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University Examinations 2024/2025

THIRD YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR
OF SCIENCE IN BIOLOGICAL SCIENCE

SCS 3300: PHYTOCHEMISTRY

DATE: JANUARY 2024

TIME: 2 HOURS

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

QUESTION ONE (30 MARKS)

- a) Define the following terms
- i) pharmacognosy
 - ii) metabolism (2 marks)
- b) State three study areas included while carrying phytochemical research (3 marks)
- c) Highlight three reasons for studying phytochemistry (3 marks)
- d) Describe the steps involved in the chemically driven process of drug discovery process (6 marks)
- e) Describe qualitative tests for the following phytochemicals
- i. Test for alkaloids (2 marks)
 - ii. Test for phenolic compounds (2 marks)
 - iii. Test for saponins (2 marks)
- g) State two methods used to test the purity of isolated phytochemical (2 marks)
- h) Discuss terpenoids under the following subheadings
- i. Define terpenoids (1 marks)

ii. Describe the classification of terpenoids (4 marks)

iii. State three advantages of extraction of terpenoids from plant materials with supercritical liquids over the traditional solvent extraction methods (3 marks)

QUESTION TWO (20 MARKS)

a) Discuss Bioassay under the following subheadings

(i) Define the term

i) bioassay

ii) screening (2 marks)

ii. Explain three roles of bioassay (3 marks)

iii. Distinguish between in vitro and in vivo assay (2 marks)

b) Explain how the following spectroscopic methods are used in phytochemicals characterization

i. x-ray crystallography (2 marks)

ii. FT-IR (2 marks)

iii. ^{13}C -NMR (2 marks)

c) State three Physico-chemical constants parameters investigated on purity of phytochemicals

(3 marks)

d) (i) identify the biosynthetic pathway responsible for flavonoids (1 marks)

(ii) Name the three-stage responsible for flavonoids biosynthesis pathway. (3 marks)

QUESTION THREE (20 MARKS)

a) Distinguish between general and specialized screening and state an advantages of each

(4 marks)

b) Secondary metabolites can be classified on the basis of their

i) Chemical structure

ii) composition

iii) The pathway by which they are biosynthesized. Explain this basis of classification

(6 marks)

c) Explain how the following parameters are investigated during determination of foreign matter

i. Determination of Ash (3 marks)

ii. Determination of Microbial Contaminants and Aflatoxins (3 marks)

- d) (i) Define flavonoids (1 mark)
ii) State two characteristics of flavonoids (3 marks)

QUESTION FOUR (20 MARKS)

- a) Define the following terms (2 marks)

i) cytotoxicity

ii) lead compound

- b) Discuss extraction under the following subheading (2 marks)

(i) Define extraction (1 mark)

(ii) State three ideal properties of the solvents for extraction

(iii) Briefly explain the following methods of extraction (3 marks)

i. Serial Exhaustive Extraction (2 marks)

ii. Microwave assisted extraction (2 marks)

- c) Discuss alkaloids under the following subheadings (2 marks)

i) Define alkaloids (1 marks)

(ii) State two characteristics of alkaloids (2 marks)

- d) .In modern sciences, phytochemicals are still the best resource of bioactive compounds.

What are the advantages to use them? And also, please describe the problems to utilize them

(disadvantages) (3 marks).