令和元年度　広島大学大学院国際協力研究科（博士課程前期）入学試験問題（10月入学）
Entrance Examination for Master's Programs (October 2019 Enrollment), IDEC
令和2年度　広島大学大学院国際協力研究科（博士課程前期）入学試験問題（4月入学）
Entrance Examination for Master's Programs (April 2020 Enrollment), IDEC

＜注意事項＞
日本語または英語のどちらで解答してもよい。

＜Notice＞
1) You can answer either in Japanese or English.

Select and answer two out of the following Questions 1 – 4.

Question 1
Answer the following questions, supposing the user equilibrium principle always holds.

1. Suppose that there are two roads (road A and road B), where the total traffic volume is 3000 pcu/hr from origin (O) to destination (D). The link performance functions of these roads are given as shown in Fig. 1 (t_A and t_B indicate travel time, and x_A and x_B refer to traffic volume, on roads A and B, respectively). Then, calculate the expected travel time from O to D.

Road A
$$t_A = 10 + 0.03x_A \text{ (min)}$$
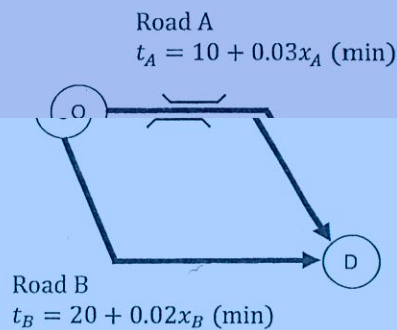
Road B
$$t_B = 20 + 0.02x_B \text{ (min)}$$

Fig.1 Road network

2. The link performance function of road A is shown in Fig.2(0) before a natural disaster. However, it changes into a different shape after the disaster. Choose the most proper link performance function of damaged road A after the disaster out of options Fig.2(a) to Fig.2(d).
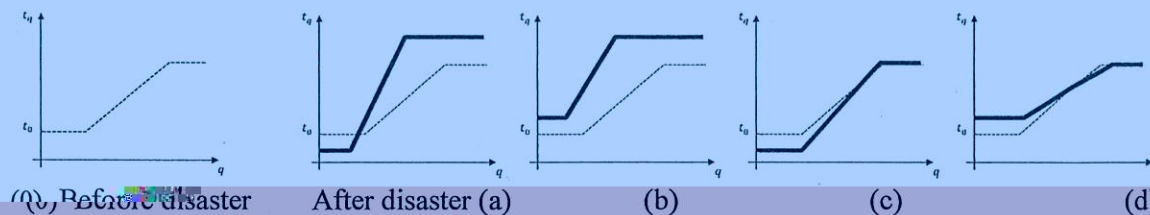
(0) Before disaster　　After disaster (a)　　(b)　　(c)　　(d)

Fig.2 Link performance functions before and after disaster
[t_0, t_d: travel times; q: traffic volume]

3. Suppose that a natural disaster causes intolerable damage on road A. Total volumes of both roads are reduced to 2000 pcu/hr but travel time is increased to 58 min during the disaster recovery period. And the link performance function of road A becomes $t_A = 30 + \beta x_A$. Obtain the parameter β of the new link performance function of road A.

広島大学大学院国際協力研究科

M 5

Question 2

It is necessary to correctly understand people's travel behaviors for resolving transportation issues. Please answer the following questions.

1. First, name two types of travel behavior surveys. Next, briefly explain each of them and describe the shortcoming(s) of each and the corresponding method(s) to overcome the shortcoming(s).

2. Discrete choice models have been widely applied in travel behavior analysis. Name two types of discrete choice models, explain the advantages and disadvantages of each, and describe how to overcome the disadvantages.

科目名　都市・建築環境学
（英文）　Urban and Building Environment

受験番号 Applicant Number	M

<注意事項>
1)　日本語または英語のどちらで解答してもよい。

<Notice>
1)　You can answer either in Japanese or English.

問題 ［1］　建築設備に関する次の 4 項目(a)～(d)から 2 項目を選び，説明せよ。
Question [1] Choose two from the following four items (a) to (d) concerned with building equipment and explain each one.

(a) 排水システムにおける通気管
　　Vent pipe in drainage system

(b) パッシブソーラーハウス
　　Passive solar house

(c) 氷蓄熱システム
　　Ice thermal storage system

(d) 第 1～3 種機械換気方式
　　Class 1 to 3 mechanical ventilation systems

問題 ［2］　建築分野における水資源の有効利用に関する質問(a)，(b)に答えよ。
Question [2] Answer the following questions (a) and (b) concerned with the effective utilization of water resources in the field of architecture.

(a) 建築分野において水資源をいかに有効活用できるか説明せよ。
　　Explain the means for the utilization of water resources
　　effectively in the field of architecture.

(b) 水資源の有効活用を普及させる上での問題点とその解決策
　　Explain the problems in dissemination of the means and the way
　　of solution for the effective utilization of water resources.

受験番号 Applicant Number	M

令和元年度　広島大学大学院国際協力研究科（博士課程前期）入学試験問題（10月入学）

Q2. Explain the utilization of plant allometry and their effects on biomass assessment at sample unit plots.

試　験　科　目　名
Subject
科目名　生態学
（英文）　Ecology