

外国語科目

19 大修

(材料物理学専攻・物質電子化学専攻・物質科学創造専攻)

English Examination

Time: 14:00 - 15:00

Instructions:

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

Problem I

Read the following text and answer Questions, I-1, I-2 and I-3.

Artificial grass has long been viewed as a poor substitute for the real thing. But synthetic turf⁽¹⁾ may finally be set to take root in professional soccer, and officials may even consider the possibility of using it for the next World Cup in 2010.

Artificial grass has come a long way since its invention in the 1960s and its debut in professional-level sport at the Astrodome in Houston, Texas, where it was dubbed "Astroturf". Now, instead of the woven nylon rugs, artificial grass has taken on the look and feel of real grass. And leading soccer organizations such as the International Federation of Association Football (FIFA) and the Union of European Football Association (UEFA) are giving it a second look, after several widely derided⁽²⁾ attempts to introduce it into the game in the 1980s. "Artificial turf was once considered glorified carpet laid over concrete," says Michael Meyers, director of the Human Performance Research Laboratory at West Texas A&M University in Canyon. But he claims that the latest generation of artificial turf is "equal to or better than grass".

These synthetic turfs consist of plastic strands⁽³⁾ that are inserted as tufts into artificial "soil" made up of sand and rubber pellets. In some versions, the strands are reinforced by plastic coils. There are so many kinds of artificial turf that Meyers says it's like "trying to compare Ford to Chevy, they're similar but dissimilar". And with the price of a new pitch coming in at up to US\$1 million, the latest imitation grass is not cheap. But its creators say that after a couple of years it pays for itself, as there is little maintenance involved compared with natural grass, which requires a talented groundskeeper.

Grassed up

Artificial grass was first created for use in environments that do not favour natural grass, such as indoor stadiums, or cold or dry regions. But the first generation of artificial turf, trialled⁽⁴⁾ by several British football clubs in the 1980s, was not well received by soccer players or fans. The ball's amazingly high bounce was a constant source of frustration for players. Injuries also worsened, and players suffered rug burns and stubbed feet, known as "turf toe". "The key with artificial turf when you match it to soccer is that it's got to fit the way the game is played," argues John Baize, managing director of the artificial-grass company Global Sports Systems, based in Texas. "We designed the system around the sport."

With a lot of biomechanical testing, Baize's and other artificial-turf companies have made the grass taller to allow the ball to roll, and added sand and rubber for better shock absorbency and player manoeuvrability⁽⁵⁾ around the field. Injuries and abrasions have also been reduced by the newer and softer generation of artificial grass. In 2004, Meyers discovered that rates of serious injuries among professional American football players had been reduced since the advent of the new turfs.

UEFA and FIFA are impressed with the improvements, and the former has already certified some artificial grass strains for use. In 2001, FIFA produced a set of laboratory standards for artificial-grass companies to follow. The agency ruled in 2003 that artificial turf could be used for its matches, and it was played on that same year at the under-17 world championship in Finland's Töölö stadium, and again at the 2005 under-17 championship in Peru.

At the moment, all World Cup games are played on natural grass, and purists couldn't imagine it any other way. But at the 2010 World Cup in South Africa, artificial grass may in fact look greener.

(<http://www.nature.com/news/2006/060605/full/060605-15.html>)

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- | | |
|------------------------------|---|
| (1) <i>turf</i> : | an artificial substitute for such a grassy layer, as on a playing field |
| (2) <i>deride</i> : | to laugh at someone or something in a way which shows you think they are ridiculous or of no value |
| (3) <i>strand</i> : | a complex of fibers or filaments that have been twisted together to form a cable, rope, thread, or yarn |
| (4) <i>trialled</i> : | tested |
| (5) <i>manoeuvrability</i> : | capability to move in a desired manner |
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Questions

I-1. Indicate whether the following claims are true (T) or false (F).

- (a) UEFA means the United and European Football Association.
- (b) Latest artificial grass is expensive, but its creators say that it pays for itself after a couple of years.
- (c) The artificial grass was utilized at the World Cup in 2006.
- (d) Artificial grass was invented in the 1980s.
- (e) The artificial grass was utilized at the under-17 world championship held in 2003.

I-2. Why was not the first generation of artificial grass received well by football players and fans? Give your answer by writing two or three short but complete sentences in English.

I-3. Of what does the latest version of the artificial grass consist? All the constituents described in the text should be shown. Give your answer by writing two or three short but complete sentences in English.

Problem II

Question II-1

The following letter of recommendation was written by a professor of this university. Select at every bracket, [], one out of the given choices (see beneath the letter text) such that the resultant sentences are logical and grammatically correct.

[1]
CONFIDENTIAL
Dear Professor <i>A</i> ,
<u>Re: National Research Training Fellowship</u>
<p>I would like to strongly support Dr. Hanako Nagatsuta in her application for the [2] Research Training Fellowship. I have known Dr. Nagatsuta since she entered [3] as a graduate student in 1999. She created a very favourable impression when she spent two months with us for a joint research program related to novel n-type semiconductor films. She showed [4] aptitude for research and has become an expert in electron microscopy. Dr. Nagatsuta is an exceptionally gifted young woman. Comparing her [5] other graduates during my 25 years of teaching, [6].</p> <p>In March 2004 [7] for her work supervised by Professor <i>B</i>. Since then, she has been working on semiconductor films as a postdoctoral researcher in the same laboratory. She works hard and has proved to be an efficient experimentalist, designing and executing experiments which have given informative results.</p> <p>I have no hesitation in recommending Dr. Nagatsuta for a National Research Training Fellowship.</p> <p style="text-align: right;">[8], Taro Suzukake, Professor, [3]</p>

[1] 2006 16 August; August 16, 2006; August 2006 16; 2006 August 16; 16 August, 2006

[2] mentioning; mentioning above; above mentioned; mentioned above

[3] to Tokyo Institution Technology; to Tokyo Institute of Technology; the Tokyo Institution of Technology; Tokyo Institution Technology; Tokyo Institute of Technology

[4] pretty; very; considerable; quite; significantly

[5] in; of; at; with; on

[6] she must be one of the best graduates; she is one of the best graduates; she is regarded as one of the best graduates; she became one of the best graduates

[7] she was given to the degree of PhD; she was given the degree of PhD; the degree of PhD was given with her; the degree of PhD was gotten to her; she was gotten the degree of PhD

[8] Cheerful!; With the best wish; Sincerely yours; Adios; Good-by

Question II-2

Correct one mistake in each of the following sentences, and rewrite the corrected sentences in full.

- (1) This reaction can be assumed to the formation of a complex ion.
- (2) We have devised a simple technique which allows measurement of the reaction rates of good precision.
- (3) The third section of the report explains that how students can benefit from using a computer.
- (4) Talking on a cellular phone while you are driving often dangerous.

Problem III

“Fullerenes” are large molecules composed entirely of carbon, in the form of a hollow sphere, *e.g.* the most symmetric fullerene molecule C_{60} (Fig.1), ellipsoid, or tube. They are somewhat similar in structure to graphite (Fig. 2) that is the most common allotrope of carbon. Referring to the figures given below, describe the structure of C_{60} fullerene molecule in comparison with the crystal structure of graphite. Your answer (written in English) should be composed of at least four complete sentences. (Please note that scientific accuracy is less essential than the general fluency and the grammatical correctness of your description.)

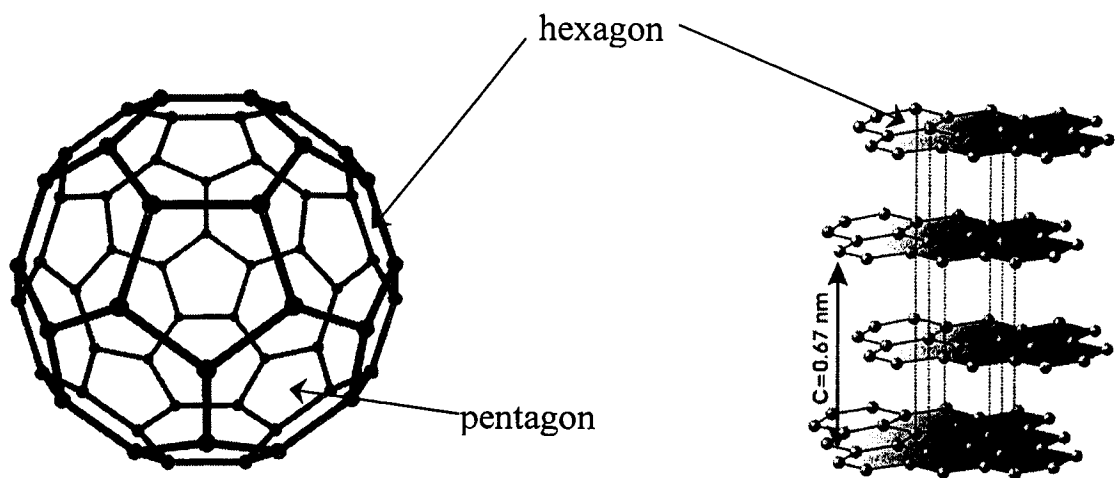


Fig. 1 C_{60} fullerene

Fig. 2 Graphite

Glossary:

hollow: having a cavity or space within

e.g.: for example

ellipsoid: a geometric surface whose plane sections are all either ellipses or circles

allotrope: one of the different forms that a pure element can take