KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER
SUPPLIMENTARY/SPECIAL EXAMINATIONS

FOR THE DEGREE OF BSC (CHEMISTRY)

COURSE CODE: SCH 334 E

COURSE TITLE: MEDICINAL CHEMISTRY

**DATE:** 5/02/21   **TIME:** 2 - 4 Pm

INSTRUCTIONS TO CANDIDATES
Time: 2 Hours

Answer question ONE and any other TWO of the remaining

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)**
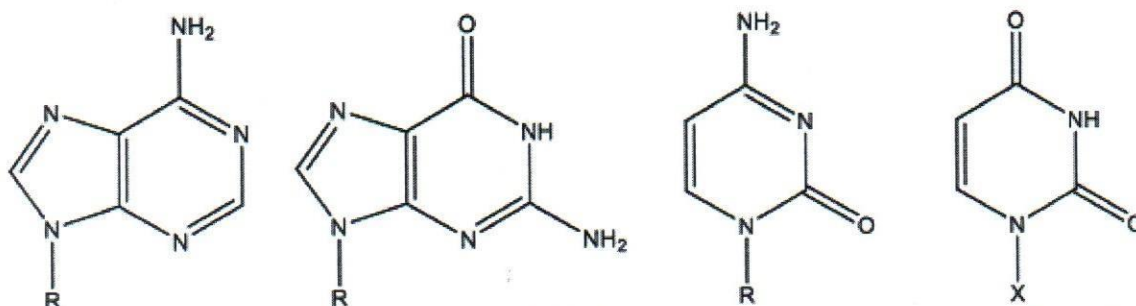

c) Using relevant example explain Watson-Crick base pairing   **(3 marks)**
d) State the difference in the structures of RNA and DNA   **(3 marks)**
e) Study the graph of the energy flow of a chemical reaction below and match the letters in the graph with the appropriate description (**i – v**).   **(5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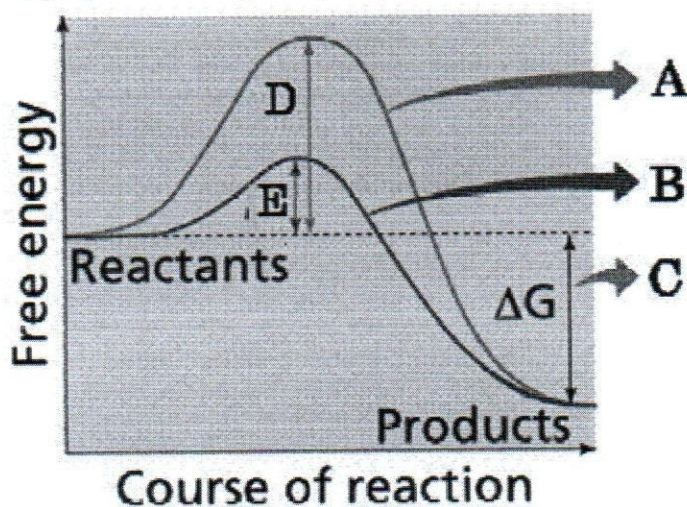

  - i. Energy path of an uncatalyzed reaction
  - ii. Energy released from this reaction
  - iii. Activation energy of a catalyzed reaction
  - iv. Activation energy of an uncatalyzed reaction
  - v. Energy path of a catalyzed reaction

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* **(3 marks)**
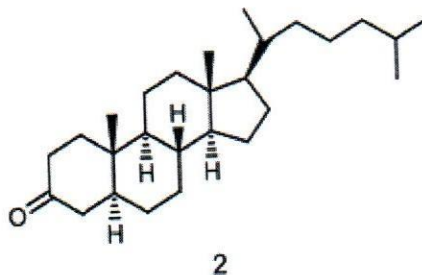   *paniculata*
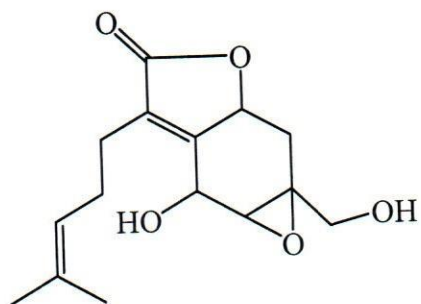
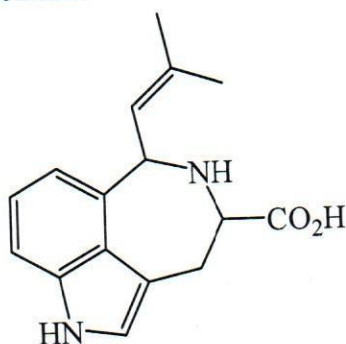## QUESTION TWO (20 MARKS)

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

A   B   C
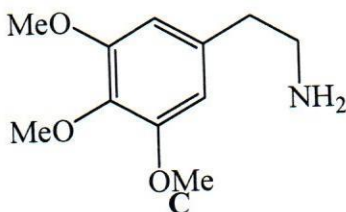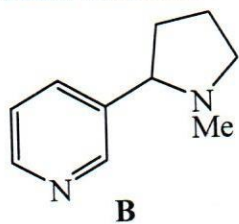
b) Name the following compounds using IUPAC rules   **(4 marks)**


1   2

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)**

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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)**
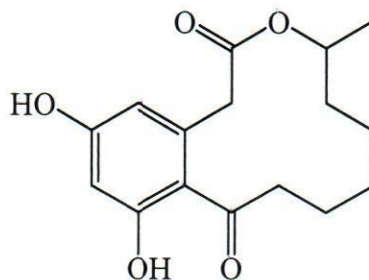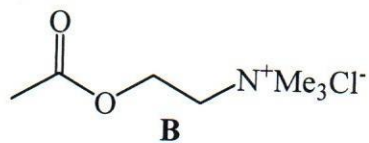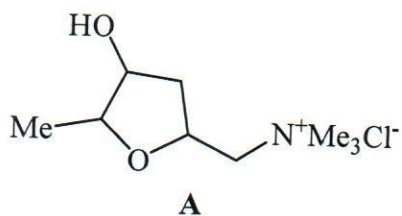

c) Name the following compounds **(6 marks)**
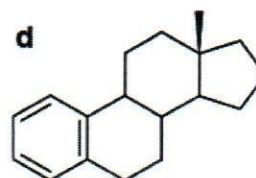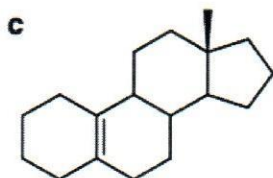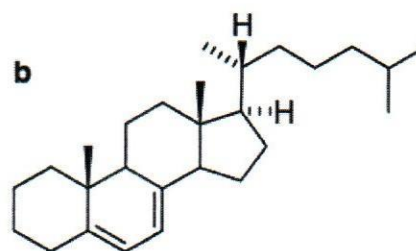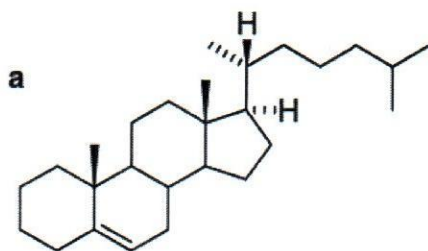

d) Discuss induced-fit model of enzyme action **(5 marks)**

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)**

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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)**

A   B

e) Name the following compounds **(6 marks)**

a   b

c   d
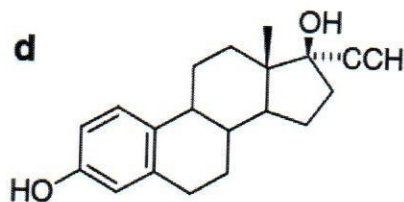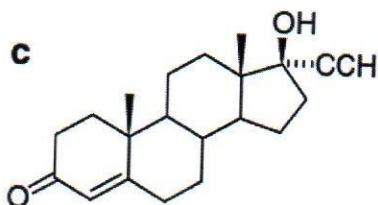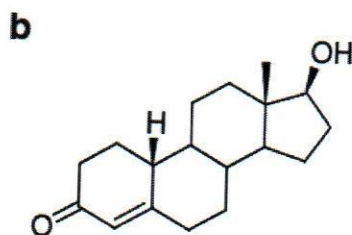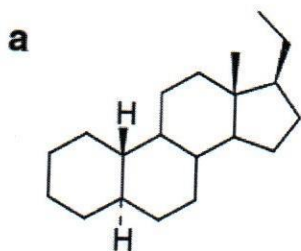
QUESTION FIVE (20 MARKS)

a) Name classes of alkaloids with one example in each **(8 marks)**

b) Provide description of 3D structure of DNA **(3 marks)**

c) Route of drug administration is a method of drug absorption. List one advantage and three disadvantages of oral drug administration **(4 marks)**

d) Indicate, using bold line, the constituent acetate units in the compound below **(5 marks)**

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