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University Examinations 2012/2013

THIR YEAR, FIRST SEMSTER, EXAMINATIONS FOR DEGREE OF BACHELOR OF
SCIENCE IN HORTICULTURE

AHS 2306: PLANT BREEDING

DATE: AUGUST 2013

TIME: 2 HOURS

INSTRUCTIONS: Answer questions *one* and any other *two* questions

QUESTION ONE – (30 MARKS)

- a) Define the following terms:
 - i. Inbreeding depression (1 Mark)
 - ii. Mass selection breeding method (2 Marks)
 - iii. Emasculation (1 Mark)
 - iv. Plant breeding (1 Mark)
- b) State and explain any four scientific disciplines a plant breeder needs to be well versed with (8Marks)
- c) (i) What is a germplasm bank (1 Mark)
(ii) State and explain any three germplasm storage techniques commonly used in the present world. (6Marks)
- d) Give a detailed explanation of microsporogenesis and microgametogenesis as it occurs in plants. (6Marks)
- e) Two superior major plants are to be selected from a population of six plants of heights 160,170,164,176,168 and 172 cm. If the heritability estimate for height is 0.64, determine the expected response to selection the breeder will get (4 Marks)

QUESTION TWO (20 MARKS)

- a) What is cross-pollination (3 Marks)
- b) Give a detailed explanation of all the mechanisms which facilitate cross-pollination in plants. (17 Marks)

QUESTION THREE

- a) (i) What is heterosis (2 Marks)
(ii) Explain the various methods of determining the magnitude of heterosis (6 Marks)
(iii) Explain the three theories which explain the genetic basis of heterosis (6 Marks)
- b) Give a detailed meaning of inbreeding citing the definition and the two possible causes of inbreeding. (3 Marks)
- c) (i) What is genetic erosion (1 Mark)
(ii) State any two causes of genetic erosion (2 Marks)

QUESTION FOUR (20 MARKS)

- a) (i) What is heritability (1 Mark)
(ii) Using equations differentiate between broad sense heritability from narrow sense heritability (4 Marks)
(iii) State any three applications of heritability on plant breeding. (3 Marks)
- b) (i) What is correlated response as used in plant breeding (3 Marks)
(ii) Explain the three basic strategies used for simultaneous selection of multiple traits. (6 Marks)
(iii) Using graphs explain how a plant breeder can determine short term response selection (4 Marks)

QUESTION FIVE

- a) State any two differences between mass selection and pure line selection (4 Marks)
- b) Write short notes on:
(i) Pedigree breeding systems (3 Marks)
(ii) Back-crossing breeding method (3 Marks)
- c) (i) what is a hybrid
(ii) State two disadvantages of hybrid (2 Marks)
- d) Differentiate between a multiline and a composite (2 Marks)
- e) (i) What is a synthetic variety (1 Mark)
(iii) State any three advantages of synthetic varieties over hybrid varieties (3 Marks)