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University Examinations 2022/2023

THIRD YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR
OF SCIENCE (CHEMISTRY)

SCH 3454: NATURAL PRODUCTS CHEMISTRY

DATE: APRIL 2023

TIME: 2 HOURS

INSTRUCTIONS: *answer question one and any other two questions*

QUESTION ONE (30 MARKS)

- a) Discuss **metabolites** under the following subheadings
- (i) Define the term metabolism (1 mark)
 - (ii) Classify and give examples of primary and secondary metabolites (4 marks)
 - (iii) State two economic importance of each class in (ii) above (4 marks)
 - (iv) State three diverse aspects of chemistry of natural products (3 marks)
- b) Discuss natural products under the following subheadings
- i) Define natural products (1 mark)
 - ii) State the sources (2 marks)
 - iii) State three reasons for studying natural products (3 marks)
- c) Discuss terpenoids under the following subheadings
- i) Define terpenoids (1 mark)
 - ii) How are terpenoids classified? (4 marks)
 - iii) State two general properties of terpenoids (2 marks)
- d) Explain the characteristics information obtained by the following methods of structural determination (5 marks)
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- e)
 - i) NMR
 - ii) IR
 - iii) UV

QUESTION TWO (20 MARKS)

- a) Name the biosynthetic pathway that leads to this class of compounds (3 marks)
 - i) Terpenes
 - ii) Alkaloids
 - iii) Polyketides
- b) Discuss **extraction** as a step used in natural drug discovery
 - i) Define extraction (1 mark)
 - ii) State four ideal properties of the solvent for extraction (4 marks)
 - iii) Briefly explain these extraction techniques giving advantages over traditional techniques
 - (i) SFE – Super critical fluid extraction (3 marks)
 - (ii) Ultrasound-assisted extraction (UAE) (3 marks)
 - (iii) MAE – microwave assisted extraction (3 marks)
- c) With suitable examples explain the following classes of natural products (3 marks)
 - (i) Steroids
 - (ii) Flavonoids

QUESTION THREE (20 MARKS)

- a) Name the detecting chemicals used in the analysis of the following phytochemicals (3 marks)
 - i) Alkaloids
 - ii) Flavonoids
 - iii) Terpenoids
- b) State advantages of natural bioactive compounds have several advantages over synthetic derivatives in drug design field (4 marks)
- c) Discuss **alkaloids** under the following sub headings

- i) Define alkaloids (1 mark)
- ii) Their occurrence (2 marks)
- iii) Their isolation (6 marks)
- iv) Their general properties (4 marks)

QUESTION FOUR (20 MARKS)

- a) Define (3 marks)
 - i) Pharmacognosy
 - ii) Crude drug
 - iii) Bioassay – guided fractionation
- b) In which class of natural products do the following compounds belong? (4 marks)
 - (i) Quinine
 - (ii) Cholesterol
 - (iii) Triacylglycerol
 - (iv) Caffeine
- c) State three classes of alkaloids based on functions (3 marks)
- d) Describe how the quality of drug is assessed under the following
 - i) Determination of ash (3 marks)
 - ii) Determination of heavy metals (3 marks)
 - iii) Determination of pesticides residue (3 marks)
- e) What are tannins? (1 mark)