國立中山大學103學年度轉學考招生考試試題

科目名稱：海洋學【海科系三年級】　　題號：758003

※本科目依簡章規定「不可以」使用計算機

一、解釋名詞，說明下列名詞在海洋方面的意義(每題4分)

1. salinity
2. algae
3. big bang
4. Coriolis effect
5. El Nino
6. euphotic zone
7. upwelling
8. Global Positioning System
9. hydrothermal vent
10. intertropical convergence zone

二、詳答下列問題(每題12分)

1. 地球表面的地殼板塊有哪些?世界陸地的分布在地球歷史歷經甚麼樣的改變?

2. 由上海經夏威夷到智利的聖地牙哥(南緯33度)，經過的海域地形變化很大，說明這行程經過的各海底地形變化的名稱(oceanic features)，如海溝、大陸棚等。

3. 說明海水對大氣二氧化碳濃度變化的反應是甚麼?與海水的酸鹼度變化有何關係?

4. 說明海洋表面的洋流如何形成?世界海洋表面有幾個大環流系統(繞圈)，分別在哪裡?

5. 何謂食物鏈?一個具有健康食物鏈的海域，水質和生態應該有甚麼特性?

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A. Vocabulary: translate the following words into Chinese (10 points; 1 point each).

(1) property, (2) example, (3) discover, (4) reaction, (5) interpret,
(6) frequency, (7) growth, (8) independent, (9) balance, (10) reduce.

B. Vocabulary: translate the following words into English according to the category specified in the parentheses (10 points, 1 point each).

(1) 測量 (動詞), (2) 敘述 (動詞), (3) 解釋 (動詞), (4) 基本的 (形容詞), (5) 壓力(名詞),
(6) 濃度 (名詞), (7) 穩定的 (形容詞), (8) 分子 (名詞), (9) 表面 (名詞), (10) 完全地 (副詞).

C. Translate the following sentences into Chinese (15 points; 5 points each).

(1) Two of the most important properties of seawater are temperature and salinity, for together they control its density.
(2) Life is a chemical phenomenon based on molecules that transfer material and energy in complex cycles between organisms and the environment.
(3) The primary cause of ocean acidification is the release of atmospheric CO_2 from human activity.

D. Translate the following sentences into English (24 points; 8 points each).

(1) 我們認為他們的結果是有問題的。
(2) 稀釋的時候，請記得把酸加到水裡，而不是水加到酸裡。
(3) 如果我是你，我會用 Excel 處理這些資料。

E. Reading: Read the following essay and answer the questions according to the text. For each question, there is ONLY ONE correct or best answer (25 points; 5 points per question).

Source: Dennis Normile, *Science* **30**, 963, May 2014

The disappearance of Malaysia Airlines Flight 370 (MH370) in the early morning hours of 8 March has become one of the darkest riddles in aviation history. As the mystery stretches into its third month, the odds of finding wreckage—and closure for grieving relatives—are rapidly receding. The scientific lessons are sobering, too: The futile search for the jet, an overnight flight from Kuala Lumpur bound for Beijing that is thought to have gone down in a desolate stretch of the southern Indian Ocean, has exposed disconcerting gaps in knowledge of the deep sea, and in technologies for monitoring aircraft from afar.

The fleeting detection early last month of pings emanating from a patch of water some 1700 kilometers northwest of Perth, Australia, raised hopes that searchers had drawn a bead on the plane's flight data recorder and cockpit voice recorder—the black boxes. That clue didn't lead to any wreckage, and the pings soon ceased, possibly because recorder batteries are designed to last for only a month or so, or because the pings weren't from the stricken plane. A search of 4,638,670 square kilometers of ocean by 29 civilian and military aircraft and 14 ships has failed to turn up a single scrap of flotsam linked to the plane. "The search for this aircraft has been one of the most difficult ever undertaken anywhere in the world," said Warren Truss, Australia's deputy prime minister, at a 5 May press conference in Canberra.

As authorities lay plans for the next phase of the operation—what could be the widest

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ranging and most challenging seafloor search in history—they face a paucity of data: the largely uncharted bathymetry of the southern Indian Ocean's sea floor and the poorly understood dynamics of how sound travels deep underwater. Knowledge of the ocean floors is "vastly poorer than our knowledge of the topographies of Earth's Moon, Mars, and Venus," write Walter Smith and Karen Marks, geophysicists at the Laboratory for Satellite Altimetry of the U.S. National Oceanic and Atmospheric Administration in College Park, Maryland, in the 27 May issue of Eos.

Then there's the sinking realization that MH370's black boxes may never be found, leaving investigators in the dark about what happened during the flight's last hours. That prospect has given new life to schemes for ensuring that ground stations can monitor flight data in real time, rather than only after a tragedy.

Questions:

(1) Which of the following term has the closest meaning to the word "pings"?
(A) shot (B) light (C) sound
(D) shape (E) Ping-Pong

(2) Which of the following underlined term is NOT referring to MH370?
(A) The futile search for the jet…
(B) A search of 4,638,670 square kilometers of ocean by 29 civilian and military aircraft…
(C) …the odds of finding wreckage…
(D) …raised hopes that searchers had drawn a bead on the plane's flight data recorder and cockpit voice recorder…
(E) … leaving investigators in the dark about what happened during the flight's last hours.

(3) What is NOT the challenge for the aviation industry?
(A) Real-time monitoring of flight data from ground stations
(B) Disconcerting gaps in knowledge of the deep sea
(C) Largely uncharted bathymetry of the southern Indian Ocean
(D) Poor understanding of how sound travels deep underwater
(E) A paucity of data of Mars

(4) According the essay, which of the following statement is true?
(A) The black boxes of MH370 were finally found.
(B) The search in May has found objects related to the plane.
(C) Walter Smith thought our knowledge of the ocean floors is better than that of our nearest neighbors in the space.
(D) Monitoring flight data from ground stations is not being implemented in the current aviation industry.
(E) There is not further plan to continue searching MH370.

(5) What is the most suitable title for this essay?
(A) Lost at sea (B) Riddles solved
(C) Aviation history (D) Acoustic technology
(E) Importance of the Indian Ocean's sea floor bathymetry

F. Reading: Read the following essay and write down your answers (16 points).

Source: Richard Van Noorden, *Nature* **505**, 144–145, January 2014

By pouring cash into science and technology faster than its economy has expanded, China has for the first time overtaken Europe on a key measure of innovation: the share of its economy devoted to research and development (R&D).

In 2012, China invested 1.98% of its gross domestic product (GDP) into R&D — just edging out the 28 member states of the European Union (EU), which together managed 1.96%, according to the latest estimates of research intensity, to be released this month by the Paris-based Organization for Economic Co-operation and Development (OECD).

The figures show that China's research intensity has tripled since 1998, whereas Europe's has barely increased. The numbers are dominated by business spending, reflecting China's push in the manufacturing and information- and communication-technology industries.

James Wilsdon, a science-policy analyst at the University of Sussex in Brighton, UK, says that China's R&D juggernaut is "astonishing", considering that the entire system emerged only after the end of the Cultural Revolution in 1976. In absolute terms, China's R&D spending is still almost one-third lower than that of Europe, but the new figures are "a significant milestone", says Wilsdon.

The reorientation of China's economy displays its soaring ambition. However, money does not buy innovation. Despite success in some areas, notably high-speed rail, solar energy, supercomputing and space exploration, leaders in China are concerned that innovation is lacking, say science-policy analysts. "Chinese leaders would like something equivalent to a Nobel prize, or a world-class product similar to an iPhone," says Denis Simon, an expert on Chinese science and innovation at Arizona State University in Tempe. "But there is a lot of risk aversion within the Chinese R&D system that doesn't allow for entrepreneurial behavior."

China's leaders recognize the issues: the government is now reviewing a 2006 long-term plan on science and technology, and will be taking advice from international experts in Beijing this month. Lan Xue, director of the China Institute of Science and Technology Policy at Tsinghua University in Beijing, expects some changes at the level of academic science. "I'm relatively optimistic that there will be improvement in how R&D programs are managed and peer-reviewed."

Tasks:

(1) Give a Chinese title for this essay. (6 points)
(2) Summarize the essay in less than 200 Chinese characters. (10 points)