

BINDURA UNIVERSITY OF SCIENCE EDUCATION

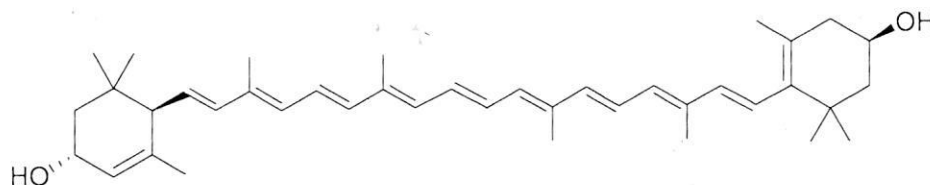
CHEMISTRY DEPARTMENT

COURSE: CH217: PHYTOCHEMISTRY

2 HOURS

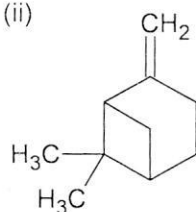
ANSWER QUESTION ONE AND FOUR OTHERS, TWO FROM EACH OF THE SECTIONS A AND B. EACH QUESTION CARRIES 20 MARKS

- 1 (a) Draw and circle the isoprene units in each of the following compounds.
(i)



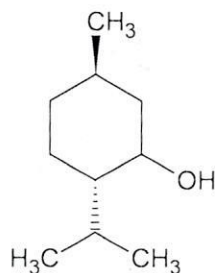
[2 marks]

(ii)



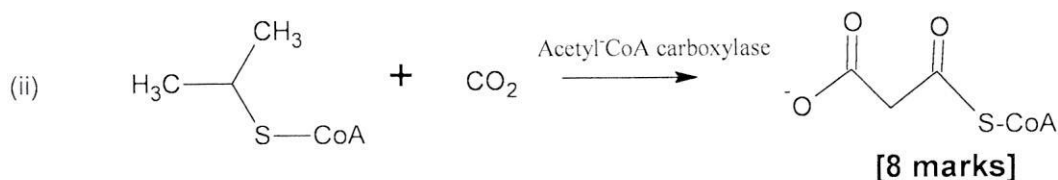
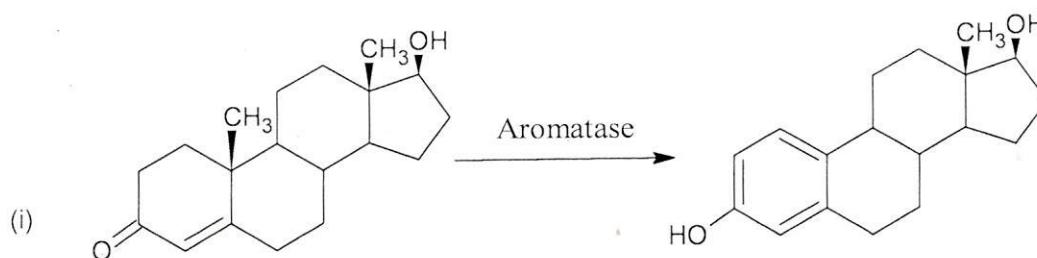
[2 marks]

(iii)



[2 marks]

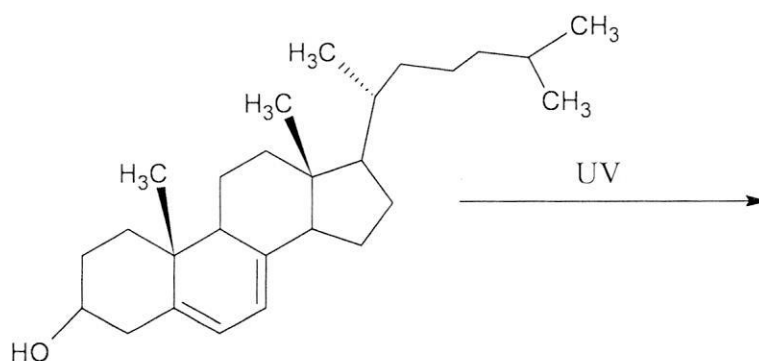
- (b) Explain the importance of the reactions below in medicine;



- (c) (i) Describe the chemistry behind the removal of scum by softening agents that are added to soap. [4 marks]
 (ii) Draw the structure of vulcanized rubber? [2 marks]

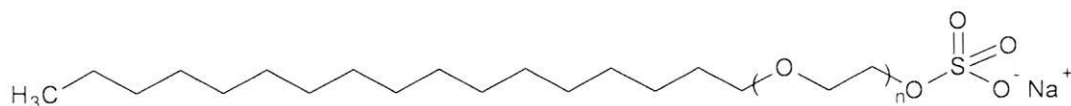
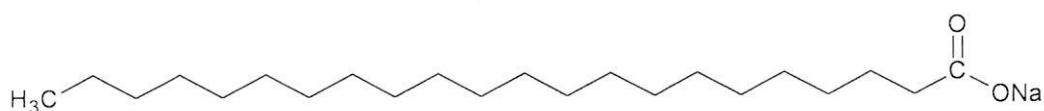
SECTION A: ANSWER ANY TWO QUESTIONS

- 2 (a) (i) Draw the structure of vanillin. [3 marks]
 (ii) Outline a mechanism for the synthesis of geraniol. [10 marks]
 (iii) Draw structures of two synthetic phenolic acids you know. [4 marks]
 (b) Draw the product of the following reaction;

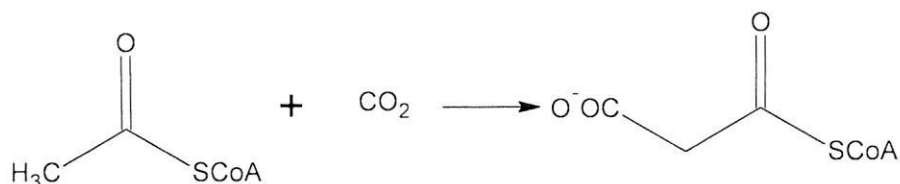


[3 marks]

- 3 (a) Draw structures of two building blocks that are used as alkylating agents in acetate and shikimate pathway. [2 marks]
 (b) Describe the advantages and disadvantages of the cleaning agents shown below.

**[4 marks]**

- (c) (i) Outline steps that are involved in the synthesis of mevalonic acid. **[8 marks]**
 (ii) Suggest a mechanism for the following conversion. **[6 marks]**



- 4 (a) Evaluate the use of thioesters as chain extenders. **[6 marks]**
 (b) Describe a chemical test that can be used to distinguish geraniol from limonene. **[4 marks]**
 (c) (i) What type of compound is cholesterol? **[1 mark]**
 (ii) Describe the effects of excessive cholesterol concentration in the body. **[4 marks]**
 (d) (i) Suggest a general structure of a steroid. **[2 marks]**
 (iii) Using examples, evaluate the use of terpenoids in industry. **[3 marks]**

SECTION B: ANSWER ANY TWO QUESTIONS

- 5 (a) Outline a mechanism for the synthesis of a geranyl diphosphate. **[10 marks]**
 (b) Draw the general structure of a phenolic compound. **[2 marks]**
 (c) Phenolic compounds exhibit antioxidant activity. **[2 marks]**
 (i) Define an antioxidant. **[2 marks]**
 (ii) Suggest a mechanism to illustrate how phenolic compounds function as antioxidants in the body. **[6 marks]**
- 6 Discuss the advantages and disadvantages of using synthetic antioxidants in food industries. **[20 marks]**
- 7 Describe the chemistry behind the following methods of testing antioxidant activity of phytochemicals. **[10 marks]**
 (a) FRAP assay **[10 marks]**
 (b) TBARS assay **[10 marks]**

END OF EXAMINATION