Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
300 level 1st Semester Examination – June / July 2016
SCT 325-2 Natural Products Chemistry

Uva Wellassa University

Instructions to candidates
Duration: 02 hour
Number of questions: 6 Structured Essay
Mark allocation: 100 mark
Answer all questions

Index No:

1. a.) What is the difference between primary metabolites and secondary metabolites found in nature?

.....

.....

(2 marks)

b.) Name two primary metabolites and three types of secondary metabolites

Primary metabolites

.....

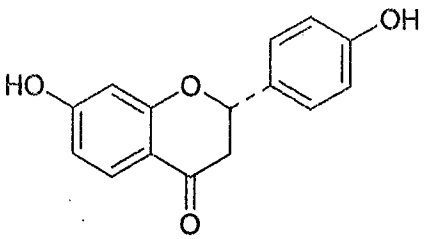
(2 marks)

Secondary metabolites

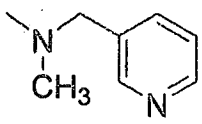
.....

(3 marks)

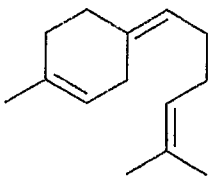
c.) Categorize the following compounds into major secondary metabolite groups



A

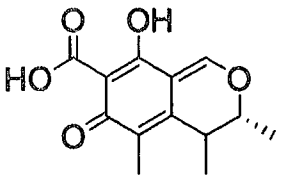


B

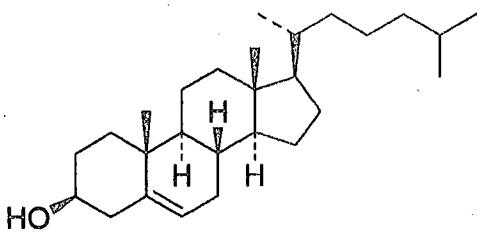


C

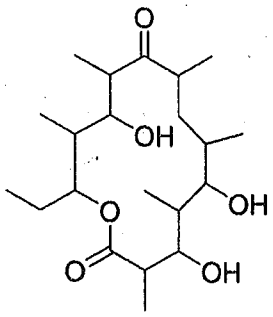
29



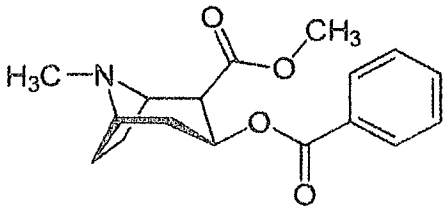
D



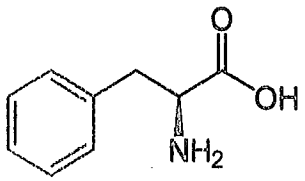
E



F



G



H

A- .....

B-.....

C-.....

D-.....

E-.....

F-.....

G-.....

H-.....

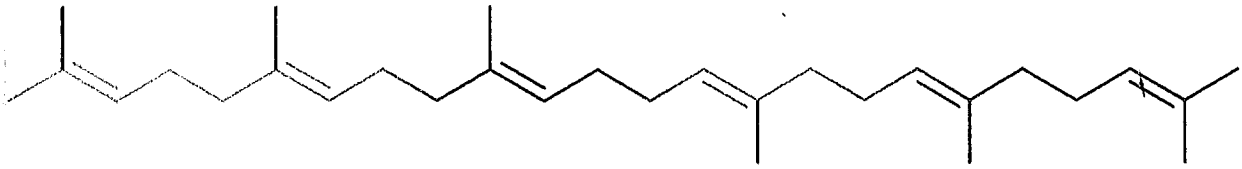
(8 marks)

2. a.) What are the two hemiterpene building blocks involved in the formation of other terpenes and terpenoids?

.....

(2 marks)

b.) Answer the questions below according to the given compound



i. What type of a terpene is the above compound? .....(1 mark)

ii. How many isoprene units does this compound has? ..... (1 mark)

iii. Circulate the isoprene units in the given structure. (3 marks)

iv. What are the precursor/s for making this compound ?

.....

(2 marks)

v. What sort of a combination/joint has taken place between the above precursors for the formation of this compound ?..... (1 mark)

3. a.) What is the difference between true alkaloids and proto alkaloids ?

.....

.....

(4 marks)

b.) State whether compound X is a true alkaloid or a proto alkaloid. .....

(1 mark)

c.) What types of ring systems do compounds X and Y consist of ?

X:.....

Y:.....

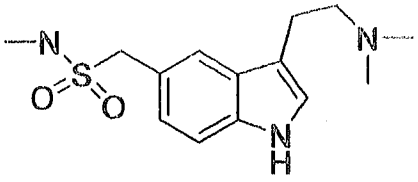
(2 marks)

d.) Which amino acids have being involved in the formation of compounds X and Y?

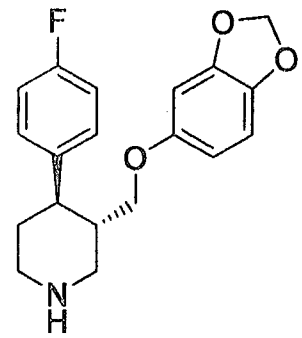
X: .....

Y: .....

(2 marks)



X



Y

e.) Which amine group (α, β, γ, δ or ε) in L-Ornithine contributes to the formation of the pyrrolidine ring?

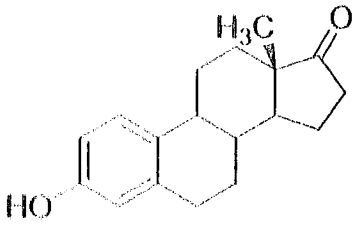
..... (1 mark)

4. a.) From which compounds are steroids biosynthetically derived ?.....

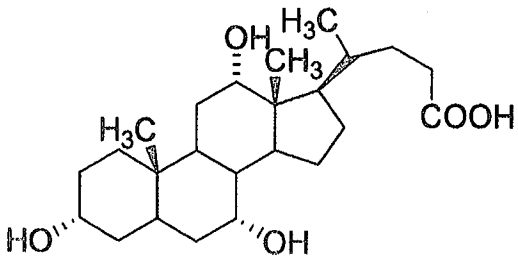
(1 mark)

b.) Draw the steroidal nucleus (2 marks)

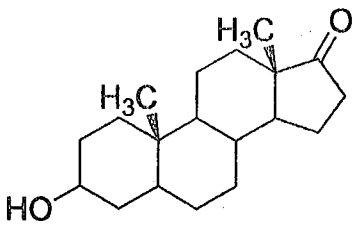
c.) Name the parental hydrocarbon skeleton of ℙ, ℚ and ℝ steroids



ℙ



ℚ



ℝ

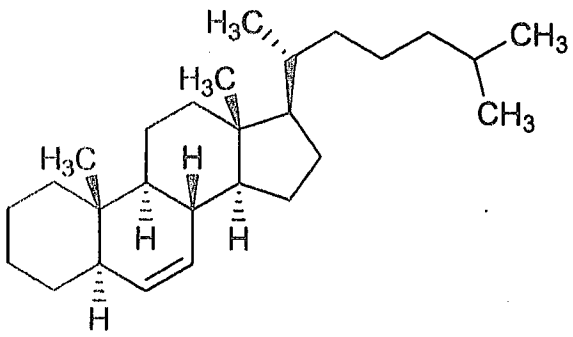
P: .....

Q: .....

R: .....

(3 marks)

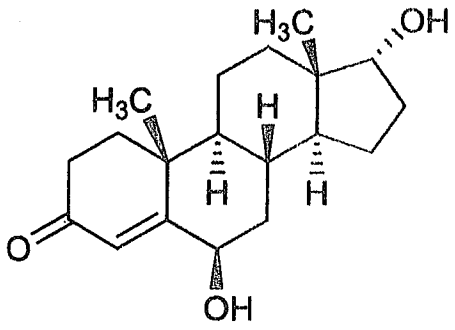
d.) Number the following structures (𝕊 and 𝕋) and give their names according to the rules of steroidal nomenclature



𝕊

.....

(7 marks)



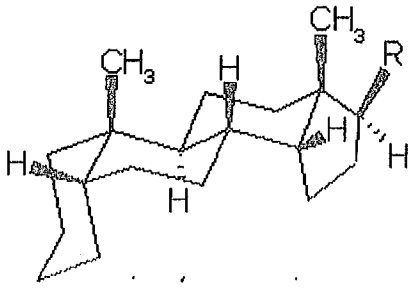
T

.....

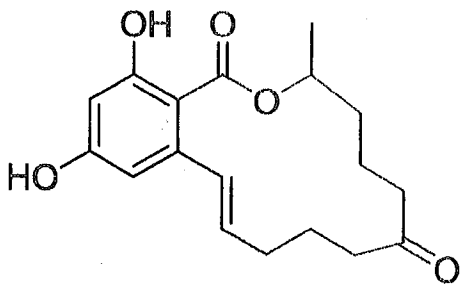
(6 marks)

e.) State whether A and B rings of the given steroid are *cis* fused or *trans* fused? .....

(1 mark)



5. Answer the questions below using the polyketide zearalenone (Z) (given below)



Z

a.) Draw the polyketide backbone for Z. Mark the starter unit and extender units. (17 marks)

b.) Draw the original linear polyketide chain which gives Z. (4 marks)

c.) What is the starter unit of Z ? ..... (1 mark)

d.) What is the extender unit of Z ? ..... (1 mark)

e.) How many extender units have combined to make Z? ..... (1 mark)

f.) After folding of the polyketide chain, there are two types of major bond formations within this molecule, which is a C-C bond formation and and C-O bond formation. Mark these two bonds on the structure Z.

(2 marks)

g.) What ring closing mechanism has taken place during the C-C bond formation ?

..... (1 mark)

Give a reason as to why this type of a reaction has occurred .....

. (2 mark)

h.) What type of a polyketide is Z? ..... (1 mark)

6. a.) Write four activities reported from the secondary metabolites isolated from plants and microorganisms.

.....

.....

.....

.....

(4 marks)

b.) Name four types of chromatographic techniques which can be used to isolate a bioactive compound from a crude plant extract.

.....

.....

.....

.....

(4 marks)

c.) Why do scientists constantly search for new antibiotics?

.....

(2 marks)

d.) How long does it normally take for a new bioactive compound to be developed as a drug?

.....(1 mark)

e.) Name two types of marine organisms that have been investigated by scientists for isolating bioactive secondary metabolites.

.....

.....

(2 marks)

f.) Name two types of fungi that have been investigated for isolating bioactive secondary metabolites.

.....

.....

(2 marks)