



# UNIVERSITY OF EMBU

2016/2017 ACADEMIC YEAR

FIRST SEMESTER EXAMINATION

FIRST YEAR EXAMINATION FOR THE DEGREE OF MASTER OF SCIENCE IN  
PLANT BREEDING AND BIOTECHNOLOGY

ACB 602: BIOTECHNOLOGY, CYTOGENETICS AND MUTATION BREEDING

DATE: NOVEMBER 30, 2016

TIME: 2:00-5:00PM

INSTRUCTIONS:

Answer ANY FOUR Questions

QUESTION ONE (25 MARKS)

You are given a fully formulated (nutritive) plant tissue culture medium. Discuss the functions of each ingredient to be included in the culture medium. (25 marks)

QUESTION TWO (25 MARKS)

- a) Discuss the characteristics of chromosomes (15 marks)
- b) With help of a well labeled diagram classify chromosomes depending on position of centromere, shape and size. (10 marks)

QUESTION THREE (25 MARKS)

- a) Discuss the differences in DNA replication and transcription in prokaryotes. (10 marks)

- b) You have been given a contract to synthesis primers for a molecular biology laboratory. Describe the ingredients (chemical and molecular) requirements you need. (15 marks)

**QUESTION FOUR (25 MARKS)**

- a) Explain how to construct gene cloning and gene expression plasmid vectors. (10 marks)
- b) Describe how to use polymerase chain reaction (PCR) to determine Maize plant contain Bt gene. (15 marks)

**QUESTION FIVE (25 MARKS)**

- a) Discuss the importance of cytoplasmic male sterility (CMS) in maize breeding. (5 marks)
- b) Describe the process of making *in situ* hybridization starting from harvesting of cultured bean protoplast cells that have been grown in liquid medium. (20 marks)

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