Department of Advanced Energy,
Graduate School of Frontier Sciences,
The University of Tokyo

H.26 (2014) Entrance Examination
For Master Course

Special Education Subjects (Essay)

Write an essay on the following theme on the next page. Use one answer sheet (front and back sides) enclosed. It must be your autograph in Japanese or in English. You may draw figures, but do not attach another sheet. Here enclosed two answer sheets, one of which is for a spare.

Applicants must send their essay written on the sheet no later than August 7, 2013 (postmarked on or before August 7, 2013) via a registered mail (Tokutei-Kiroku mail of Japan Post service is fine) to the address written below. You may fold the answer sheet. All the applicants are requested to attend the examination (August 20, 2013) with a copy of essay against a postal failure.

Mailing Address: Kashiwanoha 5-1-5, Kashiwa, Chiba 277-8561
Graduate School of Frontier Sciences, Kyoumu-Kakari
Write “Essay, Advanced Energy” in red ink on the envelope.

Problem

The following paragraph is the opening of G. Deleuze's "*Différence et Répétition*" (English translation by Paul Patton):

> Repetition is not generality. Repetition and generality must be distinguished in several ways. Every formula which implies their confusion is regrettable: for example, when we say that two things are as alike as two drops of water; or when we identify `there is only a science of the general' with `there is only a science of that which is repeated'. Repetition and resemblance are different in kind – extremely so.

In this book, Deleuze criticizes the process of creation of scientific notions which are believed to have generality. Usually, one believes that a general notion emerges from repeatable (or reproducible) phenomena. However, he points out a fundamental problem in this assumption. Aiming at interpreting his idea, compose a short essay by answering the questions given below.

1) In physics, repeatability is invoked to *define* a phenomenon. For example, falling of material is repeatable (as Galileo did experiment) when it is reduced into the mutual interaction between a material and the earth, and such motion is defined as falling in physics. Give an example (not necessarily in physics) of such "defined phenomena", and clarify the condition enabling the definition.

2) The "science of repeatable phenomena" collapses when the validity of the definition based on its repeatability is lost. For example, life is a dynamical process that varies unlimitedly through interactions with environment, and hence its repeatable aspects fall short of shedding light on the total image. Concerning the example that you gave in the previous question, discuss the circumstance that violates the applicability of the scientific notion.

3) Using the example that you gave in the previous question, discuss what consideration is needed to extend the scope of science or technology toward the realm of non-repeatable phenomena. Also, consider what generality means.

Remark: (1) This examination is not intended to ask about only knowledge, but is to evaluate the abilities of logical consideration and description, as well as originality. (2) Make the sources clear when you cite references.