Preface

The aim of this book is to assist students who will go on to study a technical course in English medium or mixed medium. The main focus of the book is on developing reading and listening skills. However, since a broad vocabulary has been found to be the best indicator of success in reading and listening, each unit also sets out to build the basic vocabulary of the unit theme. By the end of the course, therefore, students will have been introduced to a minimum of 500 basic words in technical English. In addition, key grammar and structure points are highlighted where they affect the comprehension of reading or listening texts.

The book follows a standard format with minor variations in exercise type in each section. It is possible to exploit many of the activities in different ways. For example, students can complete a task alone and then check it in pairs. Or they can complete the task in pairs. Or the teacher can go through the task with the whole class, pens down, after which the students complete the task, alone or in pairs.

Section 1 Vocabulary

Activity A is an explanatory text of the key concepts in the unit theme with a supporting diagram. Key words in the theme are highlighted. Students can read the text and look at the diagram, then try to reproduce the diagram from the text. Or the teacher can read the text, stopping at the key words, and students try to remember the key words.

Activity B (and sometimes C) contains exercises, often with visual support.

Section 2 Reading

Activity A contains a reading text on the unit theme from various genres — instruction manuals, science textbooks, reports — with multiple choice questions.

Activity B contains grammar examples and *Activity C* contains exercises which practice the grammar or structure points in the examples.

Section 3 Listening

Activity A is a reading text with gaps. The text summarizes the content of the reading text in Section 2.

Activity B contains a listening passage with multiple choice or other types of comprehension activity. Some units contain *Activity C*. Students listen to the passage in Activity B again, and then do a comprehension activity such as completing a summary, filling in a table, or labeling a diagram.

はしがき

「グローバルコミュニケーションの時代が到来！」といわれ始めたのは，20世紀の終わり頃からでした．しかし当時はことばが先行していて，このことを意識していた人は少なかったようです．人びとが本当の意味でのグローバルコミュニケーションを実感しているのは，まさに21世紀の現在といえるでしょう．そしてこれに使われる言語，すなわち，グローバルランゲージとして，英語は今まで以上にその必要性を高めています．実際，英語後進国の日本においても，従来の教養としての "everyday English" から，実用に沿った "practical English" の習得に視点が大幅に移ってきました．巷の『TOEICブーム』などはその最たる表れでしょう．しかしこの『実用英語』とは，文字通り，実用の場面や用途に応じて使うための英語ですから，ビジネスの中で使われるもの，アカデミックな状況で使われるもの，あるいは，プライベートの色彩が強いものまで，その種類は千差万別です．そのため，"English for Specific Purposes（ESP）" という捉え方で英語に接していく必要がでてきました．すなわち，単に『実用英語』を勉強するではなく，各自の置かれている環境で要求される「特定の目的のために用意された英語」，つまり，ESPを身につけなければならないのです．

特にこのESPを強く意識する必要があるのが理工系の分野でしょう．専門書や論文の講読・作成，学会や研究会の出席・発表など，さまざまな専門の場面で英語を使うことが常識だからです．そしてそこで使われる英語は，ESPの中でも "Technical English" と呼ばれるもので，理工系の人たちすべてのまさに必需品です．"Technical English" の特徴は，①客観的で明確な専門用語を中心に，②簡潔で平易な構文を用い，そして，③論理的で事実に基づく内容を展開する，というもので，時空を超えたグローバルなコミュニケーションがことさら要求される分野ならではのものとなっています．

本書は，この "Technical English" の入門書です．日本の理工系の大学や学部で，専門に直結する実用の英語力を習得するためのテキストです．その内容構成は，高校の理数系コースで学習する基礎的な項目を中心に，最新のテーマに触れながら，「情報の正確な入力」，すなわち，文字情報および音声情報を正しく理解することを目的とした説明や問題が織り込まれています．具体的には，上級学年になってゼミに配属されたり卒論に着手する際に，専門書や関連論文を英語で読んだり，さらには，専門分野の講演や学会発表を聴講できるような下地を作ることを目標に，Vocabulary，Reading，Listening という3つのセクションからなるユニットを合計で21用意しました．特にVocabularyは，単に語句を与えて形だけを対応させるのではなく，その中身とリンクさせるために，各用語を定義形式で説明してあります．これにより，理数系の基本事項のおさらいができ，実体の伴った内容理解が可能となります．また，『豆知識』として内容の補足をしてあるところもありますので，ここも是非ともお読み下さい．

本書を作成するにあたっては，理工系の大学や学部の現実のニーズをできる限り踏まえ，『ツール』としての英語力の習得を念頭に置いてきました．そのため，トレーニング性を重視し，細心の注意を払いながら，全体としてはシンプルでわかりやすい構成になるように努めました．しかし，何せ微力の致すところ，大方のご批判をいただければ幸いです．尚，本書の作成のすべての段階で，成美堂社長の佐野氏および同社の小林氏の両名には大変お世話になりました．この場をお借りして，心より感謝の意を表明したいと思います．

Integrated Technical English
Contents

Numbers

「整数」や「分数」をはじめ数に関する基本的な語句を学びます．数の基礎概念をしっかりと理解した上で，各語句を正確に身につけていって下さい．尚，整数とは，自然数（1，2，3，...）に0と負号（−）をつけた自然数を合わせた数の総称です．
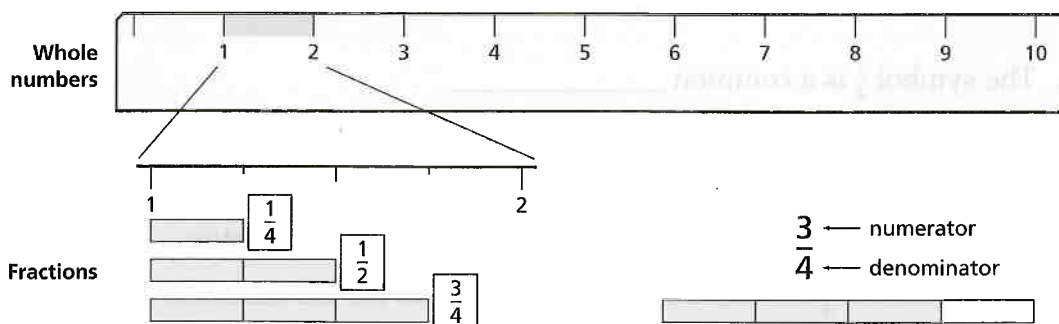
Section 1 Vocabulary

A. Read the text and look at the diagram.

In most technical subjects, like engineering, mathematics is very important. Mathematics is the study of numbers and spaces. In this unit we look at numbers. We look at spaces in Unit 5.

There are two main kinds of numbers — **whole numbers** and **fractions**. Whole numbers are numbers like 1, 2, 3. We can also write whole numbers as **decimals**; for example, 1.0, 2.0, 3.0.

Whole numbers

| 1 2 3 4 5 6 7 8 9 10 |

Fractions

1 $\frac{1}{4}$ $\frac{1}{2}$ 2 $\frac{3}{4}$

$\frac{3}{4}$ —— numerator
      —— denominator

Fractions are numbers *between* whole numbers; for example, the numbers between 1 and 2. We can express them as **common fractions**. With common fractions, we have a number, then a line, then another number, like $\frac{1}{4}$ (a quarter), $\frac{1}{2}$ (a half), $\frac{3}{4}$ (three-quarters). The number below the line is called the **denominator**. It shows how many pieces we are dividing the whole number into. The number above the line is called the **numerator**. It shows how many pieces of the denominator we have taken.

We can also express fractions as **decimals**. Decimals are based on the idea that the whole number 1 (one) can be divided into tenths, hundredths, etc. If we use hundredths (100 parts), $\frac{1}{4}$ will be 25 of these parts. We write it as 0.25 and say *zero point two five*. Note that we don't say, for example, *twenty-five* after a decimal point.

Fractions can also be **percentages**. Percentages are also based on 100 but in this case we say $\frac{1}{4}$ is the same as 25 out of 100, or 25%. If you look closely, the % symbol for percentage looks like 100, written in a strange way.

B. **Look at the table. Complete each sentence with a suitable word or number.**

Common fractions	Decimal fractions	Percentages	Words
$\frac{1}{4}$	0.25	25%	a quarter
$\frac{1}{2}$	0.50	50%	a half
$\frac{1}{3}$	0.333	33.3%	a third
$\frac{3}{4}$	0.75	75%	three-quarters
$\frac{2}{3}$	0.666	66.7%	two-thirds
$\frac{1}{5}$	0.20	20%	a fifth
$\frac{1}{10}$	0.10	10%	a tenth
$\frac{2}{5}$	0.40	40%	two-fifths
$\frac{1}{20}$	0.05	5%	a twentieth

1. The symbol $\frac{3}{4}$ is a common _____.

2. 0.25 is a _____ fraction.

3. The symbol % means _____.

4. In the fraction $\frac{1}{2}$ the number _____ is the numerator.

5. In the fraction $\frac{1}{4}$ the number _____ is the denominator.

6. The word for the fraction $\frac{1}{3}$ is "a _____."

7. The common fraction $\frac{1}{5}$ is the same as _____%.

8. The decimal fraction 0.10 is the same as the common fraction _____.

Section 2 Reading

1-03

1   How do you say these numbers: 10, 11? What about when they are part of a date: 10/11/2003?

In American English we can say *ten eleven* in both cases, but we can also say the date as *October eleventh* because we are thinking of the days in order. When
5 we put things in order, we use special number words in English called ordinals.

Most ordinals are almost the same words as the cardinal numbers. We just add *th* to the cardinal number to make the ordinal. For example, *four* becomes *fourth*, *six* becomes *sixth*.

10   However, there are a few spelling changes. Be careful with *five*, which becomes *fifth*. Don't forget that *eight* only has one *t* in the ordinal form (*eighth*). *Nine* loses an *e* (*ninth*). Remember also that numbers ending in *y* lose the *y* and add *ieth* (*twenty — twentieth*).

15   When we write the date in American English, we don't use any special symbol. So we write, for example, *October 11*. But in mathematics there is a special symbol for an ordinal number. We use the extra *th*; for example, 5th. In printing, *th* is often written as two very small letters above the line; for example, 5th.

20   Be careful with the first three ordinal numbers. They are different words from the cardinals. *One, two, three* become *first, second, third*. Like other ordinal numbers, we use the last two letters of the ordinal words in the symbols, so we get *1st, 2nd* and *3rd* or, in printing, 1st, 2nd and 3rd.

A. **Choose the best answer in each case.**

1. In American English we can say the date 10/11 as:
   a. tenth of eleventh
   b. October eleventh
   c. the ten of the eleven
   d. tenth of eleven

2. Numbers like fourth, fifth and sixth are called:
   a. simple numbers
   b. ordinals
   c. cardinals
   d. ordinary

3. To change thirty into an ordinal number:
   a. add *th*
   b. remove the *y* and add *th*

   c. remove the *y* and add *ith*
   d. remove the *y* and add *ieth*

4. The symbol for ordinals uses:
   a. the last letter of the ordinal word
   b. the last two letters of the ordinal word
   c. the first letter of the ordinal word
   d. the first and last letter of the ordinal word

5. The ordinal 2nd in dates is:
   a. the two
   b. the twoth
   c. seconds
   d. second

B. **Write the dates of these festivals as words. Say the dates.**

1. The Snow Festival, Sapporo, Feb 5–11 ___February fifth through eleventh___

2. Hina Matsuri, Tokyo, Mar 3 _____

3. Gion Festival, Kyoto, Jul 17 _____

4. Nebuta, Aomori, Aug 3 to 5 _____

5. Nada Fighting Festival, Hyogo, Oct 14 _____

6. Chichibu Night Festival, Saitama, Dec 2 and 3 _____

○CD
1-04

Section 3 *Listening*

A. **Listen and complete the summary of the reading text in Section 2. Write one word in each space.**

There are two kinds of numbers: simple numbers, or cardinals, and

_____. We use ordinal numbers when we talk about the _____

of things. We also use them in _____ like *October eleventh*. Ordinals

are normally the _____ number plus *th*; for example, *six — sixth*.

However, the cardinal numbers *one, two* and *three* have special ordinal words:

first, second and _____.

○CD
1-05, 06

B. **Listen and label the abacus. Use the words and phrases in the box.**

rod / bead / tens column / units column / hundreds column

1. _____
2. _____
3. _____
4. _____
5. _____

○CD
1-07, 06
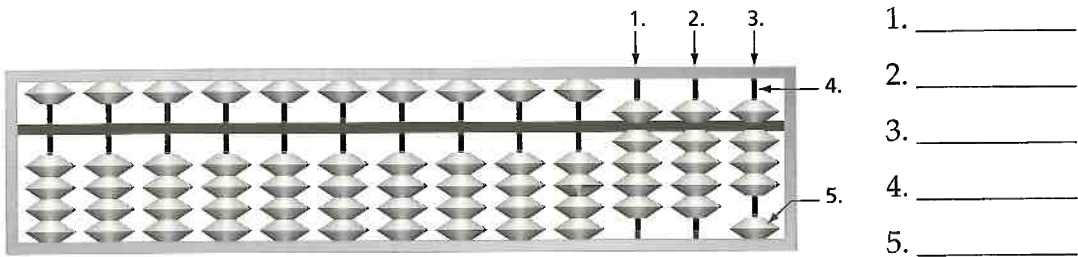
C. **Listen again and complete the summary. Write one word in each space.**

A soroban is called an _____ in the West. The Japanese abacus usually

has more than _____ rods. On each rod there are five _____.

The _____ rod on the right is the units column; each bead in the

bottom part represents _____. The second rod from the right is

the _____ column; each bead in the bottom part represents 10.

The _____ rod from the right is the _____ column.

豆知識

数 (number) の種類には，自然界に存在する 1, 2, 3 といった「自然数 (natural number)」に始まって，上記の「整数 (whole number)」，2 つの整数の比で表される「有理数 (rational number)」，2 つの整数の比で表せない「無理数 (irrational number)」，有理数と無理数を合わせた「実数 (real number)」，実数の範囲では扱えない事象を説明するために導入された「虚数 (imaginary number)」，そして実数と虚数を合わせた「複素数 (complex number)」がある.