

BOT 400E



OFFICE OF THE DEPUTY PRINCIPAL
ACADEMICS, STUDENT AFFAIRS AND RESEARCH

UNIVERSITY EXAMINATIONS

2021 /2022 ACADEMIC YEAR

FOURTH YEAR FIRST SEMESTER REGULAR EXAMINATION

**FOR THE DEGREE OF BACHELOR OF
EDUCATION SCIENCE**

COURSE CODE: BOT 400E

COURSE TITLE: ADVANCED GENETICS

DATE: 27TH JANUARY 2022

TIME: 12.00PM – 05.00PM

INSTRUCTIONS TO CANDIDATES

- SEE INSIDE

THIS PAPER CONSISTS OF 3 PRINTED PAGES

PLEASE TURN OVER

REGULAR –MAIN EXAM
BOT 400E: ADVANCED GENETICS

STREAM: BED (SCIENCE)

DURATION: 3 Hours

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INSTRUCTIONS TO CANDIDATES

- i. Answer **ALL** questions from section A and any **FOUR** from section B.
 - ii. Diagrams should be used whenever they serve to illustrate the answer.
 - iii. Do not write on the question paper.
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SECTION A (30 MARKS)

Question One

- a) Highlight four advantages of *Pisum sativum* over other experimental organisms in genetics. (4 Marks)
- b) Describe the segments of a transcribed DNA strand.
 - i. Exons (2.5 Marks)
 - ii. Introns (2.5 Marks)
- c) Classify chromosomes based on their morphology. (4 Marks)
- b) State the principle of independent assortment. (2 Marks)

Question Two

- a) Distinguish between a constitutive and inducible enzymes. (2 Marks)
- b) Differentiate between:-
 - i. Homogametic sex and Heterogametic sex (4 Marks)
 - ii. Dominant allele and Recessive allele (3 Marks)
- c) Highlight three applications of genetics in plant and animal breeding. (6 Marks)

SECTION B (40 MARKS)

Question Three

A homozygous purple-flowered short-stemmed plant was crossed with a homozygous red-flowered long-stemmed plant and the F_1 generation was test crossed with a double homozygous recessive plant, the following progeny were produced.

- 52 purple flower, short stem
- 47 purple flower, long stem
- 49 red flower, short stem
- 45 red flower, long stem

Explain these results.

(10 Marks)

Question Four

Write notes on:-

- a) Incomplete dominance (3 Marks)
- b) Codominance (2 Marks)
- c) Test cross (2 Marks)
- d) Aneuploidy (3 Marks)

Question Five

Discuss two forms of artificial selection in a population.

(10 Marks)

Question Six

Explain mechanisms by which genes are regulated within the cell.

(10 Marks)

Question Seven

a). Describe a gene as:-

- i. A unit of recombination (1 Mark)
- ii. A unit of function (1 Mark)

b) Explain four main features of a genetic code.

(8 Marks)
