



# **KIBABII UNIVERSITY**

**UNIVERSITY EXAMINATIONS  
2021/2022 ACADEMIC YEAR**

**THIRD YEAR FIRST SEMESTER  
SUPPLEMENTARY/SPECIAL EXAMINATIONS**

**FOR THE DEGREE OF BSC (CHEMISTRY)**

**COURSE CODE: SCH 317**

**COURSE TITLE: BIO-ORGANIC AND MEDICINAL CHEMISTRY**

**DATE: 18/11/2022**

**TIME: 2:00PM-4:00PM**

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## **INSTRUCTIONS TO CANDIDATES**

Time: 2 Hours

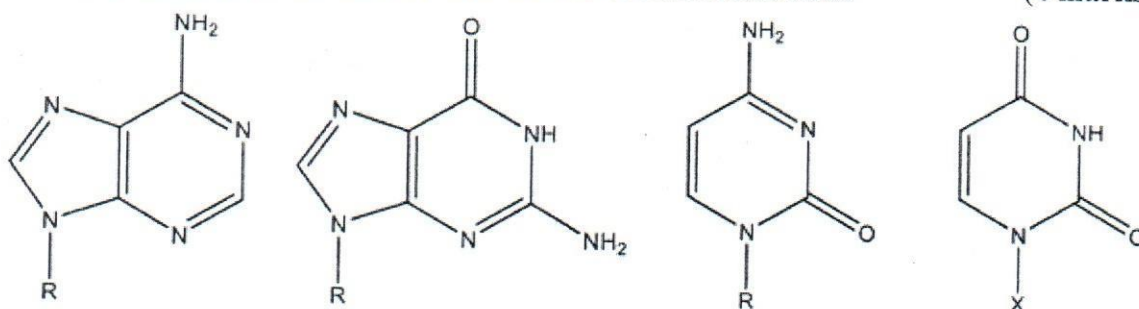
Answer question ONE and any other TWO of the remaining

KIBU observes ZERO tolerance to examination cheating

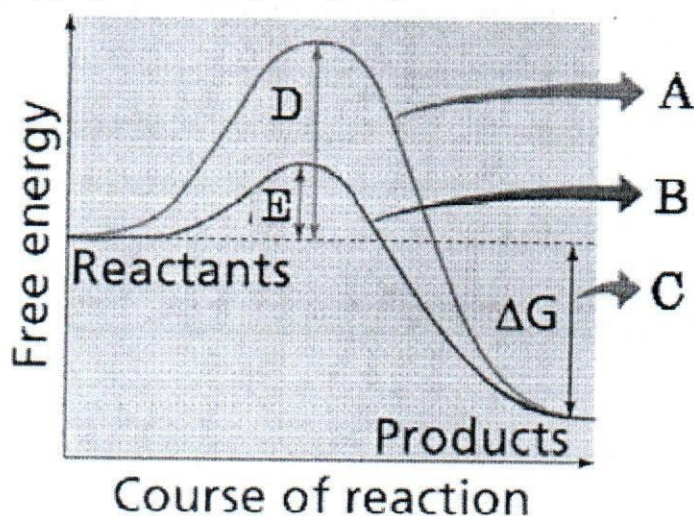
### QUESTION ONE (30 MARKS)

- a) Define the following terms as used in medicinal chemistry (5 marks)
- i. Lead
  - ii. Absorption
  - iii. Pharmacophore
  - iv. Potency
  - v. Pharmacodynamics

- b) The following represent the four bases of DNA. The 'R and X' indicate sugar moiety covalently attached to the base to form the nucleoside. Name them (4 marks)

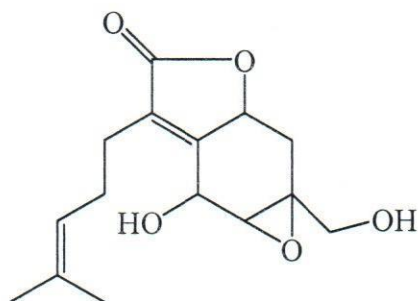


- c) Using relevant example explain Watson-Crick base pairing (3 marks)  
 d) State the difference in the structures of RNA and DNA (3 marks)  
 e) Study the graph of the energy flow of a chemical reaction below and match the letters in the graph with the appropriate description (i - v). (5 marks)



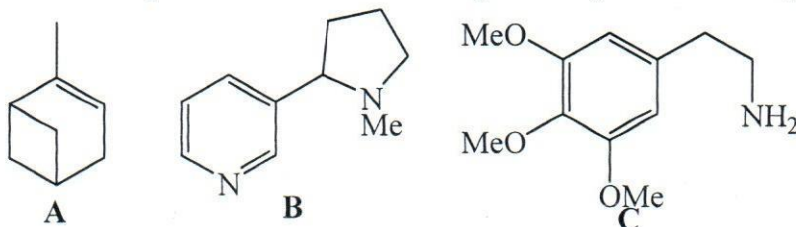
- i. Energy path of an uncatalyzed reaction
  - ii. Energy released from this reaction
  - iii. Activation energy of a catalyzed reaction
  - iv. Activation energy of an uncatalyzed reaction
  - v. Energy path of a catalyzed reaction
- f) List four reasons why metabolism of drugs important (4 marks)  
 g) Mention three organs responsible for drug metabolism (3 marks)

- h) Identify the isoprene units in paniculide B, a product of tissue culture from *Andrographis paniculata* (3 marks)

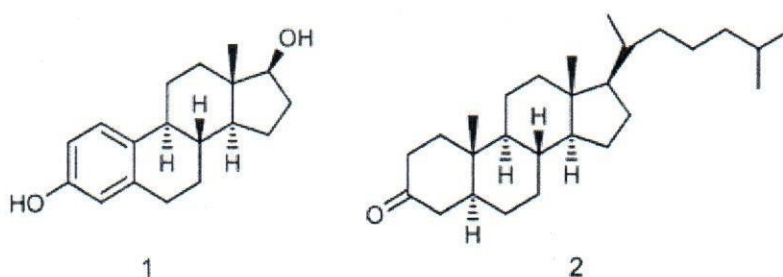


**QUESTION TWO (20 MARKS)**

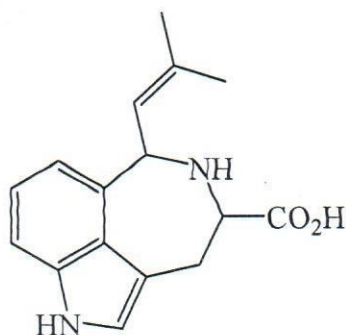
- a) In which class of natural product does the following natural products belong (3 marks)



- b) Name the following compounds using IUPAC rules (4 marks)



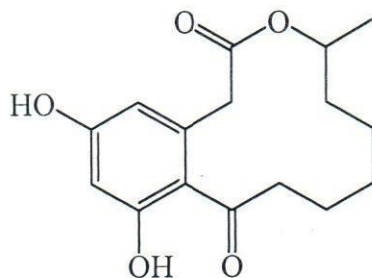
- c) The metabolite clavicipitic acid below is produced by the ergot fungus, *Claviceps purpurea*. Identify the building blocks (5 marks)



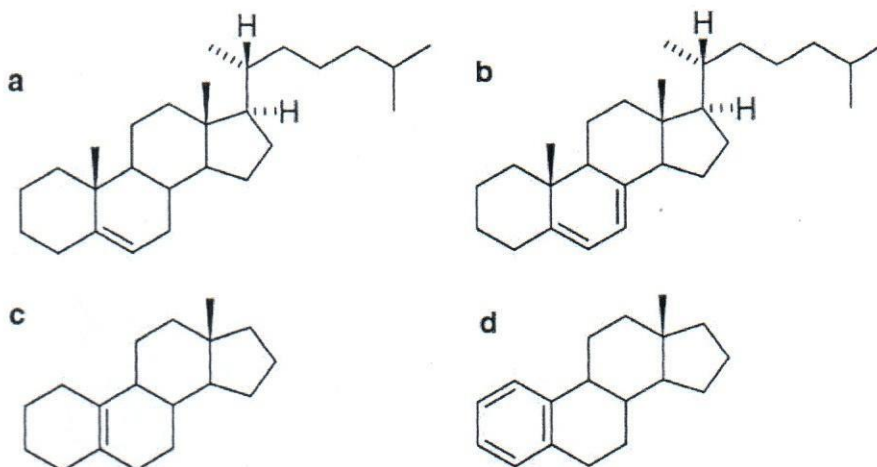
- d) Discuss the discovery of *penicillin* and *chlordiazepoxide* according to the article *The Role of Serendipity on Drug Discovery* (8 marks)

**QUESTION THREE (20 MARKS)**

- a) State five advantages of combinatorial chemistry over traditional synthesis method (5 marks)
- b) Indicate, using bold lines, the constituent acetate units in the natural product compound below (4 marks)



- c) Name the following compounds (6 marks)

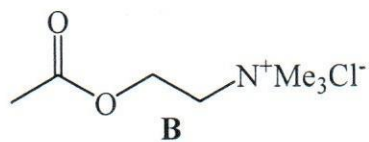
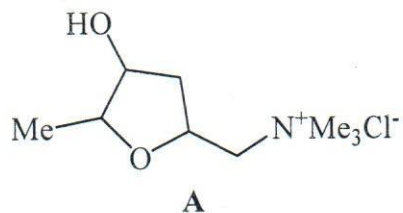


- d) Discuss induced-fit model of enzyme action (5 marks)

**QUESTION FOUR (20 MARKS)**

- a) State and briefly discuss environmental factors that affect enzyme activity (6 marks)
- b) During phase I metabolism, majority of metabolites are generated by a common hydroxylating enzyme system known as Cytochrome P450. Name any eight of these reactions (4 marks)
- c) Name classes of terpenoid (2 marks)

- d) The fungal metabolite muscarine A binds to certain receptors for the neurotransmitter acetylcholine B. Indicate, on their structures below, the structural similarity between muscarine and acetylcholine (2 marks)



- e) Name the following compounds (6 marks)

