

JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF AGRICULTURE AND FOOD SECURITY

2nd YEAR SECOND SEMESTER EXAMINATION

(For 2024/2025 Academic Year)

FOR THE DEGREE OF BACHELOR OF SCIENCE IN HORTICULTURE

COURSE CODE: APB 9206

**COURSE TITLE: CELL AND TISSUE CULTURE AND TRANSGENIC
TECHNOLOGIES**

INSTRUCTION TO CADIDATES

Answer Question ONE and any other THREE questions

TIME: THREE HOURS

QUESTION ONE

- a) Define tissue culture and list its three main types [4 marks]
- b) What are the advantages and limitations of tissue culture technology? [4 marks]
- c) Name two physicochemical properties of culture media that are critical for cell growth [2 marks]
- d) What is the role of serum in animal cell culture media? [2 marks]
- e) Define totipotency and its significance in plant tissue culture [3 marks]
- f) Differentiate between organogenesis and somatic embryogenesis [2 marks]
- g) What is micropropagation, and why is it important in crop improvement? [3 marks]
- h) List two hormones used in callus induction and their roles. [2 marks]
- i) What is artificial seed technology, and how is it produced? [4 marks]

QUESTION TWO

A researcher wants to develop a disease-resistant crop using tissue culture techniques. Design a step-by-step protocol for achieving this goal, including callus induction, organogenesis, and acclimatization of plants [**15 marks**]

QUESTION THREE

A farmer approaches you with a problem of low yield in a crop due to soil-borne pathogens. How would you use micropropagation and transgenic technologies to provide a solution? [**15 marks**]

QUESTION FOUR

Compare and contrast animal cell culture techniques with plant tissue culture. Highlight the key differences in media requirements and applications [**15 marks**]

QUESTION FIVE

What are transgenic technologies? Discuss their scope and importance in crop improvement, with examples [**15 marks**]