



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY  
SCHOOL OF AGRICULTURAL AND FOOD SCIENCES**

**FOURTH YEAR SECOND SEMESTER UNIVERSITY EXAMINATION FOR THE  
DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURAL EXTENSION  
EDUCATION**

**2020/2021 ACADEMIC YEAR  
SPECIAL/RESIT EXAMS**

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**COURSE CODE: AHT 3224**

**COURSE TITLE: Principles of Plant Breeding**

**EXAM VENUE: STREAM: BSc. Agricultural Extension Education**

**DATE: EXAM SESSION:**

**TIME: 2 HOURS**

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**Instructions:**

- 1. Answer ALL questions in section A and ANY other 2 Questions in section B.**
- 2. Candidates are advised not to write on question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

**SECTION A [30 MARKS]**

**Answer ALL questions from this Section**

1. Define or Explain the following terminologies

- (a) Plant breeding [1 MARK]
- (b) Cultivar [1 MARK]
- (c) Foundation seed [1 MARK]
- (d) Center of diversity [1 MARK]
- (e) Genotype [1 MARK]
- (f) Gene pyramiding [1 MARK]
- (g) Locus [1 MARK]
- (h) Mass selection [1 MARK]
- (i) Breeder seed [1 MARK]
- (j) Hybrid cultivars [1 MARK]

2. There are several techniques for broadening genetic base. DESCRIBE TWO of them

[5 MARKS]

3. A plant breeder will have knowledge in many subjects. List TEN of those subjects: [5 MARKS]

4. Describe FIVE mechanisms of outcrossing [5 MARKS]

5. Describe FIVE methods of propagation used in clonal crop production. [5 MARKS]

**SECTION B (40 MARKS)**

**Answer ANY TWO questions in this section**

6a. Different crop species originated in different regions of the world. List the centers of origin of the following ten crop species: beans (*Phaseolus* spp), maize (*Zea mays*), rice (*Oryza sativa*), potato (*Solanum tuberosum*), soybean (*Glycine max*), sorghum (*Sorghum bicolor*), oil palm

(*Elaeisguineensis*), sunflower (*Helianthus* spp.), wheat (*Triticum* spp.), and barley (*Hordeum vulgare*). **[10 MARKS]**

6b. Explain, using examples as necessary, the meaning of the terms plant tolerance and plant escape in relation to pest and disease resistance and plant breeding. **[10 MARKS]**

7. You were given a bag of seeds of a cereal crop you have never heard of before. Describe what you would do with the seeds and what information you would collect that would allow you to develop new cultivars from these seeds. **[20 MARKS]**

8. Describe TEN social concerns and consequences of biotechnology in agriculture.

**[20 MARKS]**