



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND  
TECHNOLOGY**

**SCHOOL OF AGRICULTURAL AND FOOD SCIENCES**

**FOURTH YEAR SECOND SEMESTER UNIVERSITY EXAMINATION  
FOR THE DEGREE OF BACHELOR OF SCIENCE IN FOOD  
SECURITY**

**2016/2017 ACADEMIC YEAR**

**REGULAR**

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**COURSE CODE: AFB 3426**

**COURSE TITLE: BIOTECHNOLOGY IN AGRICULTURE**

**EXAM VENUE: STREAM: BSc. FOOD SECURITY**

**DATE: EXAM SESSION:**

**TIME: 2 HOURS**

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**Instructions:**

- 1. Answer ALL questions in section A and any TWO in section B.**
- 2. Candidates are advised not to write on question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

**SECTION A      30 MARKS**

**Answer ALL questions from this section.**

1. Briefly explain two applications and two concerns of biotechnology. (4 Marks).
2. List any three differences between animal and plant cells. (3 Marks)
3. State and briefly define enzymes used to manipulate the DNA (4 Marks)
4. What is protoplast and how are they isolated from plant materials. (4 Marks).
5. Is it true that DNA can be synthesized from RNA? Explain briefly your answer. (4 Marks)
6. What is your understanding of gene promoters? Describe any two types of promoters (5 marks)
7. Describe briefly gel electrophoresis as a technique used in molecular biology. (3 Marks).
8. Organ cultures have been used in various applications among them is tissue engineering. However, it has some shortfalls in its application. List any three advantages and disadvantages of organ cultures. (3 Marks)

**Section B 40 Marks.**

**Answer any TWO questions from this section.**

9. Discuss intellectual property rights in biotechnology. (20 marks).
10. Gate way technology is a method that enables researchers to efficiently transfer DNA fragments between plasmids using a set of recombination sequences. Using diagram where applicable, describe the technology as used in gene cloning. (20 Marks).
11. Discuss industrial and environmental applications of biotechnology. (20 Marks).