國立中山大學104學年度碩士暨碩士專班招生考試試題

科目名稱：科學英文【海資系碩士班乙組】　　題號：452002

※本科目依簡章規定「不可以」使用計算機(混合題)　　

PART I: Multiple Choice Questions, select the SINGLE correct answer (單選，每題2分).

1. Science is limited since it cannot: (A) Predict the future (B) Make judgments about ethics, values, and morality (C) Arrive at fundamental truths (D) Provide information that can be applied to real life (E) Provide exceptions for negative evidence
2. An anthropogenic impact is one caused by: (A) Physical factors in the environment (B) Organisms that are part of marine communities (C) The destruction of primary producers (D) Organisms that live in neighboring marine communities (E) Human activities
3. The following is a synonym of autotrophs: (A) Consumer (B) Primary producer (C) Heterotroph (D) Animal (E) Predator
4. The ecosystem best encompasses one of the following: (A) All living organisms living in one area (B) Populations in one area but not the physical environment (C) The community or communities but not the physical environment (D) The community or communities and the physical environment (E) Populations and communities living in one area
5. A substance that is biodegradable: (A) Evaporates very slowly (B) Forms tar balls or other solid residues (C) Can be broken down only by special chemicals (D) Sinks to the bottom (E) Can be broken down by bacteria
6. One of the following is known to be responsible for thermal pollution: (A) Radioactive fallout (B) Sewage (C) Excessive use of fertilizers (D) Solid waste (E) Power plants
7. By definition, demersal catches are those that are harvested from: (A) The open water (B) The bottom (C) Estuaries (D) Waters where primary production is increased by upwelling (E) The continental shelf
8. The maximum sustainable yield is best defined as the: (A) Highest catch that can be taken without overfishing (B) Maximum fishing effort allowed after overfishing is reached (C) Highest catch that will pay the minimum cost of the fishing effort (D) Minimum catch that will still allow the population to grow (E) The annual size of the catch that will balance natural death and predation
9. Desalination plants: (A) Extract minerals for industrial use from seawater (B) Convert seawater into fresh water (C) Extract table salt from seawater (D) Convert seawater into brackish water for industrial uses (E) Extract oil from seawater
10. Which of the following is a renewable resource from the marine environment? (A) Oil (B) Gas (C) Seaweeds (D) Minerals
11. Photophores are: (A) Specialized eyes (B) Buoyancy-regulating organs (C) Specialized jaws (D) Light-sensitive organs that lack the lens of true eyes (E) Light-producing organs
12. Most animals in the ocean are omnivores. This means that they eat: (A) Producers and consumers (B) Part of the neuston (C) Zooplankton (D) Detritus (E) Phytoplankton
13. Euryhaline species: (A) Are less common in estuaries than stenohaline species (B) Need less oxygen to survive (C) Tolerate only a narrow range of salinities (D) Can survive

changes in salinity (E) Only tolerate small temperature changes

14. All of the following are examples of abiotic factors except one: (A) Salinity (B) Predation (C) Substrate (D) Temperature (E) Light

15. A population's carrying capacity is: (A) Affected by the growth rate of the population (B) The number of individuals a habitat can support with available resources (C) A constant that has been predetermined for all habitats (D) The number of individuals in a habitat (E) Determined by comparing birth rate and death rate in a population

16. Convergent evolution means that: (A) Organisms possess similar structures because they have a similar lifestyle (B) Organisms possess similar structures because they descended from a common ancestor (C) Closely related organisms have evolved and do not resemble one another anymore (D) Closely related organisms have different structures for same purpose (E) None of the above

17. Anadromous fishes migrate: (A) Up and down the water column (B) From fresh water to reproduce at sea (C) From polar regions to the tropics (D) From the sea to reproduce in freshwater (E) Along the Equator to reproduce along the coast

18. A larva is best defined as: (A) Immature stage that is able to reproduce (B) Early colony of cells of fresh-water sponges (C) Early stage of development of an organism, typically part of the plankton (D) Sperm cell that lives free in the water (E) Egg that has been fertilized by more that one sperm

19. Most cnidarians are specialized as: (A) Filter feeders (B) Parasites (C) Carnivores (D) Plant-feeders (E) Feeders of organic matter on the bottom

20. Echolocation is a sense that relies on: (A) Vibrations (B) Sound (C) Smell (D) Vision (E) Electromagnetic waves

PART II: Answer questions 21-25 according to the abstract of the following article:
(單選，每題2分). Reconciliation of the carbon budget in the ocean's twilight zone
2014. Nature 507, 480–483

Photosynthesis in the surface ocean produces approximately 100 gigatonnes of organic carbon per year, of which 5 to 15 per cent is exported to the deep ocean. The rate at which the sinking carbon is converted into carbon dioxide by heterotrophic organisms at depth is important in controlling oceanic carbon storage. It remains uncertain, however, to what extent surface ocean carbon supply meets the demand of water-column biota; the discrepancy between known carbon sources and sinks is as much as two orders of magnitude. Here we present field measurements, respiration rate estimates and a steady-state model that allow us to balance carbon sources and sinks to within observational uncertainties at the Porcupine Abyssal Plain site in the eastern North Atlantic Ocean. We find that prokaryotes are responsible for 70 to 92 per cent of the estimated remineralization in the twilight zone (depths of 50 to 1,000 metres) despite the fact that much of the organic carbon is exported in the form of large, fast-sinking particles accessible to larger zooplankton. We suggest that this occurs because zooplankton fragment and ingest half of the fast-sinking particles, of which more than 30 per cent may be released as suspended and slowly sinking matter, stimulating the deep-ocean microbial loop. The synergy between microbes and zooplankton in the twilight zone is important to our understanding of the processes controlling the oceanic carbon sink.

21. Porcupine Abyssal Plain is located in (A) Pacific Ocean (B) Atlantic Ocean (C) Indian Ocean (D) Arctic Ocean (E) Antarctic Ocean

22. How many tonnes of organic carbon that produced by photosynthesis in the surface ocean is exported to the deep ocean per year? (A) 10^{12} (B) 10^{11} (C) 10^{10} (D) 10^{9} (E) 10^{8}

23. Twilight zone is depths of (A) 0 to 100 m (B) 50 to 1000 m (C) 500 to 2000 m (D) 1000 to 4000 m (E) 4000 to 10000 m

24. According to this passage, which organism is responsible for majority of the estimated remineralization in the twilight zone? (A) Prokaryotes (B) Zooplankton (C) Phytoplankton (D) Fishes (E) Human

25. The difference between carbon sources and sinks in the surface ocean is about (A) 5 (B) 4 (C) 3 (D) 2 (E) 1 order(s) of magnitude.

PART III: Translate the following passages into CHINESE (每題 10 分).

1. The hydrological cycle describes the exchange of water in gaseous, liquid, and solid states among the various water reservoirs. Water is evaporated from the ocean's surface, fall as precipitation on land, and return to the oceans as river runoff and groundwater flow, thereby completing the hydrologic cycle.

2. Long-term records indicate that plankton abundance and species composition may change substantially over decadal time scales. Decreasing plankton biomass may be caused by climate changes that increase water stratification and depress upwelling; conversely, in other regions, increasing winds may enhance nutrient concentrations in the euphotic zone and lead to increased phytoplankton and zooplankton production.

3. Future scientific studies of the ocean will rely more and more on large international programs and remote-sensing techniques, including measurements from satellites, ocean buoys, unmanned platforms at sea, and exact location by the Global Positioning System. Computers for handling and processing the enormous quantities of data and for modeling ocean processes are playing an ever-increasing role in ocean research.

4. Surveys clearly indicate that fisheries around the world are being overfished. Many of these fisheries have collapsed or are near collapse; many others are not being managed in a sustainable manner in large part because national policy makers do not or are unwilling to address the seriousness of the worldwide depletion of this important resource.

5. Estuaries and mangrove swamps are productive coastal ecosystems that constitute important spawning and nursery grounds for many fish, harbour shellfish populations, and provide rich feeding grounds for birds. As well, mangrove swamps buffer coastlines from erosion and inundation during tropical storms. However, these ecosystems are often heavily affected by human activities such as land reclamation, disposal of sewage and industrial wastes, and eutrophication.