JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY UNIVERSITY EXAMINATIONS 2012/2013

2ND YEAR 1ST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN FOOD SECURITY

AGRI-BUSINESS MANAGEMENT

(REGULAR)

COURSE CODE: AAE 3212

COURSE TITLE: BIODIVERSITY AND AGRICULTURAL BIOTECHNOLOGY

DATE: 13/8/13 **TIME: 9.00 – 11.00 AM**

DURATION: 2 HOURS

INSTRUCTIONS

1. **Answer all questions in Section A and ANY other TWO questions in Section B.**

2. **Write all answers in the booklet provided.**

SECTION A: Answer ALL questions briefly and concisely (30 MARKS)

1. What is your understanding of the following terminologies?
   i. Keystone species. (1 Mark)
   ii. Transgenic crop plant. (1 Mark)
   iii. Marker Assisted Selection. (1 Mark)
   iv. Biosafety Clearing House. (1 Mark)

2. Differentiate between the architectural and functional process as attributes in the study of ecosystem (6 Marks)

3. Discuss briefly the importance and arguments against intellectual property rights (IPR) in the use and trade of GMOs. (5 Marks)

4. i) Elaborate on the importance of molecular based breeding in overcoming the shortcomings of conventional breeding. (4 Marks)
   ii) Are transgenic plants intrinsically less safe than plant varieties produced by traditional genetic crosses? (3 Marks)
5. In your opinion, can genetic engineering make already existing foods safer? (3 Marks)

6. Elaborate on the importance of agrobiodiversity in food production, food security and survival of human population (5 Marks)

SECTION B: Answer ANY TWO questions in this section (40 MARKS)

7. i) "The debate on GMOs is no longer whether they should be released or not; it has moved to how and why they are being put to use. The GMOs are here to stay; the challenge is to use them to our advantage without jeopardizing the safety of the environment and human health" Critique the above statement taking into consideration the potential environmental benefits and concerns related with GM crops. (15 marks)

   ii) How can biotechnology be important in improving sustainability and help maintain natural as well as agricultural biodiversity? (5 marks)

8. "Currently, out of a $1.3 trillion annual food production capacity worldwide, the biotic stresses caused by insects, diseases and weeds cause 31-42% loss ($500 billion), with an additional 6-20% ($120 billion) lost post harvest to insects and to fungal and bacterial rots. Another 6-20% ($120 billion) is estimated to be lost to abiotic causes (drought, flood, frost, nutrient deficiencies, various soil and air toxicities). These effects are even more pronounced for the developing countries". Discuss how biotechnology is being used to improve agricultural productivity targeting losses due to both abiotic and biotic stress, with particular focus on Kenya. (20 Marks)

9. i) In Kenya, the National Biosafety Authority (NBA) was established by an Act of Parliament, the Biosafety Act (2009) to exercise general supervision and control over the transfer, handling and use of genetically modified organisms (GMO). Enumerate the roles and services of NBA in relation to ensuring biosafety of GMO in Kenya.
(10 Marks)

ii) In contrast to developed countries, with exception of Europe, the adoption of GM crops have been slow in developing nations, particularly in Africa, with GM crops only currently grown in a handful of countries. What are the main obstacles and solutions to adoption of GMOs by developing nations? (10 Marks)