

051106T4APB

APPLIED BIOLOGY LEVEL 6

APB/OS/AB/CR/01/6

Carry Out Cytological and Histological Techniques

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. In a practical session, trainees observed structures that are present only in plant cells. List FOUR structures found only in plant cells. (4 Marks)
2. While reviewing experimental errors, trainees discuss measurement accuracy. State FOUR reasons why accurate measurement is important in solution preparation. (4 Marks)
3. A trainee demonstrates water movement using potato strips in different solutions. Outline FOUR steps involved in demonstrating osmosis using plant tissue. (4 Marks)
4. A learner observes dividing cells under a microscope. State FOUR stages of mitosis in the correct sequence. (4 Marks)
5. After collection, specimens are labelled for identification. List FOUR details that should appear on a specimen label. (4 marks)
6. In a practical lesson, trainees make temporary slides. Outline FOUR steps involved in preparing a temporary slide. (4 Marks)
7. Decalcification is a key step in bone tissue preparations. Highlight FOUR characteristics of an ideal decalcifying fluid. (4 Marks)
8. A ribbon of sections is a long, continuous strip of consecutive tissue slices that is formed during microtomy. State FOUR characteristics of a good ribbon of sections. (4 Marks)
9. A field biologist works in a remote location and needs to embed plant samples rapidly for later microscopic analysis. Name FOUR types of embedding media that can be used. (4 Marks)
10. Some slides appear clearer than others after staining. List FOUR factors that affect the quality of stained microscopic sections. (4 Marks)

SECTION B (60 MARKS)*Answer any THREE questions in this section*

11. A laboratory technologist is preparing thin tissue sections for microscopic examination using a rotary microtome.
 - a) Explain the working principle of a rotary microtome by describing the functions of its key components. (8 Marks)
 - b) Describe the procedure for correctly cutting a paraffin-embedded tissue block and flattening the sections on a floating bath using an adhesive. (8 Marks)
 - c) During specimen management, the laboratory stores live animal specimens for short-term study. Outline FOUR precautions to observe when storing live animal specimens in the laboratory. (4 Marks)
12. To study the internal structure of a young dicotyledonous stem, trainees must prepare and examine tissue sections under a microscope.
 - a) Describe how you would prepare a young dicotyledonous stem tissue for microscopic examination. (10 Marks)
 - b) Outline FIVE main differences between mitosis and meiosis. (10 Marks)
13. During a histology practical, trainees are required to prepare tissues and maintain laboratory equipment.
 - a) As part of the practical, explain FOUR methods used for preparing fresh tissues for microscopic examination. (8 Marks)
 - b) After sectioning is completed, proper care of equipment is emphasized. Outline the care and maintenance of a microtome knife. (6 Marks)
 - c) Highlight SIX characteristics of an ideal mounting media in histological techniques. (6 Marks)
14. In a histology laboratory, tissues undergo clearing, processing, and staining before microscopic observation.
 - a) During tissue processing, xylene is used as a clearing agent. Describe THREE characteristics of Xylene as a clearing agent. (6 Marks)
 - b) Some tissues require special processing methods. Discuss FOUR types of tissues that are ideally processed using a vacuum impregnation oven. (8 Marks)
 - c) Explain THREE importance of staining in tissue observation. (6 Marks)