

# 國立中山大學 106 學年度碩士暨碩士專班招生考試試題

科目名稱：科技英文【機電系碩士班乙組、戊組】

題號：438005

※本科目依簡章規定「不可以」使用計算機(混合題)

共 6 頁第 1 頁

A. 說明：第1題至第4題，每題請分別根據文章之文意選出最適當的一個選項，請畫記在答案卡之「選擇題答案區」。各題答對者，得2分；答錯、未作答或畫記多於一個選項者，該題以零分計算。(8%)

In Japan, a person's blood type is popularly believed to decide his/her temperament and personality. Type-A people are generally considered sensitive perfectionists and good team players, but over-anxious. Type Os are curious and generous but stubborn. Type ABs are artistic but mysterious and unpredictable, and type Bs are cheerful but eccentric, individualistic, and selfish. Though lacking scientific evidence, this belief is widely seen in books, magazines, and television shows.

The blood-type belief has been used in unusual ways. The women's softball team that won gold for Japan at the Beijing Olympics is reported to have used blood-type theories to customize training for each player. Some kindergartens have adopted teaching methods along blood group lines, and even major companies reportedly make decisions about assignments based on an employee's blood type. In 1990, Mitsubishi Electronics was reported to have announced the formation of a team composed entirely of AB workers, thanks to "their ability to make plans."

The belief even affects politics. One former prime minister considered it important enough to reveal in his official profile that he was a type A, while his opposition rival was type B. In 2011, a minister, Ryu Matsumoto, was forced to resign after only a week in office, when a bad-tempered encounter with local officials was televised. In his resignation speech, he blamed his failings on the fact that he was blood type B.

The blood-type craze, considered simply harmless fun by some Japanese, may manifest itself as prejudice and discrimination. In fact, this seems so common that the Japanese now have a term for it: bura-hara, meaning blood-type harassment. There are reports of discrimination leading to children being bullied, ending of happy relationships, and loss of job opportunities due to blood type.

1. What is the speaker's attitude toward the blood-type belief in Japan?  
(A) Negative. (B) Defensive. (C) Objective. (D) Encouraging.
2. According to the examples mentioned in the passage, which blood type can we infer is the **LEAST** favored in Japan?  
(A) Type A. (B) Type B. (C) Type O. (D) Type AB.
3. Why did Prime Minister Ryu Matsumoto resign from office?  
(A) He revealed his rival's blood type.  
(B) He was seen behaving rudely on TV.  
(C) He blamed his failings on local officials.  
(D) He was discriminated against because of blood type.
4. Which field is **NOT** mentioned in the passage as being affected by blood-type beliefs?  
(A) Education. (B) Sports. (C) Business. (D) Medicine.

B.說明：第5題至第8題，每題請分別根據文章之文意選出最適當的一個選項，請畫記在答案卡之「選擇題答案區」。各題答對者，得3分；答錯、未作答或畫記多於一個選項者，該題以零分計算。(12%)

Many marine animals, including penguins and marine iguanas, have evolved ways to get rid of excess salt by using special salt-expelling glands around their tongue. However, the sea snake's salt glands cannot handle the massive amounts of salt that would enter their bodies if they actually drank seawater. This poses a serious problem when it comes to getting enough water to drink. If seawater is not an option, how does this animal survive in the ocean?

背面有題

# 國立中山大學 106 學年度碩士暨碩士專班招生考試試題

科目名稱：科技英文【機電系碩士班乙組、戊組】

題號：438005

※本科目依簡章規定「不可以」使用計算機(混合題)

共 6 頁 第 2 頁

An international team of researchers focused on a population of yellow-bellied sea snakes living near Costa Rica, where rain often does not fall for up to seven months out of the year. Because yellow-bellied sea snakes usually spend all of their time far from land, rain is the animals' only source of fresh water. When it rains, a thin layer of fresh water forms on top of the ocean, providing the snakes with a fleeting opportunity to lap up that precious resource. But during the dry season when there is no rain, snakes presumably have nothing to drink. Thus, the team became interested in testing whether sea snakes became dehydrated at sea.

The researchers collected more than 500 yellow-bellied sea snakes and weighed them. They found that during the dry season about half of the snakes accepted fresh water offered to them, while nearly none did during the wet season. A snake's likelihood to drink also correlated with its body condition, with more withered snakes being more likely to drink, and to drink more. Finally, as predicted, snakes captured during the dry season contained significantly less body water than those scooped up in the rainy season. Thus, it seems the snake is able to endure certain degrees of dehydration in between rains. Scientists believe that dehydration at sea may explain the declining populations of sea snakes in some parts of the world.

5. What is the purpose of the study described in this passage?
  - (A) To test if sea snakes lose body water at sea.
  - (B) To see whether sea snakes drink water offered to them.
  - (C) To find out if sea snakes are greatly reduced in population.
  - (D) To prove that sea snakes drink only water coming from rivers.
6. Which of the following is true about sea snakes?
  - (A) Their salt glands can remove the salt in the seawater.
  - (B) They can drink seawater when it mixes with rainwater.
  - (C) The ocean is like a desert to them since they don't drink seawater.
  - (D) They usually live near the coastal area where there is more fresh water.
7. Which of the following is one of the findings of the study?
  - (A) If a sea snake was dried and weak, it drank more fresh water.
  - (B) If captured in the wet season, sea snakes drank a lot of fresh water.
  - (C) Most of the sea snakes had lost a lot of body water when captured.
  - (D) Dehydration is not a problem among sea snakes since they live at sea.
8. What can be inferred from the study?
  - (A) Sea snakes can easily survive long years of drought.
  - (B) Evolution will very likely enable sea snakes to drink seawater.
  - (C) Sea snakes will be the last creature affected by global warming.
  - (D) The sea snakes' population distribution is closely related to rainfall.

C.說明：各題答對者，得4分；答錯、未作答或畫記多於一個選項者，該題以零分計(24%)

The text has seven paragraphs, A-G. Choose the correct heading for paragraphs A, B and D-G from the list of headings below. Write the correct number, 1-9, in boxes Q9-Q14 on your answer sheet.

# 國立中山大學 106 學年度碩士暨碩士專班招生考試試題

科目名稱：科技英文【機電系碩士班乙組、戊組】

題號：438005

※本科目依簡章規定「不可以」使用計算機(混合題)

共 6 頁第 3 頁

List of Headings	
1.	Robots working together
2.	Preparing LGVs for takeover
3.	Looking ahead
4.	The LGVs' main functions
5.	Split location for newspaper production
6.	Newspapers superseded by technology
7.	Getting the newspaper to the printing center
8.	Controlling the robots
9.	Beware of robots!

Q9.	Paragraph A
Q10.	Paragraph B
Example <u>9</u>	Paragraph C
Q11.	Paragraph D
Q12.	Paragraph E
Q13.	Paragraph F
Q14.	Paragraph G

## ROBOTS AT WORK

### Paragraph A

The newspaper production process has come a long way from the old days when the paper was written, edited, typeset and ultimately printed in one building with the journalists working on the upper floors and the printing presses going on the ground floor. These days the editor, subeditors and journalists who put the paper together are likely to find themselves in a totally different building or maybe even in a different city. This is the situation which now prevails in Sydney. The daily paper is compiled at the editorial headquarters, known as the prepress centre, in the heart of the city, but printed far away in the suburbs at the printing centre. Here human beings are in the minority as much of the work is done by automated machines controlled by computers.

### Paragraph B

Once the finished newspaper has been created for the next morning's edition, all the pages are transmitted electronically from the prepress centre to the printing centre. The system of transmission is an update on the sophisticated page facsimile system already in use on many other newspapers. An imagesetter at the printing centre delivers the pages as film. Each page takes less than a minute to produce, although for colour pages four versions, once each for black, cyan, magenta and yellow are sent. The pages are then processed into photographic negatives and the film is used to produce aluminium printing plates ready for the presses.

背面有題

# 國立中山大學 106 學年度碩士暨碩士專班招生考試試題

科目名稱：科技英文【機電系碩士班乙組、戊組】

題號：438005

※本科目依簡章規定「不可以」使用計算機(混合題)

共 6 頁 第 4 頁

## Paragraph C ( 9. Beware of robots!)

A procession of automated vehicles is busy at the new printing centre where the Sydney Morning Herald is printed each day. With lights flashing and warning horns honking, the robots (to give them their correct name, the LGVs or laser guided vehicles) look for all the world like enthusiastic machines from a science fiction movie, as they follow their own random paths around the plant busily getting on with their jobs. Automation of this kind is now standard in all modern newspaper plants. The robots can detect unauthorised personnel and alert security staff immediately if they find an “intruder” ; not surprisingly, tall tales are already being told about the machines starting to take on personalities of their own.

## Paragraph D

The robots' principal job, however, is to shift the newsprint (the printing paper) that arrives at the plant in huge reels and emerges at the other end some time later as newspapers. Once the size of the day' s paper and the publishing order are determined at head office, the information is punched into the computer and the LGVs are programmed to go about their work. The LGVs collect the appropriate size paper reels and take them where they have to go. When the press needs another reel its computer alerts the LGV system. The Sydney LGVs move busily around the press room fulfilling their two key functions to collect reels of newsprint either from the reel stripping stations, or from the racked supplies in the newsprint storage area. At the stripping station the tough wrapping that helps to protect a reel of paper from rough handling is removed. Any damaged paper is peeled off and the reel is then weighed.

## Paragraph E

Then one of the four paster robots moves in. Specifically designed for the job, it trims the paper neatly and prepares the reel for the press. If required the reel can be loaded directly onto the press; if not needed immediately, an LGV takes it to the storage area. When the press computer calls for a reel, an LGV takes it to the reel loading area of the presses. It lifts the reel into the loading position and places it in the correct spot with complete accuracy. As each reel is used up, the press drops the heavy cardboard core into a waste bin. When the bin is full, another LGV collects it and deposits the cores into a shredder for recycling.

## Paragraph F

The LGVs move at walking speed. Should anyone step in front of one or get too close, sensors stop the vehicle until the path is clear. The company has chosen a laserguide function system for the vehicles because, as the project development manager says “The beauty of it is that if you want to change the routes, you can work out a new route on your computer and lay it down for them to follow” . When an LGV' s batteries run low, it will take itself off line and go to the nearest battery maintenance point for replacement batteries. And all this is achieved with absolute minimum human input and a much reduced risk of injury to people working in the printing centres.

## Paragraph G

The question newspaper workers must now ask, however is, “how long will it be before the robots are writing the newspapers as well as running the printing centre, churning out the latest edition every morning?”

D.說明：Please completely fill out the following questions.(6%)

# 國立中山大學 106 學年度碩士暨碩士專班招生考試試題

科目名稱：科技英文【機電系碩士班乙組、戊組】

題號：438005

※本科目依簡章規定「不可以」使用計算機(混合題)

共 6 頁第 5 頁

15. [\_\_\_\_] is defined as the rate of change of velocity. (2%)
16. Without other force, an object that is thrown in the air falls because it is under the [\_\_\_\_] of the Earth. (2%)
17. What is Newton's 3rd law? (2%)

E. 說明：請分別根據各篇文章之文意由題後之字匯中選出最適當的一個選項。各題答對者，得2分；答錯、未作答或畫記多於一個選項者，該題以零分計算。(10%)

Important breakthroughs in the foundations of mechanical engineering occurred in England during the 17th century when Sir Isaac Newton both formulated the three Newton's Laws of (18) and developed (19), the (20) basis of physics. Newton was reluctant to publish his methods and laws for years, but he was finally persuaded to do so by his colleagues, such as Sir Edmund Halley, much to the benefit of all mankind.

Mechanical engineers are also expected to understand and be able to apply basic concepts from c (21), physics, chemical engineering, civil engineering, and electrical engineering. All mechanical engineering programs include multiple semesters of mathematical classes including calculus, and advanced mathematical concepts including differential equations, partial (22) equations, linear algebra, abstract algebra, and differential geometry, among others.

Answers Keywords of according above text:

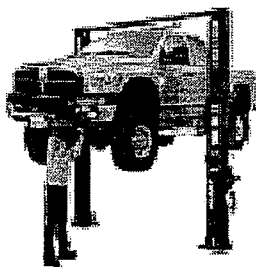
Abbreviation, basis, calculus, chemistry, force, electrical, equations, differential, motion, formula, mathematical, mechanical

F. 選擇下圖正確之名稱。每題 2 分，共 10 分。

A. Choice the Correct Answer from pictures: (10%)



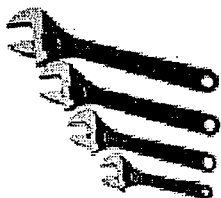
(23) \_\_\_\_\_



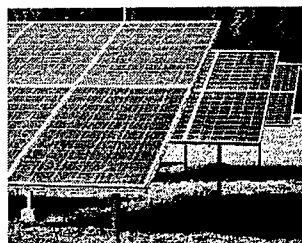
(24) \_\_\_\_\_

Ref. answers:

Robotor, tank,  
Wheels,  
Air pollution,  
solar farm, carpets,  
automotive, tracks,  
smooth flour,  
screwdriver,  
wrenches, antenna,  
sun batteries



(25)



(26)



(27)

背面有題

# 國立中山大學 106 學年度碩士暨碩士專班招生考試試題

科目名稱：科技英文【機電系碩士班乙組、戊組】

題號：438005

※本科目依簡章規定「不可以」使用計算機(混合題)

共 6 頁第 6 頁

## G. 翻譯下文中 underlined sentence 成中文：(每題 5 分，共 15 分)

The distinction between science, engineering and technology is not always clear. Science is the reasoned investigation or study of phenomena, aimed at discovering enduring principles among elements of the phenomenal world by employing formal techniques such as the scientific method. Technologies are not usually exclusively products of science, because they have to satisfy requirements such as utility, usability and safety. Engineering is the goal-oriented process of designing and making tools and systems to exploit natural phenomena for practical human means, often (but not always) using results and techniques from science. The development of technology may draw upon many fields of knowledge, including scientific, engineering, mathematical, linguistic, and historical knowledge, to achieve some practical result. Technology is often a consequence of science and engineering — although technology as a human activity precedes the two fields. For example, science might study the flow of electrons in electrical conductors, by using already-existing tools and knowledge. This new-found knowledge may then be used by engineers to create new tools and machines, such as semiconductors, computers, and other forms of advanced technology. In this sense, scientists and engineers may both be considered technologists; the three fields are often considered as one for the purposes of research and reference.

翻譯：

28. Technologies are not usually exclusively products of science, because they have to satisfy requirements such as utility, usability and safety.
29. Engineering is the goal-oriented process of designing and making tools and systems to exploit natural phenomena for practical human means, often (but not always) using results and techniques from science.
30. Scientists and engineers may both be considered technologists; the three fields are often considered as one for the purposes of research and reference.

## H. 簡答下列文章中相關之問題。每題五分，共 15 分。

### Classical mechanics versus quantum mechanics

Historically, classical mechanics came first, while quantum mechanics is a comparatively recent invention. Classical mechanics originated with Isaac Newton's laws of motion in *Principia Mathematica*; Quantum Mechanics was discovered in the early 20th century. Both are commonly held to constitute the most certain knowledge that exists about physical nature. Classical mechanics has especially often been viewed as a model for other so-called exact sciences. Essential in this respect is the relentless use of mathematics in theories, as well as the decisive role played by experiment in generating and testing them. According to the correspondence principle, there is no contradiction or conflict between the two subjects, each simply pertains to specific situations. The correspondence principle states that the behavior of systems described by quantum theories reproduces classical physics in the limit of large quantum numbers. Quantum mechanics has superseded classical mechanics at the foundational level and is indispensable for the explanation and prediction of processes at molecular and (sub)atomic level. However, for macroscopic processes classical mechanics is able to solve problems which are unmanageably difficult in quantum mechanics and hence remains useful and well used.

31. What had Newton written? Why is the classical mechanics so-called exact sciences?
32. Why is classical mechanics for macroscopic processes remaining useful and well used?
33. What is Newtonian mechanics not able to explain but quantum mechanics can predict?