

■ ■ 高职高专应用型规划教材



汽车 实用英语

◎ 主 编 张振东
◎ 副主编 吕凤军 郭刚 王东光



电子工业出版社
PUBLISHING HOUSE OF ELECTRONICS INDUSTRY



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内 容 简 介

全书共分3章19个单元。第1章为汽车基本知识,共4个单元;第2章为汽车故障诊断技术,共8个单元;第3章为汽车检测仪器,共7个单元。每个单元包括课文、词汇、注解、习题、拓展阅读等多个环节。书后另附有完整译文,以及国外汽车品牌中英文对照表、汽车常用缩略语英汉对照表、汽车常用词汇。

本书注重遵循“学用结合”的原则,课文选材均源于新技术报告类文章,词汇量与专业英语习惯用法并重;形式上力求创新,覆盖理论、维修以及仪器使用各个方面,使之能真正反映当代汽车领域发展的前沿技术和最新动态。

本书既可作为高职高专院校汽车类专业的专业英语教材,还可作为相关企业人员培训用书或相关技术人员自学参考书。

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前 言

本书是高等职业技术学院汽车检测与维修专业的教学用书。

本书的编写人员均来自高职院校汽车专业教学一线，具有丰富的教学经验，了解学生的知识需求，部分人员有出国留学工作多年的背景，或有翻译多部汽车专业书籍的经历，都具有很高的英语水平。他们把自己多年积累的汽车专业英语素材，结合世界汽车维修行业的发展趋势，立足实际教学需要，编订了这本书。

本书具有以下特色：

(1) 汽车英语词汇量与汽车专业英语习惯用法并重。汽车专业英语翻译工作的经验表明，在翻译工作中遇到的大部分困难并不是陌生单词引起的，相当一部分都是由于对整个句语或段落的汽车英语习惯用法不熟悉导致的。在汽车专业英语中，为了避免文字叙述上的繁琐和“不必要的”重复，应用的语句常常会出现句子成分不全，内容“跳跃”不连贯的现象。因此，本书在课文的选材和编写形式上，都力图培养读者根据整段或前后文提供的线索以及汽车专业知识，准确把握汽车专业英语技术含义的“潜意识”。

(2) 对语法难点的处理，不再采用基础英语教程中对语法现象详细解释的方式，而是针对典型语句给出既尽量准确又不失中文表达习惯的参考译文，让读者理解消化，做到举一反三。通过揣摩课文中注释语句的参考译文能够进一步消化英语语法知识，同时还可以增强读者阅读翻译时的“联想思维”能力，克服“常感到似乎已经明白了句子的意思，但不能用中文准确完整地表达出来”的心理困境。

(3) 课文选材主要源于新技术报告类文章。这样的选材原则使得读者在学习专业英语的同时，还能够了解世界汽车维修行业的最新知识。文章中出现的词汇、专业术语、专业操作的英语语句表达特点和习惯等，都是读者在今后的工作中要面对的。在课堂上学习这些来自于实际的，而不是经过简化的专业技术类文章，有助于提高读者阅读汽车专业英文技术资料的“技能”，并为今后进一步自学，以及阅读和翻译不断更新的汽车技术资料打下坚实的基础。

(4) 特别针对授课教师及自学者的需要，提供全篇课文的参考译文，以更加符合职业院校的教学实际。

本书的编写工作由山东科技职业学院汽修教研室全面负责，特别感谢来自浙江交通职业技术学院的同行们，他们的辛勤工作使本书增色不少，其中浙江交通职业技术学院吕凤军老师编写了本书第3章1、2、3、4单元，浙江交通职业技术学院陈蕾老师编写了本书第3章5、6、7单元。参加编写的人员还有山东科技职业学院鞠永胜、窦省委、王倩、元伟利、张传业，以及山东第二技师学院王东光。

由于编者水平有限，错误不妥之处在所难免，欢迎批评指正。

编 者
2009.2

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Chapter 1

Automotive Fundamentals

- Unit 1 The History and Major Development of Automobile
- Unit 2 Basic Components of Automotives
- Unit 3 Internal Combustion Engine Operating Principles
- Unit 4 Internal Combustion Engine Construction

Unit 1

Unit 1 The History and Major Development of Automobile

The History and Major Development of Automobile

学习目标:

1. 知识目标:
熟悉汽车的历史及发展。
2. 技能目标:
掌握有关汽车发展史的专业术语和词汇;
能进行相关内容的阅读和翻译。

As early as 1600s, the Dutch, no strangers to wind power, had built a wind-powered, sail-mounted carriage. These carriages were reported to hold several passengers and move at speeds as high as twenty mph. However, they were probably the first real land vehicles to move under power, other than that of animals or human muscle.

In 1700s, a Frenchman, Jacques de Vacanson, built a vehicle which was powered by an engine based on the working of a clock. What he neglected to calculate was that any clock which was capable of moving a vehicle with passengers would have to outweigh the load it was carrying, even winding such a clock motor would take great time and greater effort than it was worth.^[1]

Inventors in England, France, Germany and other countries worked on the idea of a compressed-air engine, but they were unable to find the solution to self-propulsion in this means. However, in their efforts, they contributed significant individual elements to the picture; elements like valves, pistons, cylinders, and connecting rods, and an emerging idea of these elements related to each other.^[2] The first invention that can truly and logically be called an “automobile” was heavy, three-wheeled, steam driven, clumsy vehicle built in 1769 by Captain Nicolus-Jesph Cugnat, a French Army Engineer. It can still be seen in the Paris Museum, where it is displayed with proper national pride.

Thomas Savery, an English engineer, gave the world the first steam engine in 1698. This engine was crude, inefficient, and blew up at intervals. Thomas Newcomen, an English black smith in 1771, turned out a better, less dangerous version of the engine. Then in 1769, James Watt, a Scottish instrument maker, patented a truly improved steam engine that became widely used in

British mills, mines and factories.

In 1864, in Austria, Siegfried Marcus built one-cylinder engine that used a primitive carburetor and magnet arrangement to create small explosions that applied alternating pressure against the piston with cylinder. In 1875, he built his second gasoline powered vehicle, which is preserved in the Technical Museum in Vein.

In 1876, in Germany, Langen and Nikolaus August Otto, improved Marcus's engine and introduced the first workable 4-stroke internal combustion gas engine after many years of experimental work. But Wilhem Daimler produced a more efficient 4-stroke gasoline engine in 1883, and successfully mounted the engine on a sturdy bicycle.

In the 1920~1940 period, the main components of the cars were well designed and efficient, and a variety of accessories were introduced, such as reverse lights, radios, automatic chokes, windshield wipers and chrome-plated trims.^[3] Since World War II, most vehicles have been fitted with the magnetic speedometer. Tires, until the 1920s, were of narrow cross section and ran at relatively high air pressures, the tires alone would not provide much comfort, however, between the wheel and the body of car it is necessary to have springs, and the semi-elliptic multi-leaf spring was an early development. Leaf springs are still widely used on cars, especially on the rear axles.

Power breaks were gradually introduced on road vehicles from the 1940s. Shock absorbers became hydraulic and telescopic consisting of a piston inside a sealed cylinder, one attached to the chassis and the other to the axle.

A great development of transistors during the 1950s led to introduction on semiconductor ignition systems, which used electronic switching systems to control the ignition coil.

Disc brakes, less prone to failure from over-heating than drum brakes, at last became widely accepted, over half a century after Lan Chester's original design was patented.

Mechanical improvements brought higher speeds, better road holding, braking and speed of vehicles in 1960s. Car had to be built to comply with the strict new safety and antipollution laws of the United States which were gradually adopted by many other countries.

Automatic transmission, power breaks and power steering gained wide spread acceptance. The electric systems, which had more and more heavy load handle, was improved by the introduction of the alternator to replace the dynamo, and the uses of circuit breakers instead of fuses.

One important development in engine design was the invention of the wankel engine, which has a single three-lobe rotor instead of the conventional pistons and crankshaft. The first one was made in 1957, by Felix Wankel of Germany and in 1964, the NSU Company brought out the Wankel-engine "Spider", and a few years later, the R80, the prototype Mercedes CIII and several Japanese Mazda cars also had wankel engines, which were light, compact, powerful, and smooth running.

Computer plays an important role in car construction now as in everything else, The purchasing department is in charge of making sure that the glass, rubber, steel and everything else is on hand in the required amounts, and computers keep track of it all. It is only natural for automobile manufacturers to install on-board computers into cars. It is after all, the only practical method of monitoring all the engine variables at once. The on-board computer receives its

information from the various sensors located near or on the engine and processes the signals to the fuel mixture, timing and the other elements. The process is continuous as long as the engine is running.



New Words

wind-powered <i>n.</i> 风力驱动		choke <i>n.</i> 阻风门, 节气门	[tʃəuk]
sail-mounted <i>adj.</i> 装备有螺旋桨的		tire <i>n.</i> 轮胎	['taɪə]
carriage <i>n.</i> 车厢	['kæridʒ]	semi-elliptic <i>adj.</i> 半椭圆的	
outweigh <i>v.</i> 重量超过, 比……重	[aut'wei]	hydraulic <i>adj.</i> 液力的	[hai'drɔ:lik]
solution <i>n.</i> 解决办法, 分解	[sə'lu:ʃən]	telescopic <i>adj.</i> 伸缩套管式的	[teli'skɒpik]
self-propulsion <i>n.</i> 自行驱动		chassis <i>n.</i> 底盘, 车架	['ʃæsi]
clumsy <i>adj.</i> 笨拙的, 不灵活的	['klʌmzi]	semiconductor <i>n.</i> 半导体, 晶体管	['semikən'dʌktə]
crude <i>adj.</i> 粗糙的, 原始的	[kru:d]	patent <i>v.</i> 取得……专利权	['peɪtənt, 'pætənt]
inefficient <i>adj.</i> 低效率的	[,ini'fiʃənt]	restrict <i>v.</i> 限制	[ris'trikt]
carburetor <i>n.</i> 化油器	[kɑ:bə'retə(r)]	antipollution <i>n.</i> 防污染	['æntipə'lju:ʃən]
magnet <i>n.</i> 磁铁	['mæɡnit]	adopt <i>v.</i> 采用, 采纳	[ə'dɒpt]
alternating <i>adj.</i> 交替变化的	['ɔ:lə(:)neɪtɪŋ]	alternator <i>n.</i> 交流发电机	['ɔ:ltə(:)neɪtə]
accessory <i>n.</i> 附件, 辅助设备	[æk'sesəri]	dynamo <i>n.</i> 直流发电机	['daɪnəməu]
reverse <i>adj.</i> 背面的	[ri'və:s]	compact <i>v.</i> 结构紧凑	['kɒmpækt]



Phrases and expression

based on	以……为依据, 以……为基础	comply with	根据
blow up	爆炸	wankel engine	旋转发动机
turn out	生产出, 推出	an emerging idea of	首次提出…… 的解决办法
windshield wiper	刮水器	make sure	确认
chrome-plated trims	镀铬装饰	keep track of	跟踪
magnetic speedometer	磁感应车速表	three lobe	三凸角
multi-leaf spring	钢板弹簧	bring out	生产出
rear axle	后桥	on hand	在掌握之中
shock absorber	减震器		



Notes to Text

1. What he neglected to calculate was that any clock which was capable of moving a vehicle with passengers would have to outweigh the load it was carrying, even winding such a clock motor would take great time and greater effort than it was worth.

他忽略了估算这样一个事实：能够驱动一辆载人汽车的发条发动机的重量甚至要超过它所驱动的负荷，而且安装这样一个发条发动机所需要的时间和精力要远远超过它本身的价值。

2. However, in their efforts, they contributed significant individual elements to the picture; elements like valves, pistons, cylinders, and connecting rods, and an emerging idea of these elements related to each other.

可是，在他们的努力下，一些重要的汽车零部件如气门、活塞、汽缸、连杆等有了初步的构想，并且首次提出了这些零部件之间的相互联系。

3. In the 1920~1940 period, the main components of the cars were well designed and efficient, and a variety of accessories were introduced, such as reverse lights, radios, automatic chokes, windshield wipers and chrome-plated trims.

在1920~1940年间，汽车的主要零部件被精心设计出来并且性能良好，如后车灯、收音机、自动节气门、刮水器、镀铬装饰等各种汽车附件也开始被采用。

Exercises

1. Answer the following questions

- 1) What is the first real land vehicles to move under power?
- 2) Where is the first invention that can truly and logically be called an “automobile” displayed

now?

- 3) When did the first wankel engine be made?
- 4) What is the function of the computer in a car?
- 5) When did power breaks be introduced on road vehicles?

2. Translate the following phrases into Chinese

- 1) wind-powered
- 2) sail-mounted
- 3) carriage
- 4) self-propulsion
- 5) magnet
- 6) accessory
- 7) telescopic
- 8) wankel engine
- 9) magnetic speedmeter

3. Translate the following phrases into English

- 1) 化油器
- 2) 节气门
- 3) 轮胎
- 4) 底盘
- 5) 晶体管
- 6) 交流发电机
- 7) 直流发电机
- 8) 刮水器
- 9) 后桥

4. Translate the following passage into Chinese

The Japanese company has been able to achieve this milestone in fuel-cell car production thanks to significant advances in the specialized technologies involved. With curb weight down to that of a current V6 Accord but sitting on a unique platform, the FCX Clarity is a hydrogen-powered technological tour de force. Engineers have increased driving range by 30 percent up to 280 miles, added 25 percent to the fuel economy reaching 74 mpg, have significantly downsized the fuel-cell stack but raised its power output by 50 percent, and have even recalibrated the electric motor — over the FCX prototype — to generate 8 percent more power, now delivering 134 hp. That propels the car from zero to 60 mph in around 8.5 seconds on the way to a top speed of 100 mph.

Reading Material

Hydrogen-powered vehicle

“We finally have a compelling product that not only clears all of the previous technical hurdles like driving range, weight and packaging, but now delivers dynamic styling, four doors, great ride quality, and all this—at a retail level,” commented Fukui.

Business owner Jon Spallino, one of the three specially selected initial customers—and who was the world’s first fuel-cell car customer having leased the previous FCX—said today that “the new FCX is very stylish and no longer looks like a toaster. And it drives superbly. Also, for someone with kids like me, it has four doors now, and that makes a huge difference for everyday use.” He will not be the first to take delivery, though. Film producer Ron Yerxa, was selected as top batter and will receive his car in July. Paying a leasing fee of \$600 a month for the privilege, Spallino and the third recipient, actress Laura Harris, will pick up their Claritys in the next few months, according to Honda.

Over the next 12 months, several dozen units will be delivered to specially selected clients in Southern California — and in Japan — who have suitable ZIP codes, in close proximity to hydrogen refueling stations. “We want people from all walks of life to experience this vehicle, and give us the necessary feedback to further the fuel-cell cause,” said Project Chief Engineer Sachito Fujimoto. Honda plans to build 200 Claritys over the next three years.

The Japanese company has been able to achieve this milestone in fuel-cell car production thanks to significant advances in the specialized technologies involved. With curb weight down to that of a current V6 Accord but sitting on a unique platform, the FCX Clarity is a hydrogen-powered technological tour de force. Engineers have increased driving range by 30 percent up to 280 miles, added 25 percent to the fuel economy reaching 74 mpg, have significantly downsized the fuel-cell stack but raised its power output by 50 percent, and have even recalibrated the electric motor—over the FCX prototype — to generate 8 percent more power, now delivering 134 hp. That propels the car from zero to 60 mph in around 8.5 seconds on the way to a top speed of 100 mph.

Fukui says that he plans to bring a fuel-cell vehicle to mass production by 2016. If the technology keeps advancing at this rate and material and development costs can continue to come down—from the estimated \$1 million per current FCX Clarity, “then we might be looking at a viable hydrogen-powered vehicle for the mass market at the price of a luxury car within eight to 10 years.” And if current hydrogen station and dealer network developments are any indication, the infrastructure to support such vehicles would have kept pace, too.

Unit 2

Basic Components of Automotives

学习目标:

1. 知识目标:
熟悉汽车的整体结构及其各部分的功能。
2. 技能目标:
掌握汽车构造的专业术语和词汇;
能进行相关内容的阅读和翻译。

A typical passenger car of today contains more than 15,000 separate, individual parts that must work together. These parts can be grouped into four categories: engine, body, chassis and electrical equipment (see Fig 1) .

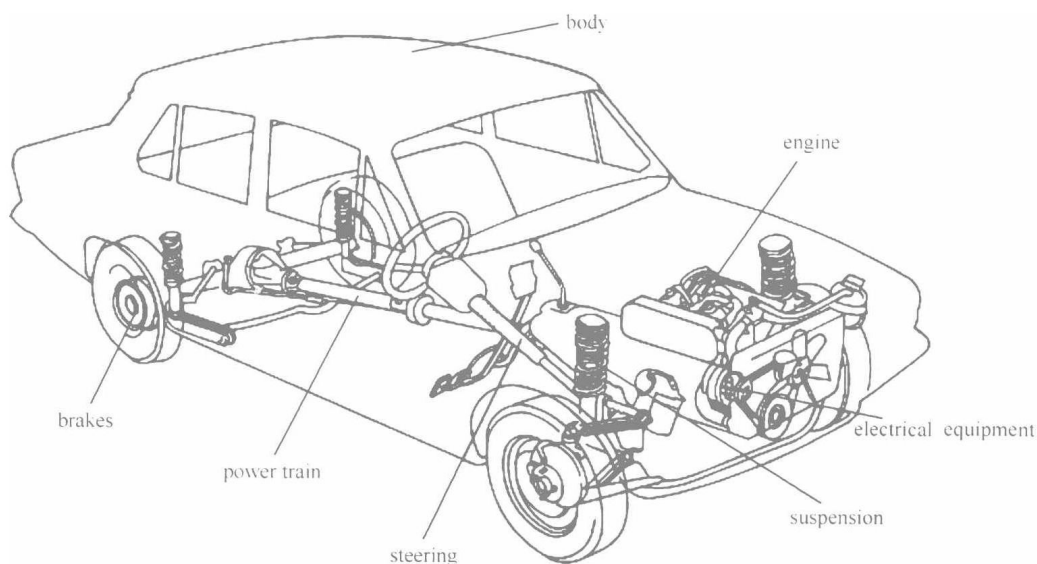


Figure 1 layout of a passenger

The engine acts as the power unit located normally at the front of the car, followed immediately by a clutch, gear box, propeller shaft, universal joint, differential, back axle, etc. ^[1] The internal combustion engine is most common on automobiles . It obtains its power by burning liquid

fuel inside the engine cylinder. There are two types of engine: gasoline which also called a spark-ignition engine and diesel which also called a compression-ignition engine. Both engines are called heat engines. The burning fuel generates heat which causes the gas inside the cylinder to increase its pressure and supply power to rotate a shaft connected to the transmission.

A car body is a sheet metal shell with windows, doors, a hood and a trunk deck built into it. It provides a protective covering for the engine, passengers and cargo. The body is designed to keep passengers safe and comfortable. The body styling provides an attractive, colorful, modern appearance.

The chassis is an assembly of those systems that are the major operating parts of a car. It includes the transmission, suspension, steering and brake systems. The transmission system is a speed and power changing device and conveys the drive to the wheels. Its main components comprise the transmission case, input shaft, output shaft, countershaft, driving gear, transmission fork, etc. A common transmission has a gear arrangement of neutral position, reverse gear, first gear, second gear, third gear, etc, where the reverse gear permits a car to reverse its direction. The suspension system is used to absorb the road shocks and reduce the impact and dynamic loads which are transmitted to the sprung weight. The sprung (including body, engine, power train, etc.) is suspended by the front and rear springs. The steering system controls the direction of the car's movement. Two types of steering system are commonly used on cars: manual system and power system. The manual steering system is composed of steering wheel, shaft and column, steering gear and pitman arm, steering knuckles and ball joint, spindle assembly, etc. The power steering system is made up of a hydraulic pump, fluid reservoir, hoses, a power steering gear assembly, etc.^[2] There are several manual steering gears in current use like the rack and pinion type, the worm and tapered pin steering gear, and the worm and roller steering gear. All power steering systems require a power steering pump attached to the engine. Most late model cars with power steering utilize either a power rack and pinion system, or an integrated power steering gear system.^[3] The brake system slows down the running car. In general, the front brakes of a car are "disc" type, wherein friction pads in a brake caliper are forced against machined surfaces of a rotating disc at each wheel to slow and stop the car. The rear brakes are "drum" type, wherein internal expanding brake shoe assemblies are forced against the machined surface of a rotating drum at each wheel to slow and stop the car.

The electrical system supplies electricity for the ignition, horn, lights, power seat and window adjusters, heater and starter. The lights include the headlights, parking lights, direction signal lights, side marker lights, stoplight, backup lights, tail lights, and the interior lights. The interior lights cover the instrumental panel lights, various warning, indicator, and courtesy lights.^[4] The electricity level is maintained by a charging circuit. This circuit consists of the battery and alternator or generator. The battery stores electricity. The alternator changes the engine's mechanical energy into electrical energy and recharges the battery.



New Words

category	['kætigəri]	transmission	[trænz'miʃən]
<i>n.</i> 种类		<i>n.</i> 传动系, 变速箱	
body	['bɒdi]	gearbox	['giəbɒks]
<i>n.</i> 车身		<i>n.</i> 变速器	
layout	['lei,aut]	suspension	[səs'penʃən]
<i>n.</i> 布置		<i>n.</i> 悬挂, 悬架	
clutch	[klʌtʃ]	steering	['stiəriŋ]
<i>n.</i> 离合器		<i>n.</i> 转向, 操纵	
differential	[,difə'renʃəl]	brake	[breik]
<i>n.</i> 差速器		<i>n.</i> 刹车, 制动器	
cylinder	['silində]	shaft	[ʃɑ:ft]
<i>n.</i> 汽缸		<i>n.</i> 轴	
gasoline	['gæsəli:n]	countershaft	['kauntəʃɑ:ft]
<i>n.</i> 汽油机		<i>n.</i> 中间轴, 副轴	
spark	[spɑ:k]	shock	[ʃɒk]
<i>n.</i> 火花		<i>n.</i> 冲击	
ignition	[ig'niʃən]	worm	[wɜ:m]
<i>n.</i> 点燃, 点火		<i>n.</i> 蜗杆, 螺纹	
diesel	['di:zəl]	horn	[hɔ:n]
<i>n.</i> 柴油机		<i>n.</i> 喇叭	
shell	[ʃel]	charge	[tʃɑ:dʒ]
<i>n.</i> 外壳		<i>v.</i> 充电	
hood	[hud]	starter	['stɑ:tə]
<i>n.</i> (发动机)罩		<i>n.</i> 起动机	



Phrases and expression

internal combustion (IC)	内燃机	pitman arm	转向臂
passenger car	乘用车, 轿车	steering knuckle	转向节
trunk deck	行李舱盖	ball joint	(转向节)球头
transmission fork	变速叉	spindle assembly	转向轴总成
neutral position	空挡	friction pad	(盘式制动器)摩擦衬块
reverse gear	倒挡	brake caliper	制动钳
steering gear	转向机	gear arrangement	齿轮排列



Notes to Text

1. The engine acts as the power unit located normally at the front of the car, followed immediately by a clutch, gear box, propeller shaft, universal joint, differential, back axle, etc.

发动机起着动力单元的作用，它通常位于轿车的前部，紧随其后的是离合器、变速箱、传动轴、万向节、差速器和后桥等。

2. The manual steering system is composed of steering wheel, shaft and column, steering gear and pitman arm, steering knuckles and ball joint, spindle assembly, etc. The power steering system is made up of a hydraulic pump, fluid reservoir, hoses, a power steering gear assembly, etc.

手动转向系统包括方向盘、转向轴和转向器（机）、转向摇臂、转向节、转向节球头以及转向轴总成等部件。动力转向系统由液压泵、液体蓄罐、软管、动力转向机总成等组成。

3. Most late model cars with power steering utilize either a power rack and pinion system, or an integrated power steering gear system.

目前（在轿车中）应用的手动转向系统有多种形式，如齿轮齿条式、蜗杆锥形销式以及蜗杆滚柱式等。

4. The lights include the headlights, parking lights, direction signal lights, side marker lights, stoplight, backup lights, tail lights, and the interior lights. The interior lights cover the instrumental panel lights, various warning, indicator, and courtesy lights.

车灯包括前大灯、驻车灯、转向信号灯、侧灯、停车灯、倒车灯、尾灯和车内灯等。其中车内灯包括仪表板灯、各种警示灯、指示灯和门控灯等。

Exercises

1. Answer the following questions

- 1) List the main parts of an automobile.
- 2) Which systems does a chassis include?
- 3) What are the main functions of the chassis?
- 4) Why are suspension systems used on vehicles?
- 5) What are the common types of a vehicle according to body styling?

2. Translate the following phrases into Chinese

- 1) gasoline
- 2) diesel
- 3) hood
- 4) gearbox
- 5) countershaft
- 6) passenger car
- 7) neutral position