2022

(November)

CHEMISTRY

(Honours)

(Chem–H–502)

(Organic Chemistry—V)

Marks : 37

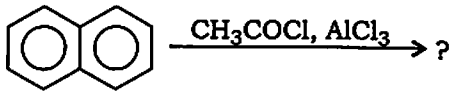
Time : 2 hours

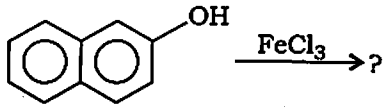
The figures in the margin indicate full marks for the questions

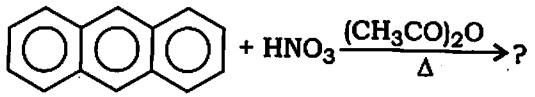
1. *(a)* Explain why electrophilic substitution reaction in naphthalene occurs preferentially at C1. 2

(b) Give a suitable method for the preparation of 1-naphthol. 1

(c) Complete the following reactions : 1×3=3

(i) 

(ii) 

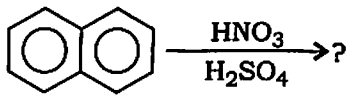
(iii) 

(d) Draw the structure of vitamin A_1. 2

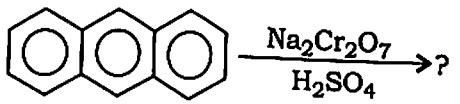
(e) Write the structure of the tripeptide Gly-Ala-Phe. 1

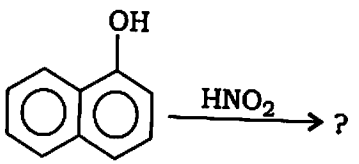
OR

2. (a) Complete the following reaction with mechanism : 2



(b) Write the products of the following reactions : 1×2=2

(i) 

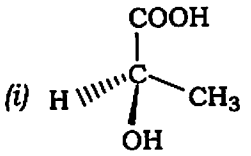
(ii) 

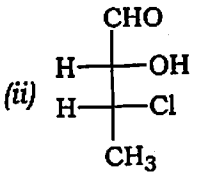
(c) Write a note on the secondary structure of proteins. 1½

(d) Give a suitable method for the synthesis of vitamin C. 2½

(e) Draw the structure of β-carotene. 1

3. (a) Assign the *R*- and *S*-configuration of the following : 1×2=2

(i) 

(ii) 

(b) Draw the chair conformers of *trans*-1,2-dimethylcyclohexane. Explain which one is more stable and why. 3

(c) Give one example each for cumulated and isolated diene. 1+1=2

(d) Write short notes on the following : 1+1=2

(i) Urea-formaldehyde resin

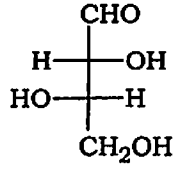
(ii) Polyurethane

OR

4. *(a)* Define relative and absolute configurations. 2

(b) State the key differences between addition polymerization and condensation polymers. 2

(c) Convert the Fischer projection formula of the following molecule to Newman projection formula : 1



(d) Discuss the molecular orbital structure of 1,3-butadiene. 2

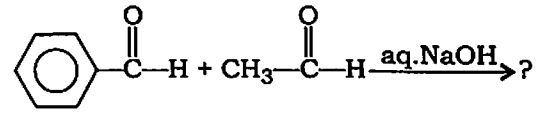
(e) Write short notes on the following : 2

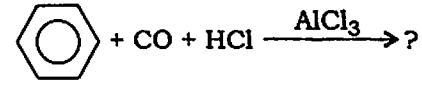
(i) Neoprene

(ii) Dacron

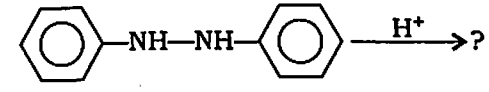
5. *(a)* What are ketals? Write the mechanism for the acid-catalyzed reaction of cyclohexanone with ethylene glycol. 1+2=3

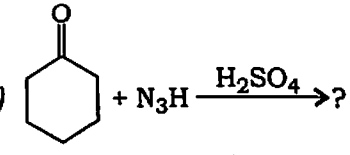
(b) Predict the product of the following reactions with mechanism : 2+2=4

(i) 

(ii) 

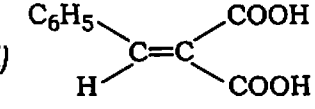
(c) Write the products of the following reactions : 1½×2=3

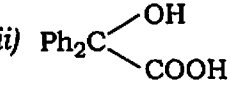
(i) 

(ii) 

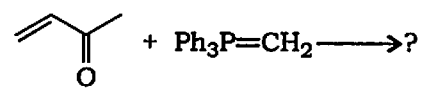
OR

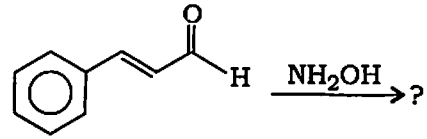
6. *(a)* How do you synthesize the following two compounds? Give the mechanism : 2×2=4

(i) 

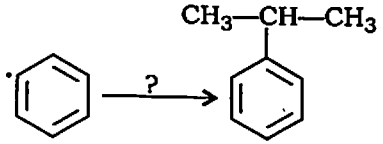
(ii) 

(b) Write the products with mechanism : 2×2=4

(i) 

(ii) 

(c) Write the mechanism and the reagent for the following reaction : 1+1=2



7. (a) Write the synthesis of quinoline using Skraup synthesis with mechanism. 3

(b) What is the most likely position of substitution by Br_2 on the indole ring? Explain with mechanism. 2

(c) What are solid-state reactions? Give example. 2

(d) Write the preparation of any *two* of the following : 1×2=2

(i) Lead tetraacetate

(ii) $LiAlH_4$

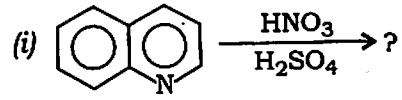
(iii) $KMnO_4$

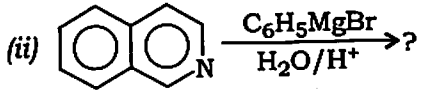
(*Continued*)

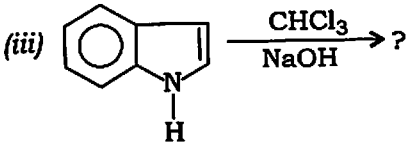
OR

8. (a) Write any three basic principles of Green chemistry. 3

(b) Write the products of the following reactions : 1×3=3

(i) 

(ii) 

(iii) 

(c) Write short notes on the following : 1×2=2

(i) Microwave-assisted reactions

(ii) $K_2Cr_2O_7$

(d) What do you mean by atom economy reaction? Give example. 1

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