一、名詞解釋 (60%，每小題 5%)

1. Fragmented states
2. Offshore financial centers
3. Sex ratio
4. Ethnicity
5. Sustainable agriculture
6. Commodity chain
7. ENSO
8. Hjulstrom curve
9. field capacity
10. pyroclastic flow
11. hysteresis
12. metapedogenesis

二、閱讀題(20%)請寫下 150 字摘要

In the nineteenth century, Roman pillars standing in the marketplace at Pozzouli (Italy) featured in the debate between the catastrophists and uniformitarians. The issue at stake was the way in which the natural environment changes. Interest in these pillars stemmed not from their architecture, but rather from the fact that borings made by the marine bivalve Lithophaga riddled their surface up to 7 m above present sea level. Clearly the sea and/or land level had changed more than once since the marketplace was constructed. Less clear was when or how these changes had taken place.

Modern geological thinking acknowledges both progressive and punctuated change, but distinguishing one from the other still remains a challenge. An important ingredient in discriminating abrupt versus gradual sea-level change is the ability to tightly constrain age and altitude. For example, Morhange et al. (2006) returned to the pillars at Pozzouli to radiocarbon date Lithophaga still in their burrows which, along with other in-situ marine organisms, can fix 'biological sea level' to ± 5 cm (Morhange et al., 2001). These data showed that the columns recorded not one but three separate sea-level highstands between the fifth and fifteenth centuries, related to changes in the underlying Phlegrean Fields caldera.

The Pozzouli pillars neatly illustrate the truism that increased record detail tends to reveal greater record variability. While at vastly differing scales, similar relative increases in record detail and variability are apparent in many of the sea-level and ice-sheet studies outlined above. This variability poses new challenges to existing conceptual and mathematical models of how sea-level/cryosphere/climate linkages operate during warm intervals, both at the suborbital (millennial) and sub-decadal timescales. For example, the recent changes in Greenland revealed by seismic and satellite data cannot be explained by melting mechanisms alone (Rignot and Kanagaratnam, 2006). The physical processes associated with dynamic glacier change, perhaps linked to ocean warming and the retreat of tidewater glaciers (Joughin et al., 2004; Alley et al., 2005; Payne et al., 2004; Bindschadler, 2006), are not included in the current models used to predict future sea-level contributions (Marshall, 2005). Consequently, these models do not display the sensitivity to change indicated by recent remote sensing data and may underestimate the magnitude of future sea-level rise (Dowdeswell, 2006; Rignot and Kanagaratnam, 2006; Velicogna and Wahr, 2006). This is particularly interesting in light of a recent modeling study that proposes existing contributions from mountain glaciers and ice caps may have been overestimated (Raper and Braithwaite, 2006).

三、閱讀題 (20%)

請用 150 字以內的中文寫出下面這段文字的摘要。

Sub-Saharan African countries have been urged by the United States to increase their food supply in part through increased use of genetically modified (GM) crops and livestock. Africans are divided on whether to accept GM organisms.

Farmers have been manipulating crops and livestock for thousands of years: the very nature of agriculture is to deliberately manipulate nature. Humans have controlled selective reproduction of plants and animals in order to produce a larger number of stronger, hardier survivors. The science of genetics beginning in the nineteenth century expanded understanding of how to manipulate plants and animals to secure dominance of the most favorable traits.

GM, which became widespread in the late twentieth century, marks a sharp break with the agricultural practices of the past several thousand years. Whereas traditional selective breeding of plants and animals has involved increasing understanding of genetic traits, GM for the first time has involved modification of those traits. Under GM the genetic composition of an organism is not merely studied, it is actually altered. GM involves mixing of genetic material among two or more species that would not otherwise mix in nature.

GM is widespread in the United States, especially in the processed food that Americans consume in restaurants and at home heated in microwave ovens. Africans face arguments both for and against adoption of GM. In favor of GM are higher yields, increased nutrition, and more resistance to pests. GM foods are better tasting, least to some palates.

Opposition to GM in Africa stems in part from practical economics, Europeans—the main customers for Africa's agricultural exports— are strongly opposed to GM, because they believe the food is less healthy than from traditionally bred crops and livestock. GM may cause safety problems, such as lowered resistance to antiobiotics and destroying longstanding ecological balances.

Africans are also uneasy with GM because it increases dependence on several multinational corporations responsible for manufacturing most of the GM seeds. If agriculture is regarded as a way of life, not just a food production business, GM represents for many Africans an unhealthy level of dependency on MDCs.