

國立清華大學命題紙

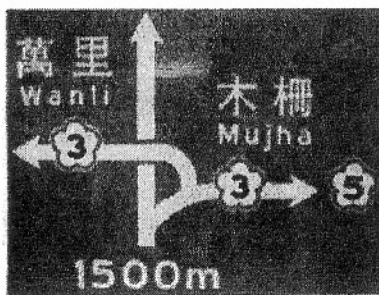
96 學年度工業工程與工程管理學系(所) 丙 組碩士班入學考試

科目 人因工程 科目代碼 1702 共 2 頁第 1 頁 *請在【答案卷卡】內作答

註：不得使用計算器。

I. Essays (50%): Please answer each question concisely and to the point. You may 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.

- (15%) In doing human factors research, the “reliability” and the “validity” of the measures of variables may determine the relevance and significance of the study. Please explain these terms and indicate why they are so important for a study?
- (15%) Please describe how you could use the “Secondary task measures” to design the experiment methods for measuring operator’s mental workload for the following two tasks. Also, please explain how would you decide which of the tasks was more mental demanded?
 - “Driving your car on a busy highway follow the enforced speed limits for 30 minutes”, and
 - “Doing food packing operation in a supermarket along a machine paced conveyor”.
- (10%) The following two traffic signs give the same instruction for drivers. Please answer the following questions from human factors point of view.
 - What types of single coding and multiple coding were used in designing sign A and sign B, respectively?
 - Which of the signs do you think would be easier for drivers to recognize the way to go? Why the one is better than the other?



- (10%) Please use human body’s heat exchange equation to explain the process of heat exchange for human.

II. Please fill the answers in the blanks, each blank is 2 points. (50%)

- O_2 deficit is always greater than O_2 debt: _____ (correct, incorrect); O_2 debt is partly attributed to convert _____ back to carbohydrates
- When we move from resting to strenuous work, our O_2 intake increases significantly, this is mainly attributed to (1) _____, (2) redistribution of blood flow and (3) _____.
- The basal metabolic rate of a man is approximately _____ kcal/min., the maximal aerobic power (MAP) of a man is approximately _____ kcal/min.

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4. The dynamic work power output efficiency of a human is compromised between force exertion level (% of maximal aerobic power) and velocity (speed of force displacement), at approximately 25% to 33% of force exertion level, the power output is maximized: _____ (correct, incorrect). For most work standards in the world, the physiological recommended limits are approximately 50% to 75% of maximal aerobic power: _____ (correct, incorrect).
5. The elbow joint can perform _____ / _____ movements, and the forearm can perform _____ / _____.
6. While a man is steering the wheel of a car in making a left-turn, the control order of the system is _____ (zero order, first order, second order). When a man is turning the handle of a bicycle in making a left-turn, the control order of the system is _____ (zero order, first order, second order).
7. In the old days, the QWERTT keyboard of a typewriter is intentionally designed to _____ (increase, decrease) the keystroke rate of operators. The QWERTT keyboard is classified as _____ (chord or sequential keyboards).
8. There are 4 principles can be applied to the design of a control panel, such as importance, frequency-of-use, functional, and sequence-of-use principles. In designing a remote control of a TV, the location of the power key (On/Off) should be determined based on _____ principle. And the grouping of the numeric keys (0, 1, 2, ...) should be determined based on _____ principle.
9. The major part of the feedback of a control is due to the various types of resistance associated with the control, the resistance can be classified into: _____, static friction, viscous damping, and _____.
10. The principles in the application of anthropometric data are: design for extreme individual, design for _____, and design for _____.
11. In determining the height of a work surface, what _____ (anthropometrical dimension) should be referenced. And the height should be adjusted based on different types of tasks: _____ (correct, incorrect).
12. In designing traffic signals the three most important coding principles can be applied are _____, _____ and _____ coding principles.