_3$

(d) Which of the following is an S_N1 reaction?

(i) $CH_3CH_2—OH + SOCl_2 \longrightarrow$

(ii) $CH_3CH_2—Br + KOH \longrightarrow$

(iii) $CH_3—CONH_2 \xrightarrow{\Delta}$

(iv) $CH_3COOH \xrightarrow{\Delta}$

(e) Arrange the following compounds with increasing acid strength :

(i) C_6H_5OH

(ii) $HCOOH$

(iii) CH_3COOH

(iv) $ClCH_2COOH$

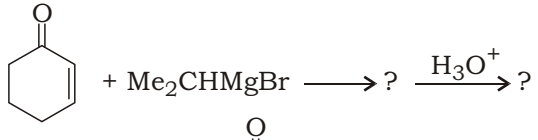
UNIT—I

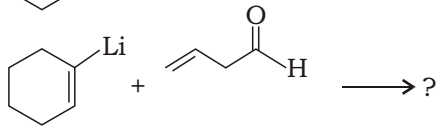
2. Answer any *five* of the following questions : 2×5=10

(a) What products do you expect when neopentyl iodide undergoes slow S_N1 and S_N2 reactions respectively?

(b) In all S_N2 reactions, the rate increases with increasing polarity of the solvent. Explain.

(c) Complete the following reactions :

(i) 

(ii) 

(d) Using organometallic compound, how would you prepare 3° alcohol from ethyl acetate?

(e) Synthesize the following : 1+1=2

(i) Ethyl bromide by Hunsdiecker reaction

(ii) Flurobenzene through diazonium salt

(f) Discuss the relative reactivity of alkyl, allyl and aryl halides towards nucleophilic substitution reactions.

UNIT—II

3. Answer any *three* of the following questions : 2×3=6

(a) Synthesize the following : 1+1=2

(i) Picric acid from phenol

(ii) *m*-nitrophenol from *m*-dinitro-benzene

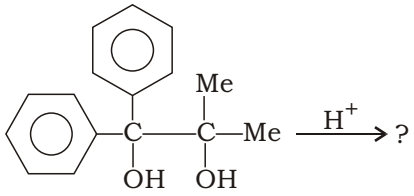
(b) Hydroxylation by OSO_4 of an alkene gives a *cis*-diol whereas hydroxylation via epoxidation of the same alkene gives a *trans*-diol. Explain.

(c) Prepare acrolein from glycerol.

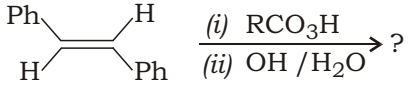
(d) How would you synthesize α-, β-unsaturated alcohol and aldehyde from glycerol?

4. Answer any *two* of the following questions : 3×2=6

(a) Complete the following reaction and discuss the mechanism :



(b) Predict the product and write the mechanism of the following reaction :



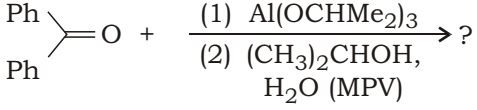
(c) Discuss the solubility and boiling point of 1°, 2° and 3° alcohols in water.

UNIT—III

Answer *either* Q. No. **5** *or* Q. No. **6**

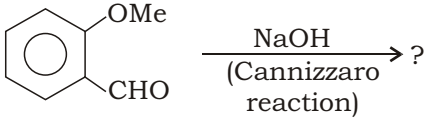
5. *(a)* Complete the following reactions and write down the mechanisms : 3×2=6

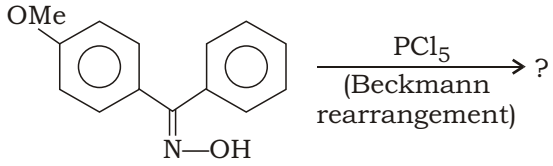
(i) $CH_3CHO \xrightarrow[H_2O]{NaOH}$ (Aldol condensation)

(ii) 

(b) How would you distinguish between 2-pentanone and 3-pentanone? 2

6. *(a)* Complete the following reactions and write down the possible mechanisms : 3×2=6

(i) 

(ii) 

(b) Synthesize the following : 1+1=2

(i) MVK from 2-butanone

(ii) Cinnamaldehyde from benzaldehyde

7. Answer any *two* of the following questions : 2×2=4

(a) Mention synthetic applications of the following reagents (any *two*) : 1×2=2

(i) $LiAlH_4$

(ii) PCC

(iii) $Pb(OAc)_2$

(b) What is Michael reaction? Explain with a suitable reaction. 1+1=2

(c) What is the difference between Clemmensen and Wolff-Kishner reactions? 2

8. What is active methyline compound? 1

Or

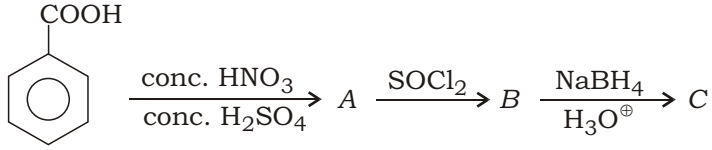
Show the keto-enol tautomerism in ethyl acetoacetate.

UNIT—IV

Answer *any* **one** question

9. *(a)* Why do carboxylic acids not give the characteristic reactions of carbonyl group? 2

(b) Identify *A*, *B* and *C* in the following reactions : 3



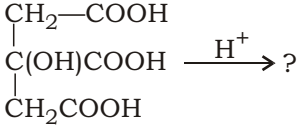
(c) Synthesize the following : 2+2=4

(i) Succinic acid from ethylene bromide

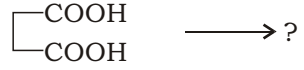
(ii) Propanoic acid to ethanoic acid by Hoffmann degradation

10. *(a)* Complete the following reactions : 1×3=3

(i)



(ii)



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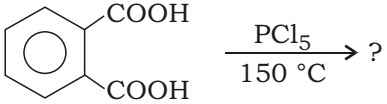
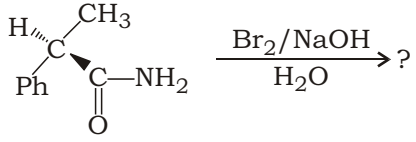


(b) Convert benzoic acid to phenyl acetic acid by using Arndt-Eistert reaction. 2

(c) Prepare propanoic acid from butanoyl chloride by using Curtius rearrangement. 2

(d) Complete the following reaction and discuss the mechanism of the reaction : 2



UNIT—V

Answer *any* **two** questions

11. Give one method of preparation of thioether. What happens when a thiol reacts with an aldehyde in the presence of HCl? 2

12. What are thioethers? How would you prepare a thioether from alkyl halide by S_N2 reaction? ½+1½=2

13. Discuss the polarity of sulfide, sulfone and sulfoxides. 2

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