

國 立 清 華 大 學 命 題 紙

95 學年度 動力機械工程學 系 (所) 戊 組碩士班入學考試

科目 科技英文 科目代碼 1902 共 伍 頁第 壹 頁 *請在【答案卷卡】內作答

Reading test (50 points)

Reading passage 1

Directions: Read the excerpt of a journal abstract below, then answer the following questions by writing your answers onto the answer sheets.

Development of a Unique, High Precision Linear Motor Integrated Air Slide Table, and Its Application to Laser Beam Writers

Hajime ONDA

Mechatronics R&D Center, NTN Corporation, 1578, Higashikaizuka, Iwata, Shizuoka, 438 - 8510 Japan

OPTICAL REVIEW Vol. 6, No. 1 (1999) 88-92

This paper reports on the development of a unique, high precision linear motor integrated air slide table for precise positioning and its application to laser beam writers for photo-mask pattern-making. The air slide table takes advantage of the balance between the air bearing's levitating and magnetic forces. A brushless linear motor and a high resolution linear encoder are integrated into the table. The unique construction of the device results in a very compact package with excellent accuracy. The basic characteristics of the air slide table are evaluated. The device is applied to a laser beam writer, which must be capable of rendering minute and precise patterns for photo-masking equipment. Examples are given including optical devices such as wave guides and Fresnel zone plates which were fabricated and evaluated. Experimental data is given to show that the Fresnel zone plate fabricated here can be used to focus a laser beam to the theoretical limit, just like a standard refractive lens.

1. In which journal was this article published?
2. When was Research Article A published?
3. Who wrote this article? State ONLY family name.
4. What device did this paper present to the readers?
5. Why did the author say that the device had a unique construction?
6. Why was it important that the device presented in this paper have high precision?
7. What is the relationship between the Fresnel zone plates and the device being reported in this paper, and what was the results found about the Fresnel zone plates?

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8. What is the meaning of the word “integrated” in this abstract? (Give another English word with similar meaning.)
9. What is the meaning of the word “render” in this abstract? (Give another English word with similar meaning.)
10. What is the meaning of the word “fabricated” in this abstract? (Give another English word with similar meaning.)
11. What is the meaning of the word “device” in this abstract? (Give another English word with similar meaning.)
12. What is the meaning of the word “evaluated” in this abstract? (Give another English word with similar meaning.)

Reading passage 2

Directions: Read the excerpt of another journal abstract below, then answer the following questions by writing your answers onto the answer sheets.

Invasive neural prosthesis for neural signal detection and nerve stimulation

Mark Gasson¹, Benjamin Hutt, Iain Goodhew, Peter Kyberd, Kevin Warwick

INTERNATIONAL JOURNAL OF ADAPTIVE CONTROL AND SIGNAL PROCESSING

Vol. 19, Issue 5, pages 365-375

This paper specifically examines the implantation of a microelectrode array into the median nerve of the left arm of a healthy male volunteer. The objective was to establish a bi-directional link between the human nervous system and a computer, via a unique interface module. This is the first time that such a device has been used with a healthy human. The aim of the study was to assess the efficacy, compatibility, and long term operability of the neural implant in allowing the subject to perceive feedback stimulation and for neural activity to be detected and processed such that the subject could interact with remote technologies. A case study demonstrating real-time control of an instrumented prosthetic hand by means of the bi-directional link is given. The implantation did not result in infection, and scanning electron microscope images of the implant post extraction have not indicated significant rejection of the implant by the body. No perceivable loss of hand sensation or motion control was experienced by the subject while the implant was in place, and further testing of the subject following the removal of the implant has not indicated any measurable long term defects. The implant was extracted after 96 days.

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13. In which journal was this article published?
14. How many people wrote this article? List ONLY their family names.
15. Why did the researchers implant a microelectrode array into a man's arm?
16. What kind of research did the authors conduct in order to collect data?
17. Did the subject react negatively to the implant? List all the reasons mentioned in the abstract to support your answer.
18. Did the authors explain how the findings of this research can be applied in the real world?
How?
19. What is the meaning of the word "implantation"? Give a definition in English.
20. What is the meaning of the word "post" in this abstract? (Give another English word with similar meaning.)
21. What is the meaning of the word "extracted" in this abstract? (Give another English word with similar meaning.)

Turn to the next page.

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Writing test (50 points)

Writing task 1: Explaining terms (40%)

Directions: Choose ONE of the following three technical terms in mechanical engineering.

Microprocessors

Liquid crystal display

Nano-structure

Write a paragraph (about 120 words) to explain this term. In that paragraph, you need to:

- (1) explain the meaning of the term that you choose in plain English so that anyone without any knowledge in mechanical engineering can understand (Imagine explaining the term to your English teacher who has no clue in science), AND
- (2) explain the application of the terms that you choose to daily life

The focus of this exam is on your ability to write well in English, so please try to elaborate your points as clearly as you can.

For example, if I have to write a paragraph to explain the technical term “robotics,” I will write a paragraph that looks like this:

Robotics is a field of computer science and engineering concerned with creating robots. It involves artificial intelligence, a subfield of computer science concerned with making computers behave like humans. Robots are programmed by computers to move and react to sensory input, such as images or sounds. They are now widely used in factories to perform high-precision jobs such as welding and riveting. They are also used in special situations that would be dangerous for humans, such as in cleaning toxic wastes or defusing bombs. However, although great advances have been made in the field of robotics during the last decade, robots are still not very useful in everyday life, as they are too clumsy to perform ordinary household chores.

(117 words)

Please write your paragraph on the exam booklet.

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Task 2: Argumentative writing (60%)

Directions: Read the passage in the box below about writing master's thesis in English.

Nowadays, it is common for graduate students in non-English speaking countries to write their master's thesis in English rather than in their first language. For example, some master's degree students in Taiwan write their thesis in English instead of Chinese. Proponents of this idea have argued that by doing so, students are better prepared to share their research with the rest of the world. After all, conference presentations are mostly in English, and the majority of respectable research journals only publish English articles. However, some people do not agree with this idea. They say that having to write in English adds unnecessary burden to students who already face the pressure of having to conduct the research itself. Moreover, the articles written in English are not accessible to lay people, making research seems more like products from ivory towers than useful projects. Finally, students in non-English speaking countries should focus on sharing their research with their fellow citizens instead of foreigners. Students can always hire translators to help with their future conference presentations and publications.

(170 words)

What do you think about this controversy? How would you feel if you have to write your Tsing Hua master's thesis in English. Write your response in about 200 words. You have to take a stance, i.e., either support or oppose the idea of writing your master's thesis in English. You should *not* be neutral and acknowledge both positions. Make sure that you start your paragraph with your main idea (your stance), then provide some reasons to support your stance. Both organization and language use are important in this test.

**This is the end of the test.
Thank you for your cooperation. Good luck!**