

以下題目請在「非選擇題作答區」作答

I. 中文翻譯：請將下文中二十五個劃底線的粗體中文辭彙翻譯成英文，所有翻譯必須配合其原文文義，以小寫印刷體書寫，潦草者不予計分。所有的辭彙均以名詞回答，必須拼字正確才能得分。

第三版「全球生物多樣性展望」報告中多項指標的資料都顯示，全球生物多樣性仍在持續流失中。例如：在物種方面，**兩棲類**面臨著最大的滅絕風險。在生態系方面，雖然某些區域**紅樹林**喪失速度減緩，但在世界大部分地區，自然棲地的範圍和**完整性**都在繼續減小。淡水濕地、海冰、**鹽沼**、珊瑚礁、海草床和貝類礁體都在嚴重退化。森林、河流和其他生態系統的**破碎化**和**退化**造成了生物多樣性和生態系統服務的喪失。未來，熱帶森林將繼續被砍伐用來種植農作物和放牧，並有可能用來製造**生物燃料**。人類的**生態足跡**超出了地球生物的承載能力。生物多樣性提供糧食、纖維、醫藥和淡水、授粉、**過濾**污染物、防止自然災害等生態系統服務都因為生物多樣性的喪失而面臨著潛在的威脅。如果生態系所承受的壓力超過了**臨界點**，將產生巨大的風險，例如：亞馬遜森林可能面臨大範圍的枯死，部分森林會陷入火災頻發和嚴重乾旱的循環，繼而退化成**疏林草原**型的植被。農業**化肥**和污水中**磷酸鹽**和**硝酸鹽**的積聚，將使淡水湖泊和其他內陸水體處於**優養化**的狀態。在某些情況下，有毒**藻華**還會給人類和**牲畜**健康帶來風險。海洋**酸化**、海水溫度升高導致珊瑚**白化**以及其他人類引起的壓力如污染、**過漁**、**外來入侵種**、**因毀林**而造成的**泥沙淤積**。問題的綜合影響下，珊瑚礁生態系**脆弱度**提高。

英譯詞彙 (每題 2 分)

- |         |           |         |          |         |
|---------|-----------|---------|----------|---------|
| 1. 指標   | 2. 兩棲類    | 3. 紅樹林  | 4. 完整性   | 5. 鹽沼   |
| 6. 破碎化  | 7. 退化     | 8. 生物燃料 | 9. 生態足跡  | 10. 過濾  |
| 11. 臨界點 | 12. 疏林草原  | 13. 化肥  | 14. 磷酸鹽  | 15. 硝酸鹽 |
| 16. 優養化 | 17. 藻華    | 18. 牲畜  | 19. 酸化   | 20. 白化  |
| 21. 過漁  | 22. 外來入侵種 | 23. 毀林  | 24. 泥沙淤積 | 25. 脆弱度 |

II. Multiple choice questions. Select only **ONE** best answer to each question (2% for each, 50% totally).

※ 注意：請於試卷內之「選擇題作答區」依序作答。

The geographical distribution patterns of barnacles have been used as an indicator of the effect of climatic changes. Changes in sea temperature over the last century have been shown to influence the oceanographic processes and hence the geographic distribution and zonation of con-generic, co-existing species in temperate systems. In the U.K., quantitative comparisons of the distribution patterns of intertidal assemblages over the past 70 years has shown global warming to enhance the survival, distribution range and abundance of warmer-water barnacle species (*Chthamalus stellatus* and *Balanus perforatus*) to the detriment of colder-water barnacle species (*Semibalanus balanoides*). In the Asian region, however, no studies have been conducted to quantitatively address the geographical patterns of barnacles for temporal comparative studies. On the Japanese Pacific Coast, the Oyashio Current flowing along the Pacific coastline has been shown intruding further south when compared with the patterns in past centuries. The construction of the Three-Gorge Dam in the Changjiang in China will reduce the run off of the Yangtze River and thus the flow rate of the China Coastal Current in the East China Sea in the coming future. This could change the geographical distribution patterns of intertidal assemblages in the Asian region. It is, therefore, essential to address the geographical distribution patterns of barnacles in the Asian region and provide future temporal comparative studies.

1. In biology, barnacles belong to
- nematode
  - vertebrate
  - Mollusca
  - Crustacea

見背面

2. According to paragraph,
- A. the distribution patterns of barnacles cannot show the effect of climatic changes.
  - B. comparison studies of the distribution patterns of intertidal assemblages in UK is very short.
  - C. the sea water temperature that *Chthamalus stellatus* lives is higher than *Semibalanus balanoides* lives.
  - D. there is no barnacle species in the Asian region.
3. What is true according to the paragraph?
- A. The Three-Gorge Dam is built in Japan.
  - B. The Three-Gorge Dam will increase the run off of the Yangtze River.
  - C. The Three-Gorge Dam will reduce the flow rate of the China Coastal Current in the South China Sea.
  - D. The Three-Gorge Dam in China is predicted to have strong impact on the marine ecology in the future.
4. The Oyashio Current \_\_\_\_\_
- A. is a cold subarctic ocean current that flows south and circulates counterclockwise in the western North Pacific Ocean.
  - B. is a river.
  - C. has warm surface temperature.
  - D. is stable when compared with the patterns in past centuries.
5. Barnacles are important indicators to global warming because they have \_\_\_\_\_
- A. strong preference to water temperature
  - B. been affected by the pattern of currents.
  - C. large numbers of species.
  - D. specific geographic distribution and zonation.

The population of the Salmon reached its lowest level in the period between 1987 and 1995 and agricultural and recreational activities were thought to be the major factors contributing to its decline. Reducing the agricultural and recreational activities became the main strategy for saving the Salmon from extinction. The 'sources of pollution' identified by the National Park officials, scientists, and conservation NGOs as being the Farm, local farmers, and tourists. Their livelihoods and interests would be greatly affected by any reduction of agricultural production and regulation of tourism. As a result, the well-being of the Salmon and the livelihoods of local people represented two opposite poles of debate.

During this stage, the planning authorities of the Salmon Wildlife Refuge (Council of Agriculture (COA), Taiwan Provincial Government, and Taichung County Government) came to adopt a more collaborative planning approach to settling disputes between the Park and the Farm. COA played a key role as a mediator between the 'two adversarial sides': The Park Authority, scientists, and conservation NGOs represented one side that emphasised the well-being of the Salmon. The Farm Authority represented the other side that emphasised the livelihoods of local farmers and the interests of tourists. By holding the public meetings and the Working Panel meetings for the proposed Salmon Wildlife Refuge (WR), the planning authorities of the Salmon WR introduced a more collaborative approach. Unlike the previous stage it sought to mediate between interests of the conservation of the Salmon and the interests of local farmers and tourists in the following ways:

First, the planning authorities made an effort to deal with the complex management problems on the ground. It also recognised the importance of local farmers' livelihoods and tourists' interests by incorporating the Farm's *Transformation Project* into the *Conservation Plan of the Salmon Wildlife Refuge*, though the overall emphasis was still placed on the well-being of the Salmon.

Second, the planning authorities adopted a more inclusionary approach to involving more stakeholders than the previous stage into the planning processes, including the planning authorities, the Farm authorities and more scientists and conservation NGOs (as members of COA's Wildlife Conservation Advisory Committee). The planning authorities, especially the COA, played a pivotal role as a mediator in helping to reconcile the conflicts and build up better working relations between the two adversarial groups of stakeholders.

Third, the planning authorities employed a series of public meetings and recruited a planning committee as key arenas for mobilising the two adversarial sides of stakeholders to work on consensus building. Together they worked out a *Conservation Plan for the Salmon Wildlife Refuge* in which a task-division agenda was drawn up and responsible authorities identified for implementing the associated conservation work. On Oct 1 1997, the Taichung County Government legally designated the Salmon WR under the Wildlife Conservation Law.

6. The Salmon in the article is referred to \_\_\_\_\_
- A. the sockeye salmon.
  - B. the coho salmon.
  - C. the steelhead salmon.
  - D. the Formosan land-locked salmon.
7. Location where the Salmon live is in \_\_\_\_\_
- A. Taichung City.
  - B. New Taipei City
  - C. Tainan City
  - D. Taipei City
8. What does the WR in the article stand for?
- A. Wildlife Refuge
  - B. With Reservation
  - C. Without Resistance
  - D. With Resistance
9. Which government designated the WR for the salmon?
- A. National Park Headquarters
  - B. Taichung County Government
  - C. Taiwan Provincial Government
  - D. Council of Agriculture
10. What does the National Park stand for?
- A. the Yushan National Park
  - B. the Kenting National Park
  - C. the Shei-Pa National Park
  - D. the Taroko National Park

The scheme to monitor waterbird populations globally was established by IWRB, predecessor to Wetlands International in 1967, aiming to (i) estimate the size of waterbird populations, (ii) describe changes in the numbers and distribution of waterbirds and (iii) assess the importance of individual sites for waterbirds. The counts take place in January every year all over the world when many waterbirds congregate in large flocks, making them easier to count than during the breeding season when many of them are widely dispersed over vast tracts of inaccessible habitats such as the Arctic tundra or boreal forests. Over the years the scheme has become the largest global biodiversity monitoring programme and now involves over 15 thousand volunteers covering more than 25 thousand sites in more than 100 countries on every continent except North America, where waterbird monitoring is largely undertaken by government agencies. Other gaps in coverage include large areas of China and Russia which are frozen in January, and desert and rainforest areas that are not attractive to large congregations of waterbirds.

見背面

11. Waterbirds are \_\_\_\_\_  
A. bird species dependent on terrestrial habitats to complete their life cycles.  
B. wildlife dependent on water to live.  
C. shorebird only.  
D. bird species dependent on aquatic habitats to complete portions of their life cycles.
12. Which month is the best to count waterbirds?  
A. December  
B. March  
C. July  
D. January
13. Monitoring on wildlife population is \_\_\_\_\_  
A. stupid  
B. useless  
C. time-consuming  
D. important but requiring high man-power
14. There is some data deficiency in global waterbirds monitoring program especially in areas of \_\_\_\_\_  
A. the United States.  
B. China and Russia.  
C. Europe.  
D. South America.

Habitat loss and associated species loss are primarily a result of the acceleration of land-use changes begun over the past century. Therefore, it is important to study land-use change as the root cause of the biodiversity crises. The human population has increased sixfold since the 1800s, and the earth has been transformed to accommodate human habitation and rising consumption. A human footprint is detectable across 83% of the land area in the world, excluding Antarctica. Land-use change associated with human development represents one of the most serious threats to terrestrial biodiversity, along with climate change, nitrogen deposition, and invasive species.

15. According to the paragraph, biodiversity loss is due to  
A. habitat fragmentation.  
B. global warming.  
C. high CO<sub>2</sub> concentration.  
D. the acceleration of land-use changes begun over the past century.
16. Since the 1800s, the human population size increase  
A. slowly.  
B. gradually.  
C. unhurriedly.  
D. rapidly.
17. Threats to terrestrial biodiversity include  
A. Land-use change  
B. Climate change, nitrogen deposition, and invasive species  
C. All of the above  
D. None of the above

Fynbos, literally meaning fine-leaved bush, is a local term for the heath-like vegetation found in areas of South Africa that have a Mediterranean-type climate with winter rainfall. Evergreen, fire-prone vegetation on a low-nutrient substrate is a key feature of the fynbos. It is largely confined to the rugged and steep quartzitic Folded Mountains in the Cape Floristic region located in the south-western tip of South Africa and occupies an area of about 71,000km<sup>2</sup>. This biome has exceptionally high species richness, with an estimated 7300 species, of which 80% are endemic. Altitude, rainfall, aspect and soil are important determinants of vegetation structure, while stochastic factors such as fire frequency and intensity play an important role in determining species composition. There is a strong dependency on insects as pollinators and some species depend on ants as seed dispersers (myrmecochory). Others depend on the wind or are passively dispersed. Most species have specific strategies to ensure regeneration from seeds after fires, although a few species can also resprout following fire. Species that do not resprout after fire but are limited by seeds for recruitment face a high risk of extinction if their pollinator or disperser mutualisms collapse.

18. According to the paragraph, which of the following statements is not true about Fynbos?
- A. Fynbos is the natural shrubland or heathland vegetation occurring in a small belt of the Western Cape of South Africa.
  - B. The Fynbos ecoregion is within the Mediterranean forests, woodlands, and scrub biome.
  - C. It accounts for 80% of the plant varieties with exceptionally high in endemism.
  - D. The Fynbos ecoregion is a biome of low species diversity.
19. Given that there is a strong dependency on insects as pollinators and the plant species are highly endemic, it suggests that
- A. the area is home to few endemic insects adapted to this area.
  - B. the area is home to a large number of endemic insects that have adapted to life in this area.
  - C. the area is home to many endemic vertebrates.
  - D. the area is not suitable to birds.
20. Myrmecochory, a type of ant-plant mutualism, means
- A. seed dispersal by ants.
  - B. fruits eaten by ants.
  - C. flowers pollinated by ants.
  - D. flowers pollinated by insects.
21. That stochastic factors such as fire frequency and intensity play an important role in determining species composition implies that
- A. fire is not a driving force in this ecosystem.
  - B. mutualism between ants and plants is important.
  - C. the diversity of fynbos plants is extremely high.
  - D. fire is a necessary stage in the lives of almost all fynbos plants.

Species richness of orchids per transect ranged from 1 to 36 species (mean 14.3) and decreased significantly with increasing altitude. Similarly, species evenness decreased significantly with increasing altitude. Around 50% of all orchid species were rare (occurred in fewer than 5% of all localities), and only a few occurred in more than 50% of all localities. Orchid species composition changed continuously with altitude, indicating turnover of species with increasing altitude. Analogously, orchid breeding systems and floral traits also changed with altitude. Relatively more auto-pollinating species were found at high altitudes compared with mid- and low-altitude sites where animal-pollinated species were most abundant. Species characterized by a cleistogamous pollination system were found almost exclusively in high-altitude sites, whereas the proportion of species displaying floral traits related to pollination by long-tongued moths (sphinx) and flies sharply decreased with increasing altitude. Environmental conditions associated with altitude exert a large influence on orchid species composition and the distribution of orchid breeding systems. Our results revealed a high proportion of auto-pollinating species, and confirm earlier findings that auto-pollinating species are more frequent in high-altitude sites.

見背面

22. With increasing elevation, the number of species of orchids
- A. increased significantly.
  - B. showed no particular trend.
  - C. decreased significantly.
  - D. decreased slowly.
23. About half of all orchid species in this study were
- A. difficult to locate.
  - B. easy to search.
  - C. hard to detect.
  - D. rare.
24. That the orchid breeding systems and floral traits also changed with altitude implied that
- A. low species turnover with increasing altitude.
  - B. species evenness decreased significantly with increasing altitude.
  - C. orchid species composition showed no change with altitude.
  - D. relatively more auto-pollinating species were found at high altitudes compared with mid- and low-altitude sites where animal-pollinated species were most abundant.
25. Cleistogamous pollination means
- A. group pollination.
  - B. individual pollination.
  - C. automatic self-pollination.
  - D. mutual pollination.