

國立清華大學 100 學年度碩士班入學考試試題

系所班組別：工業工程與工程管理學系(丙組)

考試科目（代碼）：人因工程（1802）

共 2 頁，第 1 頁 \*請在【答案卷】作答

**I. Essays (70%): Please answer each question concisely and to the point. Examples must be given if specified; in other cases, you may also give examples along with your answer to help clarify your points. Handwritten answers must be recognizable and may be done in Chinese as well as in English:**

1. (12%) Analyzing a time-sharing situation such as “Driving a car while talking on the cell phone” from 4 dimensions of a multiple resource theory.
2. (15%) List at least 3 principles of presentation in auditory display and at least 3 procedures to increase the detectability of a signal in noise.
3. (8%) Design an experiment to test the visual performance on a 3D display. Please describe the independent variables and dependent variables you may consider in this experiment.
4. (12%) In arranging locations of control and display components of a control panel in relation to an operator within a physical space, please explain the followings:
  - (1) Three types of links between the components (including the operator), and indicate their relationships.
  - (2) Six letters, i.e., A, E, I, O, U, X, are used to rate the relationships between the components, what are their meanings?
  - (3) It is known that putting C I and D II in adjacent locations is extremely dangerous. Please draw a link table using the following information (C I, C II, T I, D I, D II, Operator are the components and the numbers are the frequencies occurred between the components) and mark their relationships with the rating letters according to the given information and your choices.

	C I	C II	T I	D I	D II	Operator
C I	-	1	2	3		5
C II	1	-			3	5
T I	2		-	1	1	5
D I	3		1	-	2	5
D II		3	1	2	-	5
Operator	5	5	5	5	5	-

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5. (8%) Explain what is Control-Response Ratio and give two examples with different types of controls.
6. (15%) List five methods for measuring human physiological strain. Then, select three out of the five methods and explain how each of these methods is used to measure the human physiological strain.

**II. Filling blanks (30%). Please write the answer for the blank in each of the following question, each question is 2 points.**

1. A \_\_\_\_\_ is the three dimensional space within which an individual works.
2. A \_\_\_\_\_ and/or maximal area is the two dimensional space on a horizontal work surface within which an individual works.
3. In the arrangement of components on a display, an emergency shut off control should be better arranged based on \_\_\_\_\_ principle.
4. For routine calibration or checkup of a machine or device, i.e. airplane should be based on \_\_\_\_\_.
5. The peak brightness sensitivity of photopic vision is around \_\_\_\_\_ mn.
6. The peak brightness sensitivity of scotopic vision is around \_\_\_\_\_ mn.
7. The shift in sensitivity between photopic and scotopic is called \_\_\_\_\_ effect.
8. The display of an night aircraft fighter should be illuminated with \_\_\_\_\_ color light. Space.
9. In Munsell color notation, 5G-12/4 is vivid green color chip, which has a \_\_\_\_\_ of 12.
10. In Munsell color notation, mid-grey is specified as \_\_\_\_\_.
11. The color notation for CIE 1931 chromaticity diagram is specified as (x, y, Y), mid-gray is specified as \_\_\_\_\_.
12. For the following 3 light sources: tungsten, high pressure sodium, and mercury, which has the highest color rendering index; \_\_\_\_\_.
13. WBGT is a weighted average of natural wet-bulb temperature (NWB), globe temperature (GT), and \_\_\_\_\_.
14. In theory, there are several frequency-response weighting networks (designated as A, B, C, and F), to be used for the measurement of different level of sound pressure level, but in reality, only \_\_\_\_\_ weighting is normally used.
15. ISO 2631 is basically based on \_\_\_\_\_, to obtain the boundary for reduced comfort, subtract 10 dB, to obtain the boundary for safe physiological exposure, add 6 dB.