

系所組別：地球科學系 甲、乙組

考試科目：科學英文

考試日期：0226、節次：1

## 1. Comprehension : (50%)

The following paragraphs were extracts from Wikipedia, the free encyclopedia:

- (1) Forensic Science: ( [http://en.wikipedia.org/wiki/Forensic\\_science](http://en.wikipedia.org/wiki/Forensic_science) ) and ( [http://en.wikipedia.org/wiki/Forensic\\_geology](http://en.wikipedia.org/wiki/Forensic_geology) )  
(2) Submarine Groundwater Discharge: ( <http://walrus.wr.usgs.gov/sgd/> )

### (1) Forensic Science : (25%)

**Forensic Science** (often shortened to **forensics**) is the application of a broad spectrum of sciences to answer questions of interest to a legal system. This may be in relation to a crime or a civil action. The word *forensic* comes from the Latin *forēnsis*, meaning "of or before the forum" In Roman times, a criminal charge meant presenting the case before a group of public individuals in the forum. Both the person accused of the crime and the accuser would give speeches based on their sides of the story. The individual with the best argument and delivery would determine the outcome of the case. This origin is the source of the two modern usages of the word *forensic* – as a form of legal evidence and as a category of public presentation. In modern use, the term "forensics" in the place of "forensic science" can be considered correct as the term "forensic" is effectively a synonym for "legal" or "related to courts". However the term is now so closely associated with the scientific field that many dictionaries include the meaning that equates the word "forensics" with "forensic science".

**Forensic Geology** is the study of evidence relating to minerals, soil, petroleum, and other materials found in the Earth used to answer questions raised by the legal system. Ray Murray first encountered forensic geology in 1973 when he was teaching geology at Rutgers University. An agent from the Bureau of Alcohol, Tobacco and Firearms walked into Murray's office with a bag of dirt, looking for answers. Since then, Murray has worked as a forensic geologist and, with then fellow Rutgers professor John Tedrow, in 1975 published the first textbook on the science, Forensic Geology.

Murray served as vice president and professor of geology at the University of Montana from 1977 to 1996 and continues to work in forensic geology. His latest book "Evidence from the Earth--forensic geology and criminal investigation" has been published by Mountain Press.

According to prospective Forensic Geologist, Ray Murray, Forensic Geology began with acclaimed Sherlock Holmes writer, Sir Arthur Conan Doyle. The character Sherlock Holmes claimed to be able to identify where an individual had been by various methods including his having memorized the exposed geology of London to such a degree that detecting certain clays on a person's shoe would give away a locale.

Please briefly answer the following questions : (5% each)

- Q1. What is the meaning of Forensics? What is the Forensic Geology?
- Q2. In a broad sense, what are the forensic geologists studying on?
- Q3. Who was the first man, in what year, and with what event to initiate the forensic geology?
- Q4. By whom and in what year that the forensic geology was first officially publicized?
- Q5. What works in the Earth Sciences can you imagine that can be related to the forensic science?

(背面仍有題目,請繼續作答)

**(2) Submarine Groundwater Discharge : (25%)**

**Submarine Groundwater Discharge (SGD)** is a ubiquitous coastal process that is driven by a composite of climatologic, hydrogeologic, and oceanographic processes. For example, terrestrial hydraulic gradients that reflect both short and long term climatic conditions almost always transport both surface and ground water toward the coast. In coastal waters, physical oceanographic processes such as wave set-up, tidal pumping, and density-driven circulation impact these hydraulic gradients and thus affect rates of submarine groundwater discharge. Although only fresh groundwater discharge has traditionally been accounted for in numerical simulations of coastal water budgets, the discharge of re-circulated saline groundwater may be equally or even more important in terms of material transport (for example, nutrients, metals, organics) across land/sea margins. For the purposes of this site, we therefore define SGD to consist either of fresh groundwater, re-circulated seawater, or a composite therefore, and will evaluate and present SGD in terms of a vector for nutrient delivery to coastal waters.

Until the mid-1990s, studies on SGD did not receive widespread attentions, because it was generally thought that SGD rates were not large enough to be a direct influence on ocean water budgets. This omission may in part be due to the inherent difficulty in identifying sites and quantifying rates of SGD, because most SGD occurs as diffusive flow, rather than discrete spring flow. This is in sharp contrast to studies of river discharge or river chemistry, which are obviously more easily sampled and quantified. However, there is a growing recognition that the submarine discharge of fresh, brackish, and marine ground water into coastal oceans is just as important as river discharge in some areas of the coastal ocean. This site will thus review the progress made in SGD science (with particular emphasis on new applications of geochemical tracers and novel geophysical tools), provide links to many SGD projects and study sites, and present an inclusive list of relevant publications. The eventual goal of our SGD science is to develop some forecasting or predictive capability based on being able to de-couple climatic and seasonal signatures from SGD rates.

**Please briefly answer the following questions : (5% each)**

- Q1. What is the specific meaning of SGD?
- Q2. In a broad sense, what processes are involved in SGD?
- Q3. Why the re-circulated saline water may be more important in a coastal water budget simulation?
- Q4. Why it not until mid-1990s, studies on SGD did not receive widespread attentions?
- Q5. In a broad sense, what and how is the eventual goal for SGD study?

## 2. Translation : (20%)

(1) Please translate the following Chinese idiom into English : (10%)

「明天復明日，明日何其多。我生待明日，萬事成蹉跎。」

(2) Please translate the following two sentences : (10%)

(a) 「危機」也是一種「轉機」 (5%)

(b) Great people talk about ideas, average people talk about things, and small people talk about wines. (5%)

## 3. Composition : (30%)

In your own idea of disaster, please write in English a short paragraph to define, describe, solve, and comment on :

“The Prevention, Mitigation, and Remediation on (name your own idea of disaster, e.g., Tsunami or Landslide) Disaster”