

051106T4APB

APPLIED BIOLOGY LEVEL 6

APB/OS/AB/CR/05/6

Carry Out Ecological and Soil Studies

March/April 2026



**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION COUNCIL
(TVET CDACC)**

WRITTEN ASSESSMENT

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATE

1. This paper consists of **TWO** sections: **A** and **B**.
2. Answer **ALL** questions in section A and **ANY THREE** (3) questions in section B.
3. Marks for each question are indicated in the brackets.
4. Candidates are provided with a separate answer booklet
5. Do not write on the question paper.

This paper consists of THREE (3) printed pages

Candidate should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.

SECTION A (40 MARKS)

Answer ALL questions in this section

1. Ecosystems consist of interacting physical and biological components. Identify FOUR biotic factors within an ecosystem. (4 Marks)
2. Energy transfer between organisms follows specific ecological patterns. Construct a pyramid for a grassland ecosystem. (4 Marks)
3. Population size and behavior vary among organisms. Identify FOUR factors influencing population dynamics. (4 Marks)
4. Population size estimation is a key ecological field procedure. Outline how population size estimation is carried out using the belt transect method. (4 Marks)
5. Ecosystems are classified according to environmental conditions. Identify FOUR terrestrial ecosystems. (4 Marks)
6. Organisms exhibit features that enable survival in their environments. Identify FOUR adaptive features of aquatic organisms. (4 Marks)
7. Soil develops through ecological processes and occurs in layers. Identify FOUR soil components. (4 Marks)
8. Soils differ in physical properties used for classification. State FOUR observable physical properties used to classify soils. (4 Marks)
9. Physical conditions of the soil influence plant growth. List FOUR ways soil structure influences crop productivity. (4 Marks)
10. Soil fertility is influenced by chemical and biological characteristics. Identify FOUR macro elements found in soil. (4 Marks)

SECTION B (60 MARKS)

Answer any THREE Questions in this section

11. Soil organisms and soil properties play a central role in ecosystem productivity.

- a) Identify FOUR major soil organisms and describe how they can be isolated from soil. (8 Marks)
- b) Describe methods used to determine:
 - i. Soil pH (3 Marks)
 - ii. Cation exchange capacity. (3 Marks)
- c) Explain THREE ecological importance of soil organic matter. (6 Marks)

12. Aquatic and terrestrial ecosystems differ in environmental conditions and biological communities.

- a) Classify aquatic ecosystems into FOUR categories based on water quality. (8 Marks)
- b) Outline the procedure for collecting terrestrial organisms. (6 Marks)
- c) Explain adaptive features of plants found in terrestrial ecosystems. (6 Marks)

13. Human activities can degrade ecosystems, requiring conservation interventions.

- a) Explain FIVE causes of ecosystem degradation. (10 Marks)
- b) Discuss FOUR methods of environmental conservation. (8 Marks)
- c) Identify and explain an environmental conservation exercise carried out to restore a degraded ecosystem. (2 Marks)

14. Population studies support effective ecosystem management.

- a) Describe how population size estimation is carried out in the field. (4 Marks)
- b) Describe suitable population estimation methods for the following organisms
 - i. Elephants (3 Marks)
 - ii. Butterflies (2 Marks)
 - iii. Squirrels (3 Marks)
 - iv. *Bidens pilosa* (2 Marks)
- c) Explain the role of natality and mortality in maintaining the stability of an ecosystem's population (6 Marks)