TEVETA

DIPLOMA IN SCIENCE LABORATORY TECHNOLOGY

LEVEL 6 YEAR III EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATIONS

SITTING: NOVEMBER / DECEMBER 2025

SUBJECT: GENETICS AND BIOTECHNOLOGY

TIME: THREE (3) HOURS **TOTAL MARKS: 100**

PASS MARK: 50

INSTRUCTIONS TO CANDIDATE

1. Write your Examination number and National Registration Card (NRC) number on the answer booklet provided. Ensure you append your signature in the space provided on the answer booklet.
2. Write the ANSWER SCRIPT SERIAL NUMBER on the examination register and on the entry slip.
3. This paper has SEVEN (7) questions. Question ONE (1) is compulsory; Answer FOUR (4) questions from the remaining SIX (6) questions.
4. Diagrams may be used where necessary to clarify your answer.
5. Cellphones and programmable calculators are not allowed in the examination room.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD SO.

QUESTION 1 (COMPULSORY)

(a) Define the term gene. **[2 marks]**

(b) Describe the characteristics that qualify a Neurospora organisms for the use in genetic experiments. **[8 marks]**

(c) Colour blindness is a sex-linked disease that affects some human beings. With the aid of a diagram deduce the expected phenotypes of the offsprings of a normal man and a colour blind woman. **[10 marks]**

TOTAL: 20 MARKS

QUESTION 2

(a) In an experiment red flowers were crossed with plants with white flowers. All the plants in the F1 generation had pink flowers.

(i) Explain the reason for the appearance of pink flower in the F1 generation. **[3 marks]**

(ii) If the plants from F1 generation were self-pollinated, state the phenotype ratio of the F2 generation. **[3 marks]**

(b) In an experiment a variety of garden peas having a smooth seed coat was crossed with a variety with a wrinkled seed coat. All the seeds obtained in the F1 had a smooth seed coat. The F1 generation was self-pollinated. The total number of F2 generation was 7324.

(i) Using appropriate letter symbols state the genotype of the F1 generation. **[3 marks]**

(ii) From the information above deduce the **Genotype ratio**, **Phenotype ratio** and **Wrinkled number** for the F2 generation. **[11 marks]**

TOTAL: 20 MARKS

QUESTION 3

(a) State two **(2)** methods of enzyme purification. **[2 marks]**

(b) Explain the purposes of:

(i) Enzyme purification. **[3 marks]**

(ii) Five **(5)** named enzymes used in industries. **[15 marks]**

TOTAL: 20 MARKS

QUESTION 4

(a) State four **(4)** different microbes used in the production of dairy products like cheese and yoghurt. **[4 marks]**

(b) Explain the process of jam preparation using a suitable fruit. **[10 marks]**

(c) Distinguish between jam and jelly. **[6 marks]**

TOTAL: 20 MARKS

QUESTION 5

(a) State five **(5)**:

(i) Types of food additives that are used in food industry. **[5 marks]**

(ii) Main methods of food preservations. **[5 marks]**

(b) Describe the preparation of inverted sugar syrup in a laboratory. **[10 marks]**

TOTAL: 20 MARKS

QUESTION 6

(a) Define brewing science. **[2 marks]**

(b) Explain four **(4)** biochemical techniques that are used in the quality control of beer. **[8 marks]**

(c) Describe the main events that occur during the malting and fermentation processes of beer production. **[10 marks]**

TOTAL: 20 MARKS

QUESTION 7

(a) Describe the production process of carbonated beverage. **[10 marks]**

(b) Explain the process of producing glucose syrup from starch in the laboratory. **[10 marks]**

TOTAL: 20 MARKS