TDC (CBCS) Even Semester Exam., 2024

CHEMISTRY

(4th Semester)

Course No. : CHMHCC-402T

(Organic Chemistry)

Full Marks : 50
Pass Marks : 20

Time : 3 hours

The figures in the margin indicate full marks for the questions

UNIT—I

1. Answer any *two* questions : 2×2=4

(a) *(i)* Nitroalkanes have abnormally high boiling points. Explain. 1

(ii) Why does nitrobenzene not undergo Friedel-Crafts reaction? 1

(b) Convert the following : 1×2=2

(i) Acetamide to ethylamine

(ii) Methyl isocyanide to N,N-dimethyl amine

(c) How can you convert aniline into *p*-nitro aniline? 2

2. Answer any *one* question : 6

(a) *(i)* Distinguish among 1°-, 2°- and 3°-amines by nitrous acid test. 3

(ii) How can you synthesize 1°-amine by Gabriel phthalimide method? Give mechanism. 3

(b) *(i)* Predict the product and write the mechanism of the following reaction : 1+2=3

$$R-CONH_2 + Br_2 \xrightarrow{KOH\,(aq)} ?$$

(ii) Explain why amines are more basic than amides. 1

(iii) How will you convert aniline into *o*-bromoaniline? Write reactions only. 2

UNIT—II

3. Write the products with mechanisms (any *two*) : (1+1)×2=4

(i)  $\xrightarrow[HNO_3,\ (-10\ °C)]{(CH_3CO)_2O}$?

(ii)  Furan $\xrightarrow[100\ °C]{SO_3,\ Py}$?

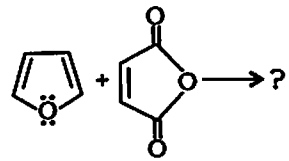
(iii)  + $CHCl_3 \xrightarrow[\Delta]{KOH}$?

4. Answer any *one* question : 6

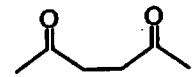
(a) Write the product(s) of the following reactions : 1×6=6

(i)  + HCN $\xrightarrow{HCl}$?

(ii)  + $ArN_2^+Cl^-$ ⟶ ?

(iii)  ⟶ ?

(iv)  + $NaNH_2 \xrightarrow[383\ K]{liq.\ NH_3}$?

(v)  $\xrightarrow[\Delta]{NH_3}$?

(vi)  + I_2 ⟶ ?

(b) Explain the following with suitable reasons : 2×3=6

(i) Furan, thiophene and pyrrole undergo electrophilic substitution reaction preferentially at C-2 position.

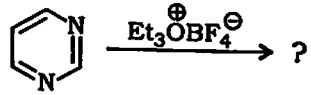
(ii) Pyrrole is more reactive than pyridine towards electrophilic substitution reactions.

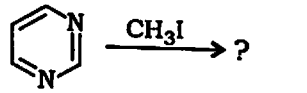
(iii) Furan is more reactive than benzene in electrophilic substitution reaction.

UNIT—III

5. Answer any *two* questions : 2×2=4

(a) Predict the product(s) of the following reactions : 1×2=2

(i) 

(ii) 

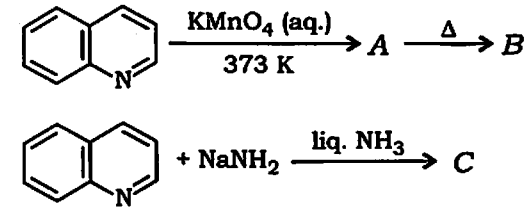
(b) Which is more basic *(i)* quinoline or *(ii)* pyridine? Justify your answer.

(c) Prove that quinoline contains a benzene ring.

6. Answer any *one* question : 6

(a) *(i)* Write the mechanism of Fischer indole synthesis. 3

(ii) Identify *A*, *B* and *C* from the following reactions : 1×3=3



(b) *(i)* Write the mechanism of Skraup synthesis of quinoline. 3

(ii) Explain with suitable reasons, why quinoline gives electrophilic substitution preferentially in the benzene ring at C-5 and C-8 positions. 3

UNIT—IV

7. Write short notes on (any *two*) : 2×2=4

(a) Physiological action of alkaloids

(b) Hoffmann's exhaustive methylation

(c) Emde's modification

8. Answer any *one* question : 6

(a) *(i)* Write a short note on Hoffmann's exhaustive methylation. 3

(ii) How can you convert catechol into piperine? Give only reactions. 3

(b) (i) Give one method of synthesis of nicotine. 3

(ii) Write the medicinal importances of morphine, quinine and reserpine. 1+1+1=3

UNIT—V

9. Answer any *two* questions : 2×2=4

(a) What are isoprene rule and special isoprene rule? Explain with examples.

(b) What are terpenes? Give one example.

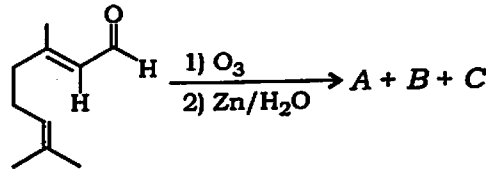
(c) What happens when citral is subjected to ozonolysis? Give reaction only.

10. Answer any *one* question : 6

(a) (i) How many isoprene unit(s) present in sesquiterpenes? 1

(ii) How would you show that citral molecule contains two double bonds? (Give reactions only) 2

(iii) Identify *A*, *B* and *C* from the following reaction (structures and names) : 1×3=3



(b) Convert the following (write chemical reactions only) : 2×3=6

(i) Citral into geraniol

(ii) Geraniol into α-terpineol

(iii) Nerol into α-terpineol

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