JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY

SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES

UNIVERSITY EXAMINATIONS 2013/2014

THIRD YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF EDUCATION SCIENCE

SCHOOL BASED

COURSE CODE: SBT 308

TITLE: ECOPHYSIOLOGY

Instructions:

I. This paper contains two (2) sections (A and B)

II. Answer all questions in section A

III. Attempt two (2) questions in section B

IV. Write all answers in the provided booklet

V. The exams takes 2 hours

SECTION A

1. Define water potential and state its importance in plant ecophysiology. (3 marks)
2. State three factors that determine the rate of water movement in the soil. (3 marks)
3. Explain the significance of the field capacity and permanent wilting point in plants. (3 marks)
4. Describe how water is measured in a given soil sample. (3 marks)
5. Distinguish between hygroscopic water and capillary water. (3 marks)
6. Explain why sandy soil has higher hydraulic conductivity than clay soil. (3 marks)
7. Explain what is meant by hydraulic lift as used in plant ecophysiology. (3 marks)
8. State the light stress avoidance mechanisms in plants species. (3 marks)
9. State factors that determines the rate of transpiration in plant leaves. (3 marks)
10. Briefly describe salinity stress in plants. (3 marks)

SECTION B (ESSAY): 20 marks for each question

11. Discuss drought tolerance mechanisms in plants. (20 marks)
12. a) Briefly discuss radial pathways in water movement. (10 marks)
    b) Discuss the water transport in the xylem of plants. (10 marks)
13. a) Using a well illustrated hofler diagram, explain the relationships between total water potential (Ψ), hydrostatic pressure (P) and osmotic pressure (π) as a cell or tissue loses water from a fully turgid state. (10 marks)
    b)Discuss the non-reversible and reversible response of stomata to factors within leaves and climatic factors. (10 marks)
14. Discuss the functional roles of abscissic acid and cytokinin in the regulation of stomata opening during dry soil and wet soil conditions. (20 marks)