EMBU UNIVERSITY COLLEGE

(A Constituent College of the University of Nairobi)

2015/2016 ACADEMIC YEAR

SECOND SEMESTER EXAMINATION

FOURTH YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE (AGRICULTURE)

ACS 410: BIOTECHNOLOGY

DATE: APRIL 11, 2016 **TIME: 8:30-10:30**

INSTRUCTIONS:

Answer Question ONE and ANY Other TWO Questions

QUESTION ONE

a) Define the following terms

i) Biotechnology (1 Mark)

ii) Exonucleases (1 Mark)

iii) Nucleotides (1 Mark)

iv) Mutations (1 Mark)

v) Chromosome (1 Mark)

b) Differentiate between

i) Exons and introns (2 Marks)

ii) Gene expression and genotype (2 Marks)

iii) Transcription and translation (2 Marks)

c) Write short notes on the following

i) Characteristics of ideal molecular markers for use in plant breeding. (5 Marks)

ii) Benefits of Amplified Fragment Length Polymorphism (AFLP) markers.

(5 Marks)

d) Assume that you are the head of biotechnology laboratory at Embu University College. Explain the applications of agarose gel electrophoresis done in your laboratory to students who have visited your laboratory (4 Marks)

e) Briefly outline the procedure carried out during Southern Blotting in molecular biology. (5 Marks)

QUESTION TWO

a) Discuss Agrobacterium mediated plant transformation (20 Marks)

QUESTION THREE

a) Citing relevant examples, describe the applications of cloning in molecular biology. (4 Marks)

b) Explain the benefits of plant tissue culture. (8 Marks)

c) Explain the requirements for granting a patent to an innovator. (5 Marks)

d) List any three (3) molecular markers employed in molecular assisted breeding. (3 Marks)

QUESTION FOUR

a) Explain the key requirements to run a Polymerase Chain Reaction (PCR). (7 Marks)

b) Discuss the limitations of Plant Breeders Rights in development of a new cultivar. (5 Marks)

c) Outline the characteristics of restriction enzymes as applied in molecular biology. (6 Marks)

d) Explain the role of transcription factors in living cells. (2 Marks)

QUESTION FIVE

Assume that you are the Chairman of the National Biosafety Committee and you have been invited to give a talk to the public on concerns that have been raised in regard to genetically modified crops. Discuss these concerns. (20 Marks)

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