外国語科目（英語）　　２１・０２　大博

物質科学創造専攻
物質電子化学専攻
材料物理科学専攻

English Examination

Time: 11:00 – 12:00

Instructions

1. Please confirm that there are **three** answer sheets to be filled in.
2. Please write your **application number** on **each** of the three answer sheets.
3. Please answer each problem (**in English**) on a **separate** answer sheet on which you must write clearly the **problem number** (I, II or III).

Problem I

Read the following text and answer the questions.

Although the sub-prime loan crisis clearly showed reasons for concern in 2008, the real news at the beginning of last year was a dramatic surge in oil prices from about $90 a barrel to almost $150. Suddenly, we had a good preview of how life is going to be if oil reserves are depleted.

In mid-September, however, these problems suddenly seemed not so important. What was largely considered a problem confined to the banking sector and housing market turned into a perfect storm when one of Wall Street's big companies, Lehman Brothers, was found to be in trouble and the US government refused to help them. Fearing that others would also fail, banks became suspicious of each other. The entire inter-bank trading system collapsed and complete meltdown was only prevented by a $700 billion rescue package.

Unfortunately, the problems in the financial markets meant that 'real economy', which was already heading for a slowdown, was affected badly. Therefore, there are now plans for a rescue package for the economy as a whole, which may well reach another $700 billion. The recession(1) is widely expected to last all of next year.

Unfortunately, the consequences of the recession on scientific research might be serious. However, we cannot afford reductions in fundamental research or to be complacent(2) on issues such as the energy crisis. The lesson from the recent financial meltdown seems straightforward. If we do not understand the risks we are exposed to and cover ourselves against them, the long-term implications might be severe. The gamble we are taking with our planet is painfully clear. Take the energy crisis as an example. The high oil prices in the first half of 2008 illustrate what happens if we cannot rid ourselves of our addiction to it. Sadly, the response remains terribly inadequate. According to the International Energy Association's *World Energy Outlook* published in November 2008, output in clean, renewable energies still accounts for only 15% of global demand. Worse, the study also emphasizes that if we do not act, temperatures may soar(3) by a staggering(4) 6 °C by the end of the century.

Even though public budgets are badly trained, it is clear that we have to take a long-term approach and cannot afford to reduce our spending on fundamental research. Budget cuts and hiring freezes are anything but a solution. We must equip our academic system with sufficient funds to push ahead fundamental research in areas such as clean energy technologies. To put the financial effort that would be required into perspective(5), compared with the $700 billion rescue package for the banks, the US Department of Energy's Office of Science budget for 2008 was only $4 billion, and that of the US National Science Foundation about $6.5 billion. Relative to the bank rescue, not much would be needed to address (a)these urgent issues we will all face in the long term.

The energy crisis and global warming may not seem to impact our life as much as the economic crisis. But if we don't act now, we might soon be in a situation where significant costs and serious implications await us.

A modified extract from "Innovation, innovation, innovation" in *Nature Materials*, 8, 1 (2009)

(1) recession: an economic slow-down
(2) complacent: ignorant
(3) soar: rise
(4) staggering: surprising
(5) perspective: outlook

Questions

I-1 Answer the following questions by less than 20 words.
(i) List at least two major situations which gave serious economic impact during a year of 2008.
(ii) Is $ 700 billion sufficient as a rescue package? Answer with reasons.
(iii) What are (a)these urgent issues we will all face in the long term?

I-2 Indicate whether the following claims agree(A) or disagree(D) to the text.
(i) Since the recent financial crisis caused shrinkage of economic activities, we should stop basic researches for clean energy technology to save the limited budget.
(ii) Economic issues should be prior to anything because their impact to our life is very large.
(iii) The financial crisis teaches us about the consequences of ignoring risks. We cannot afford to repeat the same mistakes for the continuing crises in energy and climate.
(iv) One of the current problems in funding is the too much budget being invested to the basic researches related to the planet's future.
(v) Investments in science and technology for cleaner forms of energy can help us overcome the present multiple man-made crises.

Problem II

Questions

II-1 In each of the following six sentences there are five choices provided in the parentheses. Select one word each, which makes the best sense.

(1) I cannot believe your conclusion unless you show me (argumentatively / sample / proof / reasonable / test).

(2) It is the (able / behave / effect / instinctive / nature) of a cat to hunt small animals.

(3) She left the Suzukakedai campus at 3 p.m. So, we (accept / except / expect / expense / export) her here at 4 p.m.

(4) The telephone was (build / discovering / construct / invented / synthesize) in 1876 by Graham Bell.

(5) To (quality / quantify / qualify / transmit / transform) as a doctor of engineering, you must study for three years and pass several examinations.

(6) When the lake is clear you can see the mountain (illuminating / looking / photographed / reflected / watching) in it.

II-2 Make the following sentences logical and grammatically correct by putting all the words in the parentheses into the correct order.

(1) (keeps / day / apple / an / a) a doctor away.

(2) I look forward (with / to / meeting / having / a) you next Monday.

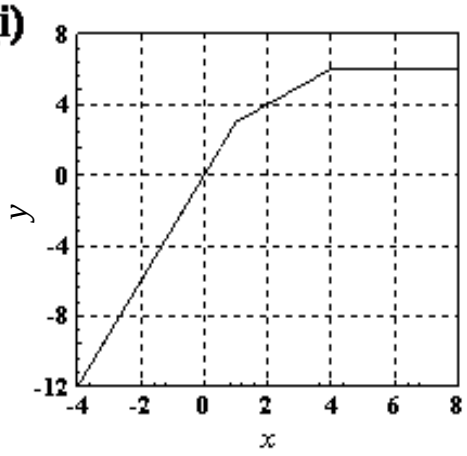
(3) I will support him (what / says / no / matter / anyone).

(4) The number of electrons in sulfur (twice / that / than / larger / is) in oxygen.

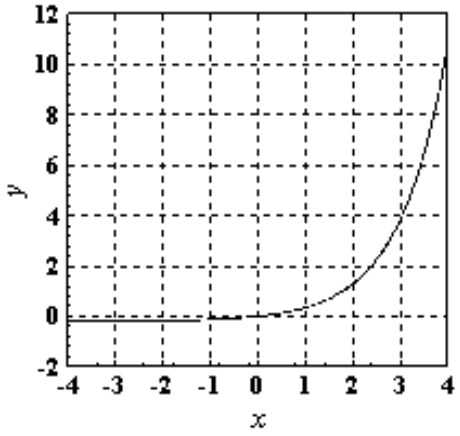
Problem III

Describe, in English, the characteristic features (shapes, structures) of graphs **(i)** – **(iv)** separately. Each answer should be composed of at least eight words. The mathematical functions of ‘log *y*’ and ‘1 / *x*’ should be expressed by words.

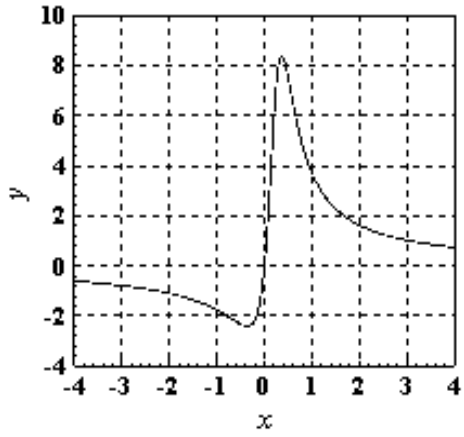
(i)



(ii)



(iii)



(iv)