

試験科目名 Subject	
科目名 交通計画・都市計画	
(英文) Transportation and Urban Planning	

受験番号 Applicant Number	M
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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>  
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 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.

- 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.

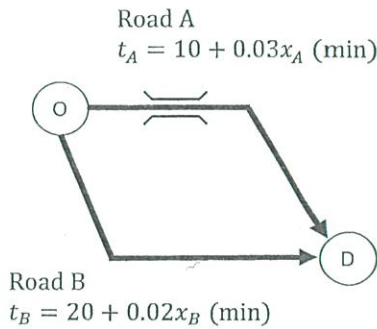


Fig.1 Road network

- 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).

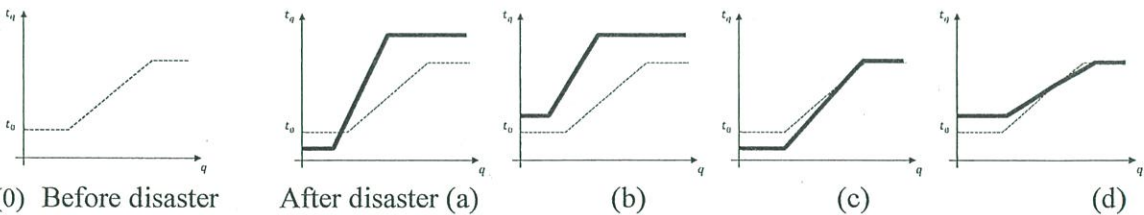


Fig.2 Link performance functions before and after disaster  
 [ $t_0, t_q$ : travel time;  $q$ : traffic volume]

- 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  $\beta$  of the new link performance function of road A.

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**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.

**Question 3**

For regional revitalization, it is effective to make tourism policies that make use of local resources under the involvement of local residents. Discuss the relationship between such tourism policies and sustainable development of the region.

**Question 4**

Name one smart technology utilizing Artificial Intelligence (AI) and Internet of Things (IoT), etc. Discuss how use of the technology may bring changes in people's lives, what the changes imply to urban planning, and what kinds of urban policies are needed to mitigate the negative impacts caused by the changes.

試験科目名  
Subject

科目名 都市・建築環境学

(英文) Urban and Building Environment

受験番号  
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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 utilization of water resources in the field of architecture.

- (a) 水資源の有効利用を図るため、いかなる対策があるか説明せよ。  
Explain the measure(s) for the utilization of water resources.
- (b) 前問(a)の対策を、開発途上国に導入する際の問題点を説明せよ。  
Explain the problems in introduction of the measure(s) in the former question (a) to the developing countries.

試 験 科 目 名 Subject
科目名 植物機能科学  (英文) Functional Plant Sciences

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問1. 全フェノール及び全フラボノイドの測定方法を説明せよ。

Q1. Describe the methods to measure total phenols and total flavonoids.

問2. 雑草及び害虫の生物的防除における植物アレロパシーの利用方法とその効果を説明せよ。

Q2. Explain the utilizations of plant allelopathy and their effects in biological management of weeds and pests.

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

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問1. 以下の用語について説明せよ.

- (1) 生態系サービス
- (2) 生物多様性
- (3) ニッチ（生態的地位）

Question 1. Explain the following terms.

- (1) Ecosystem services
- (2) Biodiversity
- (3) Ecological niche

問2. 地域の生態系は自然環境だけでなく、そこで行われる人間活動の影響を受けて形成されることが多い。伝統的な人間活動により形成された生態系の例を一つ挙げ、その維持メカニズムについて論じよ。

Question 2. Local ecosystems have often been formed not only by natural environments but also by human activities there. Give one example of ecosystems that have been formed by traditional human activities and describe the mechanisms that maintain the ecosystem.