

## 第一題(50 分)

### A Successional Model

By the classical model for ecological succession, a community develops in sequence, from pioneer species to an end array of species that remain in equilibrium over some region. Pioneer species are opportunistic colonizers of empty or clear habitats. They enjoy high dispersal rates and rapid growth. In time, more competitive species replace the pioneers. They are themselves replaced until the array of species stabilizes under the prevailing habitat conditions. This persistent array of species is the climax community.

Primary succession is a process that begins when pioneer species colonize an empty or clear habitat, such as a new volcanic island or land exposed when a glacier retreats. The pioneer species include lichens and plants that are small, have brief life cycles, and are adapted to exposed sites having intense sunlight, large temperature changes, and nutrient-deficient soil. In the early years, hardy flowering plants put out many small seeds, which are quickly dispersed.

Once established, the pioneers improve conditions for other species and often set the stage for their own replacement. Many new arrivals are mutualists with nitrogen-fixing bacteria, too, and outcompete the early species in nitrogen-poor habitats. In time, wastes and remains accumulate, adding volume and nutrients to soil that help more species take hold. Successional species eventually crowd out the pioneers, whose spores and seeds travel as fugitives on the wind and water—destined, perhaps, for a new but temporary habitat.

In second succession, a disturbed area within a community recovers and moves again toward a climax state. The pattern is typical of abandoned fields, burned forests, and storm-battered intertidal zones. It occurs after a falling tree opens part of an established forest's canopy. Sunlight reaches seeds and seedlings that are already on the forest floor and spurs their growth.

提示：

array：一系列； prevailing：主要的； persistent：持續的；  
glacier retreats：冰河退卻； nutrient-deficient：養分貧瘠的；  
hardy：能吃苦耐勞的； fugitive：逃亡者； destined：命定；  
temporary：暫時的； batter：連續猛擊，搗毀； spur：刺激。

## 第二題(50 分)

### Wood and Its Uses

The use of wood by humans for fuel, shelter, weapons, and other purposes dates back into antiquity, and present uses are so numerous that it is impossible to list them all in a short paragraph.

In a living tree, up to 50% of the weight of the wood comes from the water content. Before the wood can be used, seasoning reduces the moisture content to 10% or less, either by air-drying it in ventilated piles or stacks or by drying it in special ovens known as kilns. The dry part of wood is composed of 60% to 75% polysaccharide and 15% to 25% lignin. The proportions and amounts of these and other substances of smaller amounts, known as extractives, determine how various woods will be used.

In North America, about half of the wood produced is used as lumber, primarily for construction; the sawdust and other waste formed in processing the boards are converted to particle board and pulp. A considerable amount of lumber goes into the making of furniture, which may be constructed of solid wood or particle boards.

The next most extensive use of wood is for pulp, which is converted by various processes to paper, synthetic fibers, and plastics. In recent years, it has been added as a filler to commercial ice cream and bread. Some hardwoods are treated chemically or heated under controlled conditions to yield a number of chemicals, such as wood alcohol and acetic acid. Boxes, musical instruments, bowling pins, tool handles, and Christmas trees are but a few of the additional wood products worth billions of dollars annually on the world market.

提示：

antiquity：古代； seasoning：乾燥。