**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY**

**SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES**

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

**MAIN CAMPUS - REGULAR**

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**COURSE CODE:** **SBT 308**

**COURSE TITLE:** **ECOPHYSIOLOGY**

**EXAM VENUE:** **_____**

**DATE:** **EXAM SESSION:**

**TIME: 2 HOURS**

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**Instructions:**

1. **Answer ALL questions in Section A and Any two 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**

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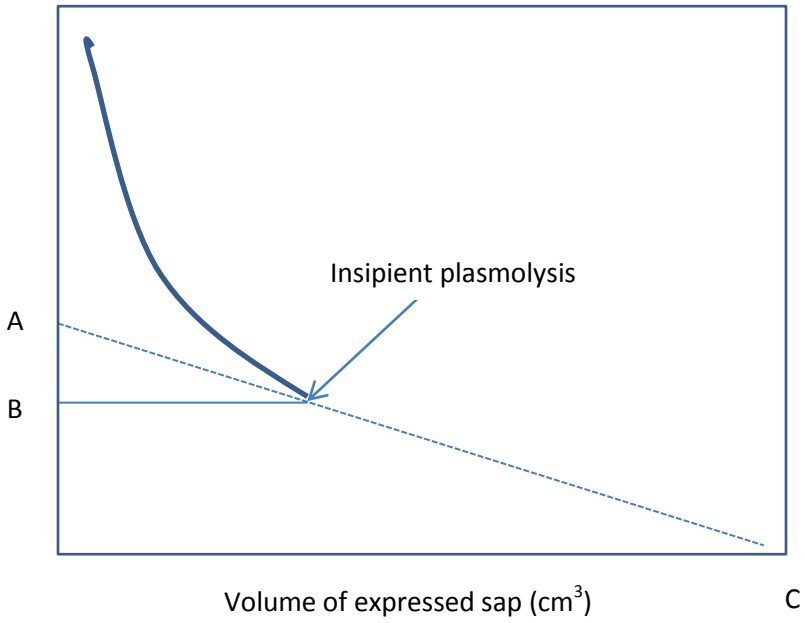
## SECTION A: Short Answer Questions (30 marks)

1. Using a Höfler diagram, explain what you understand by the term 'Water Potential' as used in plant water relations. (3 marks)
2. The movement of water across a stomatal pore can be described by the equation $Jv = L\Delta P/l$ . (3 marks)
   Which component of this equation represents stomatal regulation? (3 marks)
3. Explain the meaning of the following terms used cell/tissue water relations
   a. Osmotic adjustment
   b. Cell wall elasticity
   c. Cavitation (3 marks)

4. The P-V curve below represents changes in a plant cell during dehydration




   Name the components represented by A, B & C. (3 marks)
5. Explain the meaning of the following terms used cell/tissue water relations
   a. Osmotic adjustment
   b. Cell wall elasticity (3 marks)
6. Distinguish between desiccation avoidance and desiccation tolerance in plants, giving examples in each case. (3 marks)
7. What are "Halophytes"? Briefly explain how they are adapted to their extreme environments. (3 marks)

8. Briefly explain how adsorbed mineral ions are absorbed by the plant roots. (3 marks)
9. State the function of the following minerals in plants
    a. P
    b. Mg
    c. Mo (3 marks)
10. What are "Xerophytes"? List 4 key adaptations to their environment. (3 marks)

## SECTION B: Essay Questions (40 marks)

11. Discuss Nodulation of roots and the process of nitrogen fixation in plants. (20 marks)
12. Discuss the ascent of sap in plants. (20 marks)
13. Discuss the mobilization of chemically bound nutrients and mineral ion uptake into the plant cell. (20 marks)
14. Discuss the properties of water and their relevance to life conditions. (20 marks)