63/2 (SEM-4) CHM 402

2022

CHEMISTRY

(Theory Paper)

Paper Code : CHM 402

(Natural Products and Heterocyclic Chemistry)

Full Marks – 80

Time – Three hours

The figures in the margin indicate full marks
for the questions.

1. Answer the following questions (any *four*) :

    5×4=20

    (a) Write about the method of ascending the sugar series.

    (b) Write briefly about cellulose.

    (c) Write the occurrence and classification of terpenoids.

(d) Explain the isoprene rule of terpenoids with examples.

(e) Discuss the general methods of structure determination of terpenoids.

(f) Discuss briefly about vitamins D_1 and D_2.

2. Answer the following questions (any *four*) :

$5 \times 4 = 20$

(a) Draw a flow chart for the extraction of crude alkaloid from a plant.

(b) How can the number of methoxy group be determined in alkaloid ? Give a chemical reaction which confirms the presence of phenanthrene nucleus in morphine. 3+2=5

(c) Write the Pschorr's synthesis of dimethly morphol. 5

(d) Write the synthesis of opso pyrrole and phyllo pyrrole. $2\frac{1}{2}+2\frac{1}{2}=5$

(e) How would you proceed to confirm the structure of ethyl methyl maleimide ? 5

(f) Elucidate the structure of haematinic acid and confirm it by synthesis. 5
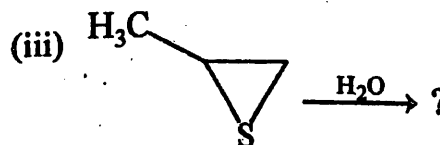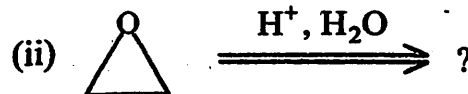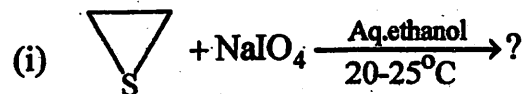
3. Answer the following questions (any *four*) :

$5 \times 4 = 20$
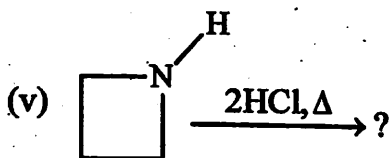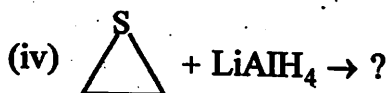
(a) Write short note on click chemistry. 5

(b) What are π-excessive and π-deficient heterocycles ? Explain with suitable example. 5

(c) Give the mechanistic steps involved in the synthesis of thiirane and aziridine by any one mnethod. $2\frac{1}{2}+2\frac{1}{2}=5$

(d) Write down the synthesis of imidazole starting from α-haloketone. Write any two reaction of imidazole. 3+2

(e) Write the product of the following reaction :

$1 \times 5 = 5$

(i) $\underset{S}{\triangle}$ + $NaIO_4$ $\xrightarrow[20\text{-}25^\circ C]{\text{Aq.ethanol}}$?

(ii) $\underset{O}{\triangle}$ $\xRightarrow{H^+, H_2O}$?

(iii) $H_3C\diagdown\underset{S}{\triangle}$ $\xrightarrow{H_2O}$?

(iv) $\triangle$S + LiAlH$_4$ → ?

(v) [ ]—N⟨H $\xrightarrow{\text{2HCl,}\Delta}$?

4. Answer the following questions (any *two*) :

$10\times2{=}20$

(a) Write about the synthesis of b-caryophyllene or longifolene. **10**

(b) Establish the position of propionic acid residue and vinyl group in both the types of chlorophyll. **5+5=10**

(c) What is chlorine -e trimethyl ester ? Establish the structure of the compound from the degradation of chlorophyll-a. **2+8=10**

(d) Write about the ring structure of sucrose.

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