



**MAASAI**

# **MARA UNIVERSITY**

**REGULAR UNIVERSITY EXAMINATION  
2018/2019 ACADEMIC YEAR  
FOURTH YEAR SECOND SEMESTER**

**SCHOOL OF SCIENCE AND INFORMATION  
SCIENCES  
FOR THE DEGREE OF BACHELOR OF  
SCIENCE WILDLIFE**

**COURSE CODE : EBH 410  
COURSE TITLE: BIOTECHNOLOGY**

**DATE: 17<sup>TH</sup> APRIL, 2019  
1300HRS**

**TIME: 1100 -**

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**INSTRUCTIONS TO CANDIDATES**

- a) Answer **ALL** questions in section **A** and **any two** questions in section **B**
- b) Illustrate your answers with suitable diagrams and give examples wherever appropriate.

**SECTION A: Answer ALL questions in this section. Each question carries 3marks**

1. Define the following :-
  - a. Gene (1mark)
  - b. recombinant DNA (1mark)
  - c. Restriction enzyme (1mark)
2. Explain transgenic organism. (3marks)
3. Distinguish between genomic and DNA libraries (3marks)
4. Scientist use restriction enzymes isolated from bacteria for DNA cloning. How do bacteria prevent restriction enzymes from dicing up their own DNA? (3marks)
5. Give three advantages of cloning. (3marks)
6. What is the function of gell electrophoresis in geneticengineering. (3marks)
7. Name and state the function of the reagent used in visualizing DNA and the enzyme used in PCR. (3marks)
8. State the advantages of stem cells over other type of cell for scientific research. (3marks)
9. Name two major areas/fields where biotechnological application is significant. (3marks)
10. Describe agro-bacterium/Rhizobium plant interaction. (3marks)

**SECTION B: Answer Any Two Questions Each question carries 20 marks**

11. Discuss the environmental implications of biotechnology (20 marks)
12. Discuss transcription in a prokaryotic cell. (20 marks)
13. Discuss Puc 19 as a plasmid vector and its application in antibiotic ampicillin. (20 marks)

**14. Read the passage and answer the question (20MARKS)**

Scientists in the United States of America have produced genetically modified pigs with fat containing omega-3 fatty acids. These fatty acids, which are usually found in salmon, mackerel and fresh tuna, are thought to be responsible for a number of benefits, from

combating heart disease to improving intelligence.

Researchers from the University of Pittsburgh – School of Medicine created piglets capable of converting less useful omega-6 fatty acids into omega-3 fatty acids. They implanted 1 800 embryos into 14 female pigs. Ten live offspring, which were able to make high levels of omega-3 fatty acids, were born.

- a. Name TWO health benefits of omega-3 fatty acids.
- b. What percentage success did the scientists have with the implanted embryos in forming a clone of pigs capable of producing omega-3 fatty acids? Show your working.
- c. To produce genetically modified pigs, the gene that produces omega-3 fatty acids is inserted into the pig embryos. Describe the steps in forming and introducing many copies of the desirable gene (using bacteria) into the pig embryos.
- d. Give TWO reasons why:
  - i. Some people may support the use of genetically modified pigs to produce omega-3 fatty acids
  - ii. Some people may be against the use of genetically modified pigs to produce omega-3 fatty acids

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