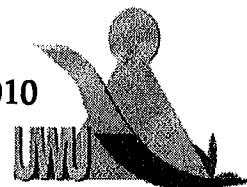


Uva Wellassa University, Sri Lanka
End Semester Examination – December 2009/ January 2010
SCT 325-2 Natural Products Chemistry



Time: Two (02) hours

Index Number:.....

Answer all questions

No. of questions : 8

Total marks allocated : 200 points

Use a separate booklet to provide answers for question 5b and 6.

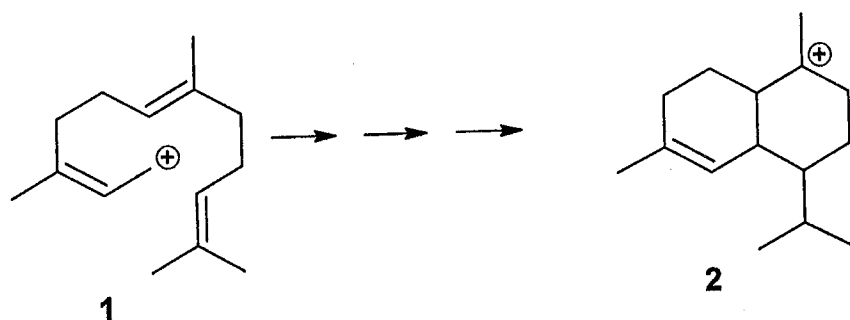


1. Outline the fatty acid biosynthesis pathway.

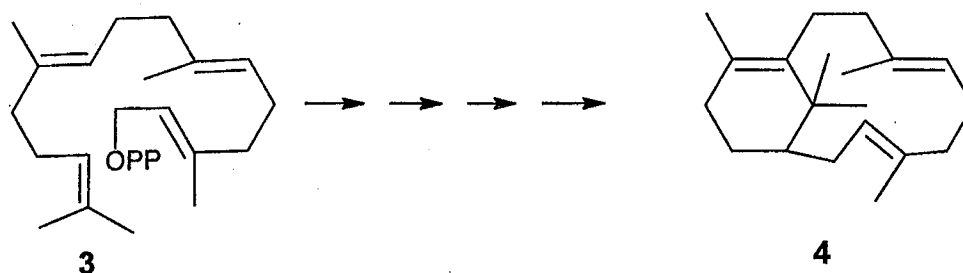
[Your answer must include names of reactants, intermediates and products, names of enzymes and reactions, stereochemistry where relevant (R/S and/or E/Z), functions of reducing/oxidizing agents if involved. Starter unit and chain extender unit must also be identified].

[50 points]

2. Show (by using arrows to indicate formation and migration of bonds) how *E,Z*-farnesyl cation (1) can be converted to cadinyl cation (2). [5 points]



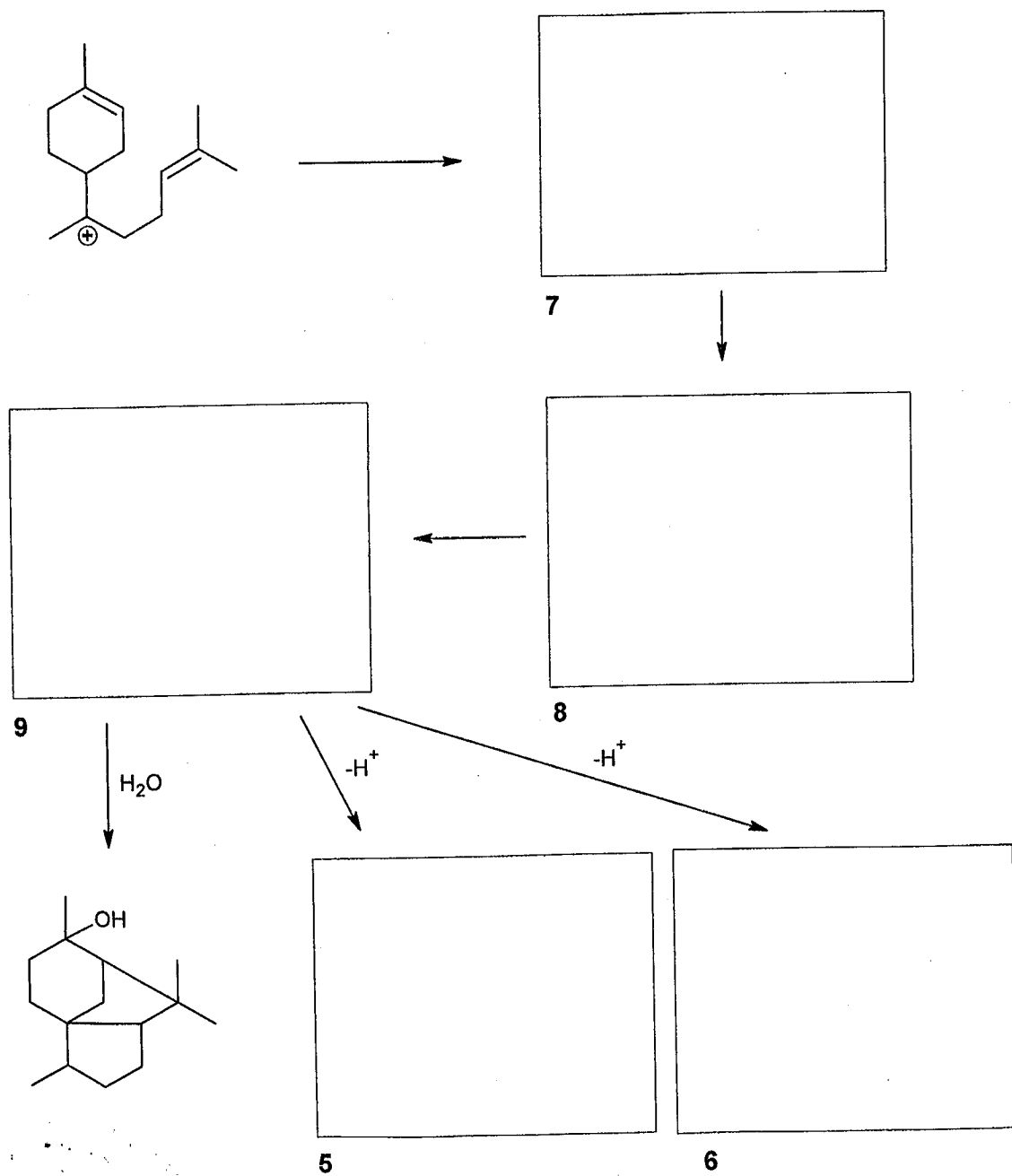
3. Show (by using arrows to indicate formation and migration of bonds) how GGPP(3) is converted to verticillene (4). [7 points]



tion (1)
[5 points]

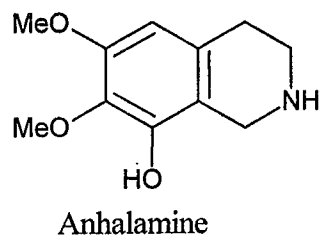
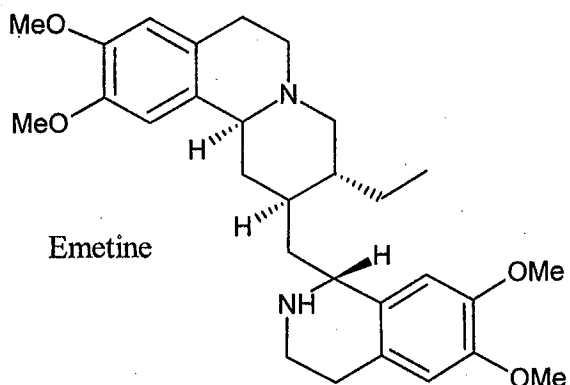


4. Show the structures of products **5** and **6**, and structures of intermediates **7**, **8** and **9** in relation to biosynthetic pathways associated with terpenoids [use arrows to indicate formation and migration of bonds]. [8 points]



5. (5a) Perform repeated Hoffmann degradation (Exhaustive methylation and Hoffman elimination) on the following compounds and draw the structures of all possible products.

[20 points]



(5b) Coniine is a secondary amine containing a piperidine ring. Exhaustive methylation of coniine yields a salt that, when treated with Ag_2O , then heat, gives a mixture of three alkenes. All three alkenes have the same molecular formula, $\text{C}_{10}\text{H}_{21}\text{N}$. One alkene (designated as A) is the major product and other two (designated as B and C) are minor products. The major product, A, was isolated. Exhaustive methylation of A and treatment with Ag_2O and heat gave a mixture of 1,4-octadiene and 1,5-octadiene. When pure B was subjected to exhaustive methylation, treatment with Ag_2O and heating, it gave 1,4-octadiene and when pure C was subjected to the same experimental procedure, it gave 1,5-octadiene.

Propose a structure for coniine.

What are the structures of A, B and C ?

[You are supposed to show how you determined the structures based on the experimental results provided. Just drawing structures without any explanation will not qualify for full marks].

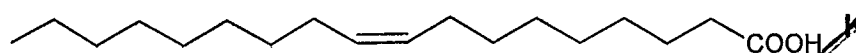
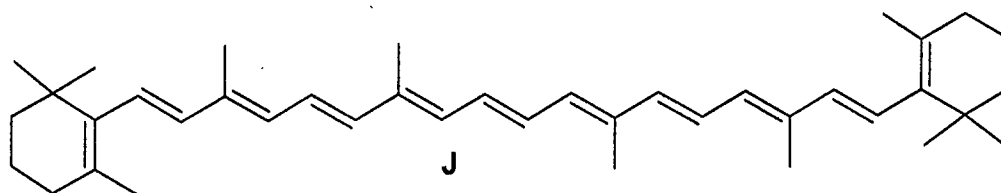
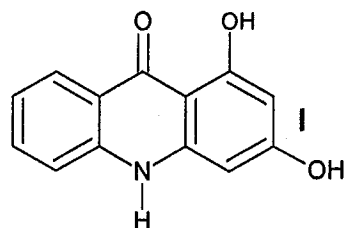
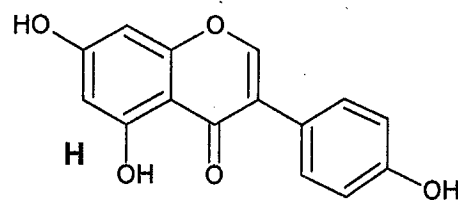
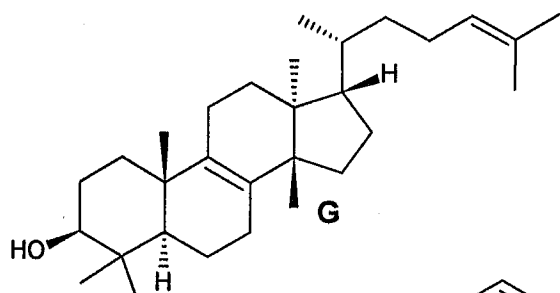
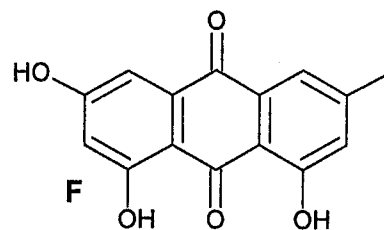
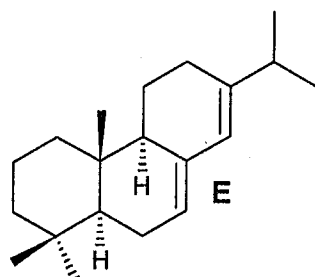
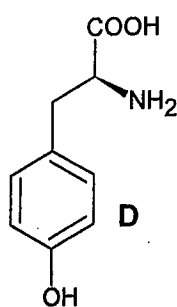
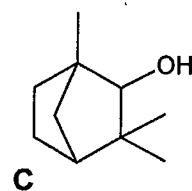
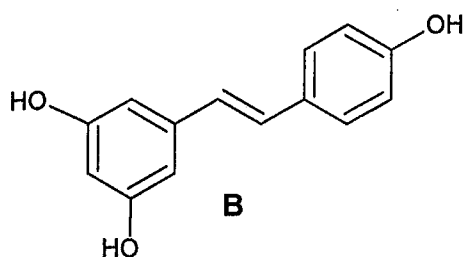
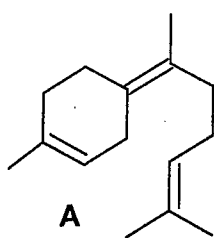
[50 points]

6. Preliminary screening studies have shown that the dichloromethane extract of root bark of *Alstonia macrophylla* has alkaloids. Describe briefly (using a flow chart) how alkaloid fraction can be separated from the extract

[You must justify (provide reasons for) each step of the experimental procedure and reagent added].

[22 points]

7. Consider the following natural products, A to K.



a. Assign each of the natural products, A to K, to the appropriate class (e.g., coumarin, diterpenoid, triterpenoid, amino acid, fatty acid, alkaloid, anthraquinone, isoflavonoid etc.).

[25 points]

A.

B.

C.

D.

E.

F.

G.

H.

I.

J.

K.

b. Name the pathway(s) involved in the biosynthesis of natural products, D, H, I, J and K.

D.

H.

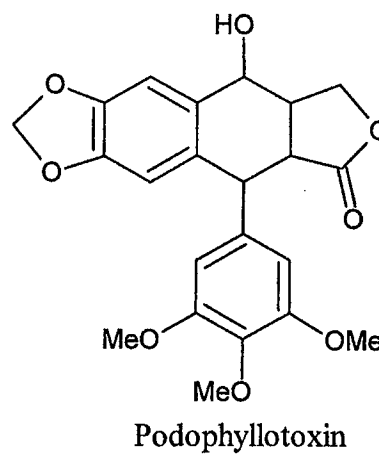
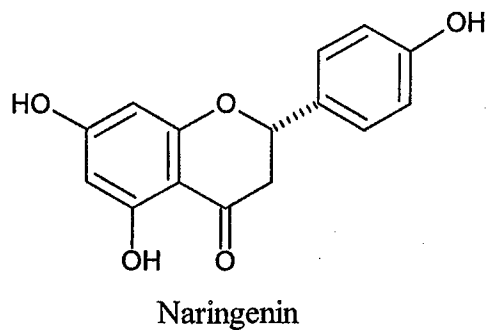
I.

J.

K.

8. Identify the "biosynthetic building blocks" of Naringenin and Podophyllotoxin as C_1 , C_2 , C_5 , C_6C_3 , C_6C_2N , C_4N or C_3N .

[13 points]



Question No.	Points
1	
2	
3	
4	
5	
6	
7	
8	
Total	

