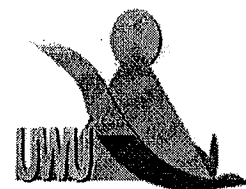


Uva Wellassa University of Sri Lanka  
End Semester Examination – March 2011  
SCT 325-2 Natural Products Chemistry



Time: Two (02) hours

Total four (04) questions

Answer all questions

Write the answers for question No 1 in the space given in the question paper

1. Consider the natural products, *A* to *L*, on page 5.

- a. i Assign each of the natural products, *A* to *L*, to the appropriate class; monoterpene, diterpene, tetraterpene, sesterterpene sesquiterpene, coumarin, flavone, flavonol, catechin, anthocyanidin, flavanone, steroid, fatty acid, polyketide, fats and oils, alkaloid and simple phenylpropanoid.
- ii. Name the pathway(s) involved in the biosynthesis of each of the natural products, *A* to *L*, as Mevalonate, Acetate, Shikimate, Malonate or none of them.

Compound	Class	Biosynthetic Pathway(s)
<i>A</i>		
<i>B</i>		
<i>C</i>		
<i>D</i>		
<i>E</i>		
<i>F</i>		
<i>G</i>		
<i>H</i>		
<i>I</i>		
<i>J</i>		
<i>K</i>		
<i>L</i>		

24 marks

- b. i. Identify the biosynthetic building blocks of natural product *C*, *D*, *E*, *G* and *H* as  $C_2$ ,  $C_5$  or  $C_6C_3$ .

*C*- \_\_\_\_\_  
*D*- \_\_\_\_\_  
*E*- \_\_\_\_\_  
*G* \_\_\_\_\_  
*H*- \_\_\_\_\_

5 marks

- ii. For each biosynthetic building block mentioned in the above question, write the structure and the name of the corresponding biosynthetic precursor(s).

Biosynthetic building block	Structure and the name of the corresponding biosynthetic precursor
$C_2$	
$C_5$	
$C_6C_3$	

8 marks

- c. Identify the structure corresponding to each of the following compounds from the natural products, *A* to *L*, on page 5. Write the letter of the structure in the appropriate space.

- i. Caffein, the stimulant in coffee and tea. ....
- ii. Estrogen, a female hormone responsible for female sexual characteristics. ....
- iii. Taxol, an anticancer drug originally obtained from the bark of the Pacific yew tree. ....
- iv. Epigallocatechin gallate, the main active constituent of tea polyphenols. ....
- v. Camphor, which was isolated from the camphor tree, *Cinnamomum camphura*, but is now made commercially from  $\alpha$ -pinene. ....

5 marks

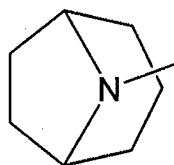
2. Answer any three parts

- a.
  - i. Define the term essential oils.
  - ii. Two natural products given on page 5 are major constituents of essential oils. Name the class to which each of the two natural products belongs.
  - iii. Name a suitable method for extracting essential oils from plant materials?

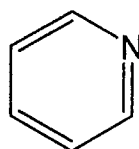
6 marks

- b.
  - i. What are the biosynthetic precursors of 'true' alkaloids?
  - ii. Write a specific use of alkaloids in medical applications.
  - iii. Identify following ring structures X-Z as pyridine, indole and tropane.

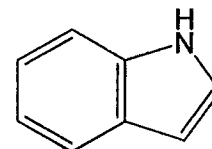
X



Y



Z



6 marks

- c.
  - i. What are saponins?
  - ii. Name two properties of saponins, which make them commercially important.
  - iii. Explain the phrase that "saponins are foaming agents" relating to their structures.

6 marks

- d.
  - i. Draw the basic skeletal structure of steroid, number the C atoms using numbers 1-25, and label rings as A-D according to the standard steroid nomenclature.
  - ii. What are phytosterols?
  - iii. How does a phytosterols differ from cholesterol in terms of structure?

6 marks

3. a. Name four hot extraction methods of natural products.

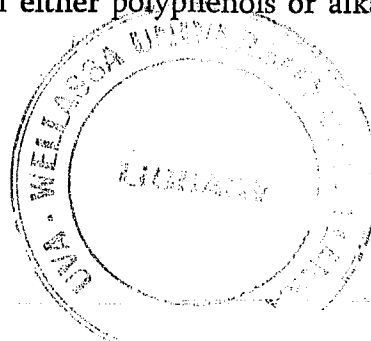
4 marks

b. Name four chromatographic methods that can be used to separate crude extracts of natural product.

4 marks

c. Draw a flow chart showing the isolation of either polyphenols or alkaloids from a plant material.

12 marks



4. A student is planning to develop an antifungal cream using natural products from a certain plant. Using a flow chart, show steps that he should follow during his research project.

20 marks

