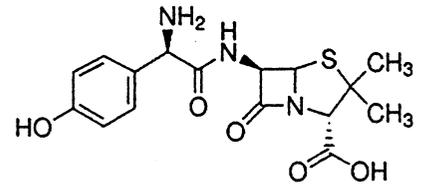
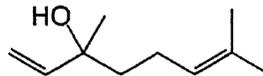


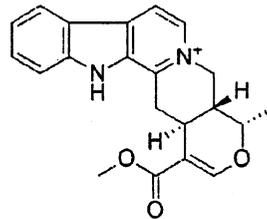
1. a. Amoxicillin antibiotics are formed by certain essential amino acids. Identify and highlight them in the given structure and write their names. You do not have to redraw. [2]



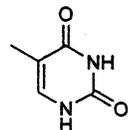
- b. Below is the structure of linalool (present in lavender oil). If the natural source had only radio labelled acetyl CoA with  $(\text{CH}_3\text{-C}^*\text{O})^-$ , locate the  $\text{C}^*$  atoms in linalool. Work it out. [Correct answer: 1 + Working it out 2]



- c. What is the *minimum* number of amino acid that nature needs to make serpentine (below)? Encircle the amino acid(s)-derived framework with a line. [2]

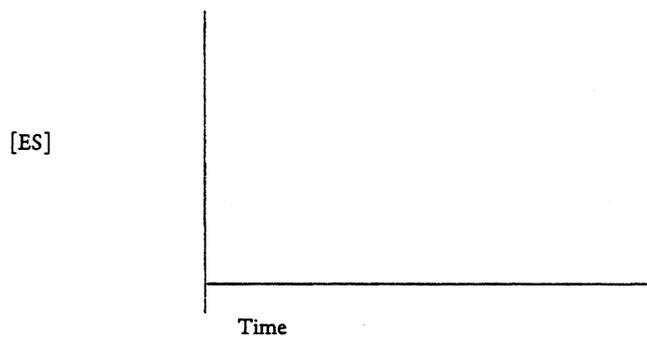


- d. What happens to a thymine rich nucleotide in the presence of bright sunlight? [3]



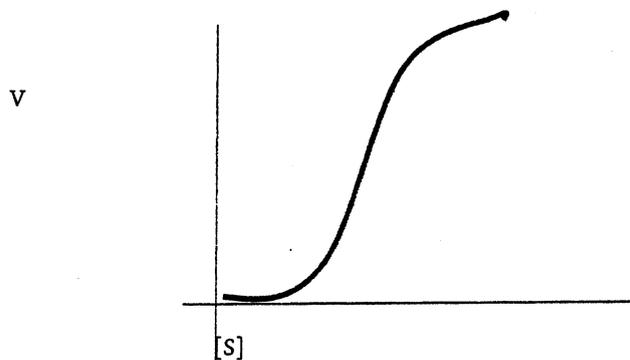
- e. *Think and give your insight:* Why has nature chosen a five carbon (reduced) sugar in the DNA structure instead of a more common six carbon sugar? *Grading for this question will be done based on your insight rather than a fixed right or wrong answer.* [3]

- f. For an enzymatic reaction, draw a plot that shows the appropriate relationship between the variables. In the same plot, indicate the zone where the steady state approximation is valid. [2 + 2]



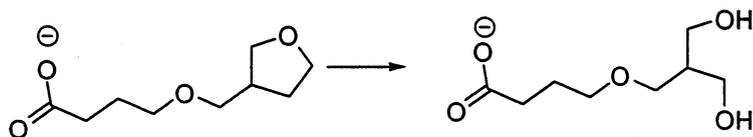
2. How can  $k_{cat}[E]_0$  in Michaelis Menten equation be equal to  $V_{max}$ ? [3]

3. A plot of rate vs substrate concentration for an allosteric enzyme is shown below. What kind of interactions (at least two) might be operative here that causes deviation from the MM behaviour? [ 2]



Ans

4. (a) Design the transition state and a TSA for the following reaction in the box provided. You might need to employ suitable conditions for the reaction to occur. All the rough work for this problem should be done in the space below. [2 + 2]



Transition state:

TSA:

- (b) Do you expect the antibody pocket for this reaction to be hydrophobic or hydrophilic? Why? [2]

5. The reactive part of an enzyme is small compared to its whole structure. What is the function of the rest of the molecular structure? [2]

*Space for rough work for all questions unless specified*