

**一、 Please answer the following questions (100 points)**

1. Please explain the following terms: (30 points)

ABC model, acid growth hypothesis, ethylene triple response, morphogenesis, secondary metabolite, hypersensitive response, acquired resistance, dormancy, statocyte and statolith.

2. Please (a) draw the basic structure of a chloroplast and (b) mark or describe where the light reaction, Calvin cycle,  $H^+$ -ATPase pump, accumulated  $H^+$ , and electron transport system are located. (10 points)

3. Plants can absorb water and mineral nutrients from soil with root system, and transport them via stem xylem to leaves. Please explain the possible mechanisms involved in the transport. (10 points)

4. Please explain phototropism and the possible mechanisms in plants. (10 points)

5. The oil-containing seeds generally store the triacylglycerols in the oil body. When seeds germinate, the stored triacylglycerols can be metabolized and converted into sucrose for transport and seedling growth. Several steps located in different cellular compartments are involved. Please explain the process. (10 points)

6. Abscisic acid (ABA) plays important roles during seed development and maturation. (a) Please explain the main functions of ABA during seed development and maturation. (b) What are the characteristics or phenotypes of seeds likely affected in ABA-deficient mutants? (10 points)

7. Ethylene and auxin are two key regulators in leaf abscission. Please list and explain the steps of leaf abscission process. (10 points)

8. *Arabidopsis* plant is a facultative long-day plant, and transition from vegetative to reproductive growth is affected by photoperiod and vernalization. Please explain how these factors affect the reproductive transition and flowering. (10 points)