

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE

BOTA 412: PLANT BIOTECHNOLOGY

STREAMS: BSC

TIME: 2 HOURS

DAY/DATE: TUESDAY 06/04/2021

2.30 P.M. – 4.30 P.M.

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INSTRUCTIONS: Answer ALL questions in section A and any TWO from section B

SECTION A

1. Describe the features of a binary vector for use in *Agrobacterium* mediated gene transfer [5 marks]
2. (a) Give three reasons why *Agrobacterium* mediated transformation is the most preferred method for plant transformation [3 marks]  
(b) Describe the selection of transgenic plants after transformation [3 marks]
3. (a) After tissue culture of garden pea plant, regenerated plants were found to have unusually round leaves. This characteristic was however not observed in the generations that followed. Describe what caused the unusual leaf shape [2 marks]  
(b) State four differences between genetic engineering and conventional breeding [2 marks]  
(c) List five applications of recombinant DNA technology in agricultural production [5 marks]
4. State four issues of concern that arise from genetically modified crops [4 marks]
5. (a) A gene for drought resistance has been identified in a wild relative of maize, *zea diploperennis*. Explain how you can use it to develop drought tolerant maize [3 marks]  
(b) Differentiate between somatic embryogenesis and organogenesis [3 marks]

**SECTION B**

7. Describe the constituents of tissue culture medium [20 marks]
  8. Discuss the methods of genetic engineering in plants [20 marks]
  9. (a) Discuss four tools of biotechnology [10 marks]  
(b) Discuss the use of genetic markers in plant breeding [10 marks]
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