BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT: ENGINEERING AND PHYSICS

PROGRAMME: BACHELOR OF SCIENCE HONOURS IN ENVIRONMENTAL PHYSICS AND ENERGY SOURCES (HBScEPES)

COURSE CODE (s) HPH 221 (3): ENVIRONMENTAL BIOCHEMISTRY

DURATION: 3 HOURS TOTAL MARKS: 100

INSTRUCTIONS TO CANDIDATES

Answer **ALL** questions in Section A and any **THREE** questions from Section B. Section A carries 40 marks and Section B carries 60 marks.

Section A

1.(a) (i) Name one method for cleaning up contaminated soil.
(1 Mark)

(ii) Which soil component plays a crucial role in nutrient cycling?
(1 Mark)

(iii) What is the primary mechanism for atmospheric oxygen regeneration?
(1 Marks)

(b) Explain the concept of bioremediation and provide two examples of how it is used to clean up environmental pollutants.
(6 Marks)

(c) Explain the concept of a food web and how it differs from a food chain.
(4 Marks)

(e) What is the difference between a pollutant and a contaminant? Provide examples of each.
(4 Marks)

(f) Discuss the importance of biodiversity for ecosystem stability.
(7 Marks)

(g) (i) Describe the formation and effects of acid rain.
(10 Marks)

(ii) Explain the process of eutrophication in aquatic systems.
(8 Marks)

Section B

2 (a) What is a pollutant? Give 3 three examples of pollutants.
(5 Marks)

(b) Identify and describe the main sources of air, water, and soil pollution.
(15 Marks)

3 Analyze the biochemical effects of gold mining on the river's water quality and surrounding ecosystem in the Mazoe river catchment in Zimbabwe.
(20 Marks)

4 Discuss the concept of energy flow in ecosystems, including the roles of producers, consumers, and decomposers.
(10 Marks)

(b) (b) Compare and contrast energy transfer efficiency in different ecosystems, such as forests and grasslands.
(10 Marks)

5 (a) Describe the interconnectedness of the carbon, nitrogen, and phosphorus cycles, highlighting their importance in ecosystem functioning.
(12 Marks)

(b) Explain how human activities have impacted these cycles, providing examples
(8 Marks)

6 (a) Explain the concept of bioaccumulation and biomagnification
(6 Marks)

(b) Compare and contrast the effects of different pollutants on gene expression.
(14 Marks)

END OF PAPER