全国高等职业教育机电类“十二五”规划教材

JIDIANLEI ZHUANYE YINGYU

机电类专业英语

秦 相 李 明 主编

黄河水利出版社

全国高等职业教育机电类“十二五”规划教材

机电类专业英语

主　编　秦　相　李　明
副主编　宋　娟　冯宜丽

黄河水利出版社
·郑州·

内 容 提 要

本书是全国高等职业教育机电类“十二五”规划教材。本教材内容丰富，可分为三大部分：机械、机电和电子通信。全书共20单元，内容包括机械的基本概念、金属的分类、材料的特性、铸造、尺寸公差、计算机辅助设计、柔性制造、传感器的应用、信源编码与解码、可编程序逻辑控制器、伺服电机、电阻电容及电感器、三级真空管、数字电路、模拟电路、线性电路分析、常用电子测量工具、移动通信、网络电话技术、光纤通信。每个单元均设置了相关的习题，以巩固学生所学的知识。

本教材适合机电类专业的高职高专学生使用，同时也适用于计算机、自动化等相关专业的技术人员和本科学生自学与参考。

图书在版编目(CIP)数据

机电类专业英语/秦相，李明主编. —郑州：黄河水利出版社，2012.1

全国高等职业教育机电类“十二五”规划教材

ISBN 978-7-5509-0029-5

Ⅰ.①机… Ⅱ.①秦… ②李… Ⅲ.①机电工程-英语-高等职业教育-教材 Ⅳ.①H31

中国版本图书馆CIP数据核字(2011)第263119号

策划编辑：贾会珍 电话：0371-66028027 E-mail：xiaojia619@126.com

出 版 社：黄河水利出版社

地址：河南省郑州市顺河路黄委会综合楼14层 邮政编码：450003

发行单位：黄河水利出版社

发行部电话：0371-66026940、66020550、66028024、66022620(传真)

E-mail：hhslcbs@126.com

承印单位：黄河水利委员会印刷厂

开本：787 mm×1 092 mm 1/16

印张：11.25

字数：274千字 印数：1—4100

版次：2012年1月第1版 印次：2012年1月第1次印刷

定价：25.00元

前　言

随着我国经济建设的迅猛发展，对机电类专业人才的需求一直在持续增长。面对企业和市场对人才的需求，高职院校需不断调整人才培养方案，使得毕业生能够满足社会的需求，从而顺利就业。专业英语是高职英语教学的重要组成部分，是使学生从基础英语学习过渡到工程实际应用的有效途径。本书是综合考虑了学生就业方式多样化等多种因素，从高职教育的实际出发，结合专业英语的教学实践编写而成的。首先使专业英语教材具有良好的通用性，其次具有较强的实用性、实践性和前瞻性，从机电专业基础知识出发，由浅入深，由简到繁，循序渐进，以满足高职院校机电类专业的专业英语教学需求。

在教材编写过程中，我们查阅了大量的机电类的英语原版书籍，参考了大量的讲座和论文。因此，通过本教材的学习，读者会从英语角度获得较基础的、广泛的专业知识，掌握较多的、使用频率较高的专业英语词汇，从而具有从英语原文资料获得信息的能力。

本教材共20个单元，对机械、机电和电子通信专业的基础知识进行了概括性的介绍，如机械的基本概念、金属的分类、机电类的传感器、伺服电机、电子通信类的移动通信等。每篇文章后皆给出文章中的生词、词组及专业词组，并对文中的疑难句子给出注释或者参考翻译。文章后还附带习题。课文注释主要侧重讲解课文中英语语言难点和专业知识难点。练习题是针对课文的内容进行相应的训练，以便加深对课文的掌握。全书选材广泛，语言规范，难度适中。

本教材适合机电类专业的高职高专学生使用，也适用于计算机、自动化等相关专业的技术人员和本科学生参考学习，还可作为相关技术人员和管理人员教学、培训和自学使用。

本教材由河南机电高等专科学校的部分老师承担编写任务。其中，秦相老师、李明老师（电子系）任主编，宋娟老师和冯宜丽老师任副主编。本书编写人员及编写分工如下：段珂老师编写1～3单元，冯宜丽和申磊老师合编第4单元，鲁兴冉老师编写第5～6单元，孙丽梅老师编写第7～8单元，柴玉洁老师编写第9单元，申磊老师编写第10单元，张利老师编写第11单元，史兆强老师编写第12～13单元，李明老师编写第14单元，李靖老师编写第15～16单元，宋娟老师编写第17单元，秦相老师编写18～20单元。冯宜丽老师负责校稿工作。

本教材编写过程中的主要参考书目、讲座和论文列在本书的最后，它们对本书的完成提供了很重要的帮助。在此，编者对其作者表示诚挚的感谢和敬意。

由于编者的水平和编写时间有限，书中难免出现一些错误和不足，恳请专家和读者批评指正。

编　者

2011年5月

目　录

Unit 1 Basic Concepts in Mechanics

Text

Introduction

In original sense, mechanics refers to the study of the behavior of systems under the action of forces. Statics deals with cases where the forces either produce no motion or the motion is not of interest. Dynamics deals properly with motions under forces. Mechanics is subdivided according to the types of systems and phenomena involved.

An important distinction is based on the size of the system. Those systems are large enough and can be adequately described by the Newtonian law of classical mechanics. In this category, for example, are celestial mechanics, the study of the motions of planets, stars, and other heavenly bodies, and fluid mechanics, which treats liquids and gases on a macroscopic scale. Fluid mechanics is a part of a larger field called continuum mechanics or (by some physicists) classical held theory, involving any essentially continuous distribution of matter, whether rigid, elastic, plastic, or fluid. On the other hand, the behavior of microscopic systems such as molecules, atoms, and nuclei can be interpreted only by the concepts and mathematical methods of quantum mechanics. From its inception, quantum mechanics had two apparently different mathematical forms: the wave mechanics of E. Schrodinger, which emphasizes the spatial probability distributions in the quantum states, and the matrix mechanics of W. Heisenberg, which emphasizes the transitions between states. These are now known to be equivalent.

Mechanics may also be classified as non-relativistic or relativistic mechanics, the latter applying to systems with material velocities comparable to the velocity of light. This distinction pertains to both classical and quantum mechanics.

Finally, statistical mechanics uses the methods of statistics for both classical and quantum systems containing very large numbers of similar subsystems to obtain their large scale properties.

Basic concepts in mechanics

Some of the terms used in our studies are defined below.

Force. Our earliest ideas concerning forces arose because of our desire to push, lift, or pull various objects. Therefore, force is the action of one body acting on another. Our intuitive concept of force includes such ideas as place of application, direction, magnitude, and these are called the characteristics of a force.

Matter. Matter is any material of substance. If it is completely enclosed, it is called a body.

Mass. Newton defined mass as the quantity of matter of a body as measured by its volume and density. This is not a very satisfactory definition because density is the mass of a unit volume. We can excuse Newton by surmising that he perhaps did not mean it to be a definition. Nevertheless, he recognized the fact that all bodies possess some inherent property that is different from weight. Thus, a moon rock has a certain constant amount of substance, even though its moon weight is different from its earth weight. This constant of substance, or quantity of matter, is called the mass of the rock.

Inertia. Inertia is the property of mass that causes it to resist any effort to change its motion.

Weight. Weight is the force of gravity acting upon a mass. The following quotation is pertinent:

The great advantage of SI units is that there is one, and only one unit for each physical quantity — the meter for length, the kilogram for mass, the Newton for force, the second for time, etc.. To be consistent with this unique feature, it follows that a given unit or word shouldn't be used as an accepted technical name for two physical quantities. However, for generations the term "weight" has been used in both technical and non-technical fields to mean either the force of gravity acting on a body or the mass of a body itself.

Particle. A particle is a body whose dimensions are so small that they may be neglected.

Rigid body. All bodies that are either elastic or plastic will be deformed if acted upon by forces. When the deformation of such bodies is small, they are frequently assumed to be rigid, i.e., incapable of deformation, in order to simplify the analysis.

Deformable body. The rigid-body assumption cannot be used when internal stresses and strains due to the applied forces are to be analyzed. Thus we consider the body to be capable of deforming. Such analysis is frequently called elastic-body analysis, using the additional assumption that the body remains elastic within the range of the applied forces.

New Words & Expressions

deformation [di:fɔ:'meiʃən]	n.	变形,形变
density ['densəti]	n.	密度
	n.	[数] 维;尺寸;次元;容积
dimension [di'menʃən;dai-]	adj.	规格的
	vt.	标出尺寸
dynamics [dai'næmiks]	n.	动力学
elastic [i'læstik]	adj.	弹性的,有弹力的

gravity ['grævіti]	n.	重力,地心引力;严重性;庄严
inception[in'sepʃən]	n.	开始
inertia[i'nə:ʃiə]	n.	惯性,惯量
intuitive [in'tju:itiv]	adj.	直觉的;凭直觉获知的
macroscopic[,mækrə'skɔpik]	adj.	宏观的
microscopic[,maikrə'skɔpik]	adj.	微观的
pertinent ['pə:tinənt]	adj.	相关的,相干的;中肯的;切题的
spatial['speiʃəl]	adj.	空间的
statics ['stætiks]	n.	静力学
statistics [stə'tistiks]	n.	统计学
velocity[vi'lɔsəti]	n.	速率;迅速;周转率

Phrases & Expressions

classical mechanics	经典力学
celestial mechanics	天体力学
heavenly body	天体
fluid mechanics	流体力学
quantum mechanics	量子力学
wave mechanics	波动力学
continuum mechanics	连续介质力学
relativistic mechanics	相对论力学
matrix mechanics	矩阵力学
statistical mechanics	统计力学
material velocity	实际速度
mating surface	啮合表面
sleeve bearing	套筒轴承

Notes

1. In this category, for example, are celestial mechanics, the study of the motions of planets, stars, and other heavenly bodies, and fluid mechanics, which treats liquids and gases on a macroscopic scale.

   译文:例如,天体力学与流体力学是属于这类,前者研究行星,星体和其他天体的运动,而后者在宏观尺度上研究液体与气体。

Exercises

Getting the Message

A Answer the following questions according to the text.

1. What does statics deal with?
2. What are the differences between classical mechanics and continuum mechanics?
3. What are the characteristics of a force?
4. What is the meaning of mass?
5. What is the meaning of weight?

B Mark the following statements with T (true) or F (false) according to the text.

1. ( ) The behavior of microscopic systems such as molecules, atoms, and nuclei can be interpreted only by the concepts and mathematical methods of quantum mechanics.
2. ( ) Wave mechanics is a part of a larger field called continuum mechanics classical held theory, involving any essentially continuous distribution of matter, whether rigid, elastic, plastic, or fluid.
3. ( ) The characteristics of a force include such ideas as place of application, direction, and magnitude.
4. ( ) Newton defined mass as the quality of matter of a body as measured by its volume and density.
5. ( ) A particle is a body whose dimensions are so large that they must not be neglected.

Translating

Translate the following sentences into Chinese.

1. The great advantage of SI units is that there is one, and only one unit for each physical quantity—the meter for length, the kilogram for mass, the Newton for force, the second for time, etc..

2. Globalization is also bringing about the integration of the internationally distributed facilities of a single company into a truly coherent global production resource. The commitment of the Ford Motor Company to this goal is a case.

_____

_____

_____

3. Vehicle type development will be divided by vehicle type (small cars and light trucks, mid-size cars, etc.), not by national or regional market.

_____

_____

Translation Skills

科技英语翻译的标准——准确规范、通顺易懂、简洁明晰(Ⅰ)

(一)准确规范

科技文献和情报技术资料的主要功能是论述科学事实、探讨科学问题、传授科学知识、记录科学实验、总结科学经验等,这就要求科技文献和情报技术资料的翻译标准首先必须是准确规范。所谓准确,就是忠实地、不折不扣地传达原文的全部信息内容。所谓规范,就是译文要符合所涉及的科学技术或某个专业领域的专业语言表达规范。要做到这一点,译者必须充分地理解原文所表达的内容,其中包括对原文词汇、语法、逻辑关系和科学内容的理解。科技翻译的任何错误、甚至是不准确都会给科学研究、学术交流、生产发展等带来不良影响或巨大损失,甚至是灾难。请比较下列句子:

(1) Velocity changes if either the speed or the direction changes.

译文:假如力的大小或方向改变了,速度跟着要变化。

结构分析:首先,将 speed 译成"力的大小",与原文差距太大。其次,没有把 either…or (两者居其一)的着重点译出。我们知道,在物理学中,速度和速率是两个不同的概念。速度(velocity)是矢量,有大小和方向;而速率(speed)是标量,有大小而没有方向。所以,此句应译为:

如果(物体运动的)速率和方向有一个发生变化,则(物体的)运动速度也随之发生变化。

(2) We shall mention here two temperature scales, namely, the Fahrenheit scale and the Centrigrade scale.

译文:这里我们将提及两种温度计:华氏表和摄氏表。

结构分析:根据专业词典,temperature scale 有固定的译法,译为温标,而不是温度计(thermometer)。所以,此句应译为:

这里我们将提及两种温标:华氏温标和摄氏温标。

(3) Oil and gas will continue to be our chief source of fuel.

译文:油和气体将继续是燃料的主要源泉。

结构分析:该译句使人怀疑是否一切油类和气体都可以作为“燃料的主要源泉”。事实上,在翻译科技英语时,要根据上下文将某些词的含义具体化和专业化。如果不注意这一翻译特点,只是按原文句子逐句译出,就会造成误解或歧义。这里的 oil 和 gas 不是泛指油类和气体,而是特指石油和天然气。另外,“燃料的……源泉”也不符合汉语的表达习惯。所以,该句应译为:

石油和天然气将继续是燃料的主要来源。

(4) Three of Archimedes' extant works are devoted to plane gometry.

译文:阿基米德现存的三部著作都是献给平面几何的。

结构分析:数词前面有无冠词,会使短语的含义相差很大。例如,three of our brothers 是“我们兄弟中的三个”(言外之意:不止三个兄弟),而 the three of our brothers 是“我们兄弟三人”(言外之意:只有三个兄弟)。另外,“献给平面几何”也不符合汉语的搭配习惯。所以,该句应译为:

阿基米德现存的著作中有三本是专门论述平面几何的。

Unit 2 Classification of Metals

Text

It is known that metals are very important in our life. Metals have the greatest importance for industry. All machines and other engineering constructions have metal parts; some of them consist only of metal parts.

In the study of metals, it is necessary first to understand basic metal classifications. There are two large groups of metals:

(1) Simple metals—more or less pure chemical elements. Metal may exist in the form of a pure metallic element, such as aluminum, copper, lead, silver, and so on.

(2) Alloys—materials consisting of simple metal combined with some other elements. Most pure metals, however, useful for relatively few engineering applications are mixtures of two or more metallic elements known as alloys. A modern automobile has more than one hundred different metals used in its manufacture, most of which are alloys. Thousands of alloys are used in modern industry. About two thirds of all elements found in the earth are metals, but not all metals may be used in industry. Those metals which are used in industry are called engineering metals. The most important engineering metal is iron (Fe), which in the form of alloys with carbon (C) and other elements, finds greater use than any other metals.

Alloys are further classified as ferrous alloys and nonferrous alloys. The ferrous alloys contain iron as the base metal, and one or more other metallic elements. Nonmetallic elements also may be included. The base metal is generally the metal in largest proportion. For steels, the base metal is iron. Examples of ferrous alloys include nickel steel, stainless steel, vanadium steel, and alloyed cast iron. All steels which have metallic elements intentionally added to change their properties are ferrous alloys.

Nonferrous alloys do not contain iron, except in very small amounts in the form of impurities. The most important nonferrous metals are copper (Cu), aluminum (Al), lead (Pb), zinc (Zn), tin (Sn), but all these metals are used much less than ferrous metals, because the ferrous metals are much cheaper. Other examples of nonferrous alloys are brass, bronze, and monel. Brass is a copper-base alloy which is composed largely of copper and zinc. Bronze is also a copper-base alloy composed largely of copper and tin. Monel is a nickel-base alloy composed largely of nickel and copper.

Engineering metals are used in industry in the form of alloys because the properties of alloys are much better than the properties of pure metals. Only aluminum may be largely used in the form of simple metal. Metals have such a great importance because of their useful properties or their strength, hardness, and plasticity.

Different metals are produced in different ways, but almost all the metals are found in the form of metal ore (iron ore, copper ore, etc.).

The ore is a mineral consisting of a metal combined with some impurities. In order to produce a metal from some metal ore, we must separate these impurities from metal that is done by metallurgy.

New Words & Expressions

alloy ['ælɔi;ə'lɔi]	n.	合金
	vt.	使成合金;使减低成色
	vi.	易于铸成合金
bronze [brɔnz]	adj.	青铜色的;青铜制的
	n.	青铜;古铜色;青铜制品
	vt.	镀青铜于;上青铜色于
	vi.	变成青铜色,被晒黑
carbon ['kɑ:bən]	n.	[化学] 碳;碳棒;复写纸
	adj.	碳的;碳处理的
construction [kən'strʌkʃən]	n.	建设;建筑物;解释;造句
ferrous ['ferəs]	adj.	[化学] 亚铁的;铁的,含铁的
impurity [im'pjuərəti]	n.	杂质;不纯;不洁
metallurgy[me'tælədʒi]	n.	冶金;冶金学;冶金术
mineral ['minərəl]	n.	矿物;(英)矿泉水;无机物;苏打水(常用复数表示)
	adj.	矿物的;矿质的
Monel ['mɔnəl]	n.	蒙乃尔铜-镍合金
ore [ɔ:]	n.	矿;矿石
plasticity [plæs'tisiti]	n.	塑性,可塑性;适应性;柔软性
property ['prɔpəti]	n.	性质,性能;财产;所有权

Phrases & Expressions

consist of	由……构成