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CRAWFORD UNIVERSITY
COLLEGE OF NATURAL AND APPLIED SCIENCES
DEPARTMENT OF PHYSICAL AND EARTH SCIENCES
INDUSTRIAL CHEMISTRY PROGRAMME
HARMATTAN EXAMINATION 2013/2014

COURSE CODE: ICH 439

COURSE TITLE: MEDICINAL PLANT CHEMISTRY

UNITS: 2

TIME ALLOWED: 2HRS

DATE: FEBRUARY, 2014

INSTRUCTIONS: ANSWER ANY FOUR (4) QUESTIONS.

- (a) Give a detailed explanation of the nature, occurrence, distribution and localization of alkaloids.

(b) Explain with an example, the influence of the presence of oxygen atom in the alkaloidal compound.

(c) The precursors in the synthesis of alkaloids are amino acids or amino aldehydes derived from amino acids. What are the examples of amino acids that are precursors for true alkaloids?
- (a) The basicity of alkaloids varies from one compound to another. Explain the factors that affect the basic character of alkaloids.

(b) What is the biosynthetic origin of alkaloids?

(c) Synthesize isoquinoline from shikimic acid.
- (a) Alkaloids are classified into eight groups. Write short note on:
(i) Phenylethylamine (ii) Quinoline (iii) Isoquinoline (iv) Pyrrolidine and (v) Phenanthrene.

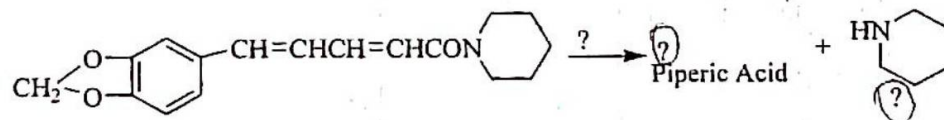
(b) Explain the reactions that are postulated for the biosynthetic conversion of amino acids to alkaloids
- (a) Give a synthetic route to 3-isopentenylpyrophosphate from 2 molecules of acetyl CoA with the aid of equations and conditions. Label all the isotopic carbon (i.e. ^{14}C) properly.

(b) (i) Draw the structure of an isoprene unit.
(ii) What is responsible for the basic character of alkaloids?
(iii) (a) List two neutral alkaloids. (b) What are the functional groups that make them neutral?
- (a) State the number of carbon atoms and the number of isoprene units in an example of each of the following terpenoids:
(i) Hemiterpenoids (ii) Sesquiterpenoids (iii) Triterpenoids (iv) Polyterpenoids
(v) Monoterpenoids (vi) Tetraterpenoids (vi) Diterpenoids.

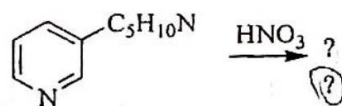
(b) Give a detailed explanation of 2 examples of diterpenoids and 4 examples of triterpenoids.
- (a)(i) Describe a monocyclic and a bicyclic monoterpenoids
(ii) What are essential oils or volatile oils?

c) Complete the reaction below,

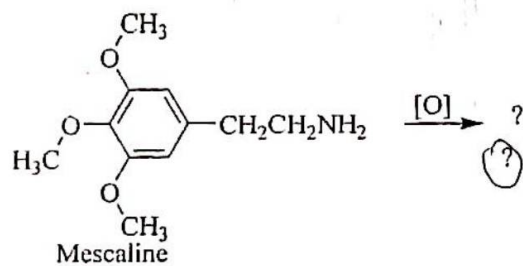
i.



ii.



iii.



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