

**CHUKA**



**UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURE**

**AGRI 328: BIOTECHNOLOGY IN AGRICULTURE**

**STREAMS: BSC (AGRICULTURE)**

**TIME: 2 HOURS**

**DAY/DATE: TUESDAY 04/12/2018**

**8.30 A.M. – 10.30 A.M.**

**INSTRUCTIONS:**

**SECTION A: Answer all questions in this section (30 marks)**

1. (a) Explain any three roles of the plasma membrane in eukaryotic cells. (3 marks)
- (b) Describe a primer and outline its importance in DNA replication. (3 marks)
- (c) Explain the importance of restriction enzymes in biotechnology. (3 marks)
2. Explain the four principles in DNA replication. (4 marks)
3. (a) Describe the five phases of a eukaryotic cell cycle. (5 marks)
- (b) Describe five biotechnology tools that are important in agriculture. (5 marks)
4. (a) Explain why DNA fingerprinting is a unique method of identifying individuals. (4 marks)
- (b) Describe the two types of forensic DNA testing methods currently in use. (3 marks each)

**SECTION B: Answer any 2 questions (40 marks)**

5. (a) Briefly describe how DNA replicates before any cell division takes place. (5 marks)
- (b) Describe the three main stages of a PCR process. (5 marks)

6. (a) Describe yeast artificial chromosomes (YACs), and explain when best to use them for cloning. (5 marks)
- (b) Describe the basic ingredients of tissue culture medium. (7 marks)
- (c) Using a diagram, illustrate construction of a recombinant DNA molecule and state three main steps in a DNA cloning procedure. (8 marks)
7. (a) Describe how biotechnology applications can be used to reduce use of agrochemicals in crop production. (6 marks)
- (b) Discuss the 7 main steps involved in a plant tissue culture procedure. (14 marks)
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