

注意：考試開始鈴響前，不得翻閱試題，
並不得書寫、畫記、作答。


國立清華大學 112 學年度碩士班考試入學試題

系所班組別：動力機械工程學系
丙組(固體與奈微米力學組)

科目代碼：1302

考試科目：科技英文

—作答注意事項—

1. 請核對答案卷(卡)上之准考證號、科目名稱是否正確。
2. 考試開始後，請於作答前先翻閱整份試題，是否有污損或試題印刷不清，得舉手請監試人員處理，但不得要求解釋題意。
3. 考生限在答案卷上標記「由此開始作答」區內作答，且不可書寫姓名、准考證號或與作答無關之其他文字或符號。
4. 答案卷用盡不得要求加頁。
5. 答案卷可用任何書寫工具作答，惟為方便閱卷辨識，請儘量使用藍色或黑色書寫；答案卡限用 2B 鉛筆畫記；如畫記不清(含未依範例畫記)致光學閱讀機無法辨識答案者，其後果一律由考生自行負責。
6. 其他應考規則、違規處理及扣分方式，請自行詳閱准考證明上「國立清華大學試場規則及違規處理辦法」，無法因本試題封面作答注意事項中未列明而稱未知悉。

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考試科目 (代碼)：科技英文(1302)

共 8 頁，第 1 頁 *請在【答案卷、卡】作答

Time: 10:30~12:10 (100 minutes)

Question I, problem 1-32, 2.5 points for each question.

Question II, problem 33-37, 3 points for each question.

Question III, Problem 38-39, 2.5 points for each question.

No points will be deducted for incorrect answers.

Questions I, problem 1-32 (2.5 points each)

Choose the best answer to replace the section in the question that has an underline.

1. He likes to eat fruits, _____ apples, oranges and papayas.

(A) which, (B) which is, (C) which as, (D) such that, (E) such as

2. Companies have to _____ the needs of potential customers and create products that can satisfy the requirements.

(A) assess, (B) anneal, (C) appear, (D) acute, (E) accuse

3. Intelligent robots with _____ for humans are designed to improve our daily lives.

(A) entropy, (B) eminent, (C) emerge, (D) empathy, (E) anguish

4. In this new town, the number of people is growing from 15000 to 35000 within the last decade, marking a _____ increase.

(A) 33%, (B) 43%, (C) 57%, (D) 133%, (E) 233%

5. Convenience stores are quite _____ in Taiwan. You can easily find one.

(A) unavailable, (B) unbearable, (C) unanimous, (D) utilization, (E) ubiquitous

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考試科目 (代碼)：科技英文(1302)

共 8 頁，第 2 頁 *請在【答案卷、卡】作答

Time: 10:30~12:10 (100 minutes)

Question I, problem 1-32, 2.5 points for each question.

Question II, problem 33-37, 3 points for each question.

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6. The park is two kilometers _____.

(A) with, (B) off, (C) at, (D) of, (E) on

7. Neither Mary _____ her husband went to the party last night.

(A) and, (B) or, (C) with, (D) nor, (E) not

8. Let's meet _____ 10 o'clock.

(A) in, (B) over, (C) on, (D) at, (E) of

9. One THz is _____ Hz.

(A) 10^6 , (B) 10^9 , (C) 10^{12} , (D) 10^{15} , (E) 10^{18}

10. What is the unit of power?

(A) N, (B) N/s, (C) J, (D) J/s, (E) N/m^2

11. Accuracy is defined as how accurately a given signal can be _____.

(A) guessed, (B) measured, (C) multiplied, (D) removed, (E) modified

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共 8 頁，第 3 頁 *請在【答案卷、卡】作答

Time: 10:30~12:10 (100 minutes)

Question I, problem 1-32, 2.5 points for each question.

Question II, problem 33-37, 3 points for each question.

Question III, Problem 38-39, 2.5 points for each question.

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12. Let's have dinner _____ Tuesday.

(A) in, (B) over, (C) at, (D) on, (E) with

13. The book was published _____ 2020.

(A) in, (B) over, (C) at, (D) on, (E) with

14. You can clean the floor, _____ you can wash the dishes.

(A) but, (B) later, (C) which, (D) nor, (E) or

15. COVID-19 is the _____ for "Coronavirus Disease 2019"

(A) antonym, (B) anomaly, (C) acronym, (D) adverb, (E) adjective

16. One picometer is _____ meter.

(A) 10^{12} , (B) 10^9 , (C) 10^{-9} , (D) 10^{-12} , (E) 10^{-15}

17. Procrastination is not a good habit. Never _____ till tomorrow what you can do today.

(A) get up, (B) put off, (C) take off, (D) turn off, (E) turn out

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共 8 頁，第 4 頁 *請在【答案卷、卡】作答

Time: 10:30~12:10 (100 minutes)

Question I, problem 1-32, 2.5 points for each question.

Question II, problem 33-37, 3 points for each question.

Question III, Problem 38-39, 2.5 points for each question.

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18. It is a device _____ opening cans.

(A) in, (B) at, (C) from, (D) for, (E) on

19. Gallium nitride is a very promising semiconductor material for the applications of power electronics. What is the chemical formula of gallium nitride?

(A) GNi, (B) GaN, (C) GaNi, (D) GN, (E) GINi

20. Global warming is mainly caused by greenhouse gases, of which the most important is _____.

(A) carbon dioxide, (B) oxygen, (C) nitrogen, (D) helium, (E) clean air

21. If I _____ you, I would not buy it

(A) am, (B) was, (C) are, (D) were, (E) is

22. "Give me where to stand, and I _____ the earth." – Archimedes.

(A) moved, (B) have move, (C) will be moved, (D) will move, (E) have been moved

23. Each owner has to be responsible for _____ pet.

(A) his, (B) her, (C) their, (D) its, (E) your

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考試科目 (代碼)：科技英文(1302)

共 8 頁，第 5 頁 *請在【答案卷、卡】作答

Time: 10:30~12:10 (100 minutes)

Question I, problem 1-32, 2.5 points for each question.

Question II, problem 33-37, 3 points for each question.

Question III, Problem 38-39, 2.5 points for each question.

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24. The _____ of a sensor signifies how much the output signal varies when the input quantity that the sensor measures varies.

(A) sensitivity, (B) bandwidth, (C) offset, (D) resolution, (E) dynamic range

25. What is the unit of strain?

(A) m, (B) N, (C) N/m, (D) N/m², (E) unitless

26. What is the difference _____ the two pictures?

(A) with, (B) between, (C) among, (D) amongst, (E) at

27. We both love this symphony. As the old saying goes, "Great minds think _____."

(A) liking, (B) likes, (C) alike, (D) likely, (E) to like

28. Big data refers to huge data system with increasing _____ and variety.

(A) humidity, (B) monotony, (C) rigidity, (D) complexity, (E) viability

29. Many countries around the world have now been working on "2050 Net-Zero Emissions". What is the meaning of the above-mentioned "Net-Zero Emissions"?

(A) Cutting light emissions that cause light pollution to nearly zero, (B) Cutting greenhouse gas emissions to nearly zero (C) Cutting radiation emissions to nearly zero, (D) All of the above, (E) None of the above

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共 8 頁，第 6 頁 *請在【答案卷、卡】作答

Time: 10:30~12:10 (100 minutes)

Question I, problem 1-32, 2.5 points for each question.

Question II, problem 33-37, 3 points for each question.

Question III, Problem 38-39, 2.5 points for each question.

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30. What is the synonym of 'Quadruple'?

(A) Twofold, (B) Half, (C) Fourfold, (D) Quarter, (E) Q

31. The climate of the earth is changing faster than ever, mainly _____ human activities".

(A) results in, (B) results, (C) resulting, (D) resulting in, (E) as a result of

32. Jane is not only beautiful _____ smart.

(A) yet, (B) and, (C) also, (D) but also, (E) is

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共 8 頁，第 7 頁 *請在【答案卷、卡】作答

Time: 10:30~12:10 (100 minutes)

Question I, problem 1-32, 2.5 points for each question.

Question II, problem 33-37, 3 points for each question.

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Questions II, problem 33-37 (3 points each)

Try to help complete the introduction of atomic force microscope by filling the answers in.

An atomic force microscope detects the force between a sample surface and a sharp tip which is mounted 33 a cantilever. The force between the sample and the tip causes the cantilever to deflect according to 34. A feedback control system, 35 controls the vertical displacement (z-position) of the tip, keeps the cantilever deflection constant. The tip scans in x- and y-direction by 36 of piezoelectric driving, and the z-position of the tip is recorded 37 a function of x- and y- position to form a map of equal force. The morphology of the sample can therefore be determined.

33. (A) of, (B) due to, (C) off, (D) on, (E) for
34. (A) Ohm's law, (B) Faraday's law, (C) special relativity, (D) quantum tunneling effect, (E) Hooke's law
35. (A) which, (B) what, (C) in which, (D) over which, (E) but
36. (A) a meaning (B) meanings, (C) meant, (D) means, (E) no means
37. (A) of, (B) at, (C) as, (D) over, (E) behind

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Time: 10:30~12:10 (100 minutes)

Question I, problem 1-32, 2.5 points for each question.

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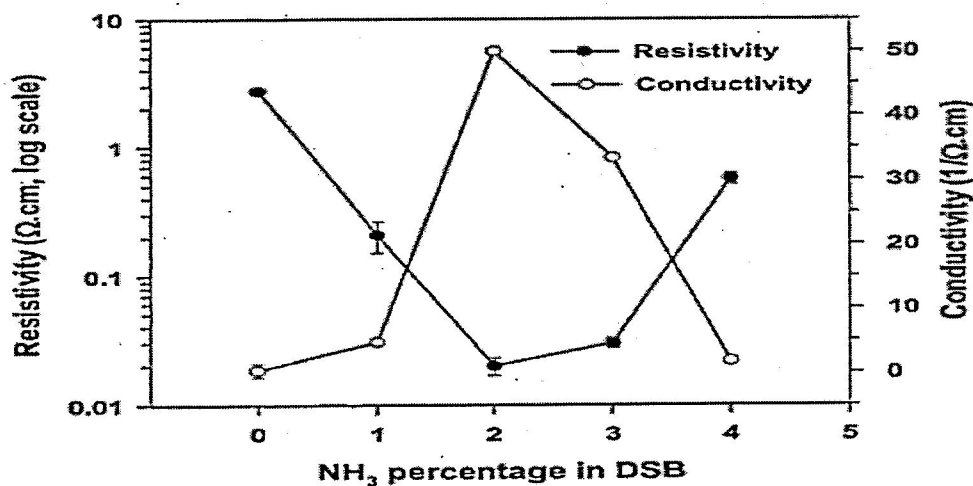
Question III, Problem 38-39, 2.5 points for each question.

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Questions III, problem 38-39 (2.5 points each)

Below is the data from a published Journal paper. (Source: Fraga M., Pessoa R. Progresses in synthesis and application of SiC films: From CVD to ALD and from MEMS to NEMS. Micromachines. 2020;11:799.)

Please try to answer the following questions.



38. According to the above curves, what is the maximum conductivity?

(A) 3 Ωcm, (B) 5 Ωcm, (C) 7 Ωcm, (D) 44 Ω⁻¹cm⁻¹, (E) 50 Ω⁻¹cm⁻¹

39. What is the relationship between resistivity and conductivity?

(A) Resistivity is proportional to conductivity, (B) Resistivity is inversely proportional to conductivity, (C) The summation of resistivity and conductivity is a constant, (D) Resistivity is proportional to the square of conductivity, (E) The relationship between resistivity and conductivity depends on the types of materials.