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ГУМАНІТАРНОЇ ОСВІТИ

Кафедра іноземних мов

ТЕКСТИ ДЛЯ ПОЗААУДИТОРНОГО ЧИТАННЯ

МЕТОДИЧНІ ВКАЗІВКИ

для студентів 2-го курсу механічного факультету
заочної форми навчання
(англійська мова)

Харків 2013

Методичні вказівки розглянуто і рекомендовано до друку на засіданні кафедри іноземних мов 23 листопада 2011 р., протокол №4.

Видання підготовлено відповідно до програми навчальної дисципліни і є складовою частиною навчально-методичного комплексу дисципліни «Англійська мова».

Дані методичні вказівки призначені для роботи з текстами для студентів механічного факультету заочної форми навчання. Тексти доступні за своїм лексичним наповненням і призначені для самостійної роботи студентів, до них також додаються завдання, що забезпечують закріплення лексики. Все це дає можливість проводити різноманітні види робіт.

Дані методичні вказівки стимулюють ефективне оволодіння іноземною мовою.

Рекомендуються для студентів 2-го курсу механічного факультету.

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ТЕКСТИ ДЛЯ ПОЗААУДИТОРНОГО ЧИТАННЯ

МЕТОДИЧНІ ВКАЗІВКИ

для студентів 2-го курсу механічного факультету
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(англійська мова)

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ГУМАНІТАРНИЙ ФАКУЛЬТЕТ

Кафедра “Іноземні мови”

МЕТОДИЧНІ ВКАЗІВКИ

для студентів 2-го курсу заочної форми навчання
механічного факультету
«Тексти для позааудиторного читання»

(англійська мова)

Харків, 2013

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Тексти доступні за своїм лексичним наповненням і призначені для самостійної роботи студентів, до них також додаються завдання, що забезпечують закріплення лексики. Все це дає можливість проводити різноманітні види робіт.

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Рекомендуються для студентів 2-го курсу механічного факультету.

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Варіант 1

Exercise 1. Read the text and translate it in written form.

THE BRAKES AND TRANSMISSION

How to check the brake system. The most important safety item on the car is often the most ignored. A simple test will signal the problem. If you have power brakes, turn on the engine to do the test. Push the brake pedal down and hold it down. The pedal should stop firmly about halfway to the floor and stay there. If the stop is smooth or the pedal keeps moving slowly to the floor, you should have your brakes checked.

Parking brakes let you know when they need adjustment. As lining wear, you must move the handle or foot pedal a greater distance before the brakes are fully engaged. Also, the cables and linkage should be lubricated when the parking brakes are adjusted.

How you can check the brake fluid. The most important item in brake system maintenance is periodic checking of the brake-fluid level. Check the level monthly or, at least, at every oil change. Many new cars have translucent brake fluid reservoirs in which the level can be seen or checked without removing the cover. Check your owner's manual for its exact location.

On cars with opaque reservoirs, carefully wipe off the reservoir cover to remove any dirt before checking the level then pry the retaining clip aside and remove the cover. The fluid level should be kept about a half inch from the top on reservoirs that are not otherwise marked.

If you add your own brake fluid, buy it in small cans and store them tightly sealed in a cool dry place. Discard open containers after one year. Brake fluid absorbs moisture. Excess moisture can damage your brake system.

Three different grades of automotive brake fluid are available. Using the correct grade is essential to maintaining proper brake operation in all driving conditions. Check your owner's manual for the right brake fluid for your car.

How a driver can check the automatic transmission. An automatic transmission is a very complicated item and expensive to replace. Checking your fluid level is easy and can prevent an expensive repair job. You will first find the transmission fluid dipstick. Usually it is at the rear of the engine and looks like a smaller version of the oil dipstick. To get an accurate reading, the engine should be warmed up and running. If the fluid is below the ADD line, pour in one pint at a time. Be sure not to overfill the reservoir.

While checking the fluid, note its colour. It should be bright cherry red. If it is a darker, reddish brown one, the fluid needs changing. If it is very dark, nearly black, and has a burned smell, like vanish, your transmission may be damaged. You should take it to the specialist. Automatic-transmission fluid is available at most department stores. Check the owner's manual or the transmission dipstick for the correct type for your car because the choice of transmission fluid affects the shifting characteristics of the.

How a driver can check the manual transmission. Always be sure the clutch pedal is loose enough to push down a half inch to an inch, depending on the car, before the clutch engages. If should require more pressure yet to push it to the floor. Have your clutch adjusted if the amount of play exceeds one inch. Fluid levels in both the transmission and differential should be checked with each oil change, or when you notice erratic or rough gear shifting. Both are signs that the level is low. On most cars the manual transmission lubrication does not require changing but should be replenished if it gets low.

How a driver can make the transmission last. Automatic transmissions are more susceptible to damage than manual transmissions. One reason is that they are so automatic that we tend to neglect them. Another reason is that they are more complex than manual transmissions

Exercise 2. Answer the following questions.

1 What item on the car is often ignored? 2 What test shows that the problem exists? 3 What does worn lining cause? 4 What needs lubricating when the parking brakes are adjusted? 5 What are the conditions of keeping brake fluid cans? 6 What type of transmission is a very complicated item? 7 What can prevent an expensive repair job?

8 What is necessary to use for checking fluid level in transmission? 9 Should the engine be warmed up and running for checking the fluid level? 10 Why are automatic transmissions more susceptible to damage than manual transmissions?

Exercise 3. Translate and memorize the following expressions from the text.

To check the system, turn on the engine, push the brake pedal down, to need adjustment, to be fully engaged, brake system maintenance, oil change, exact location, to be available, owner's manual, to absorb moisture, automatic transmission, a very complicated item, expensive repair job, may be damaged, shifting characteristics, clutch pedal, require more pressure, gear shifting, manual transmission.

Exercise 4. Find synonyms among the following words.

To check, characteristic, slowly, to affect, to change, different, operation, require, to damage, correct, soft, important, location, to prevent, amount, to verify, significant, smooth, action, demand, various, feature, quantity, proper, to replace, to stave off, sluggishly, position, to harm, to influence.

Exercise 5. Write a summary of the text, presenting the content of each paragraph in 2-3 sentences. Use the expressions:

The main idea of the text is ... The text deals with one of the most important (urgent) issues ... Much attention (consideration) is given to (classification, description)... It focuses on the matters of … The text gives an overview of... The text is mainly concerned with ... The aim of the survey is to show (demonstrate, find)... Particular emphasis is given to the analysis of... The text gives a detailed analysis of (reports on)... To sum up ... In conclusion ...

Варіант 2

Exercise 1. Read the text and translate it in written form.

TRUCKING INDUSTRY: CLASSIFICATION OF TRUCKS

The trucking industry is made up of those persons and firms engaged in the business of owning and operating motor trucks for hire to transport products over roads. Such companies are known as carriers.

The three principal categories of carriers are: private carriers, who use trucks to transport only their own products from farm to market, or raw materials from source to processing or manufacturing plants, or finished products to their markets, or for interplant movements; contract carriers, who enter into contractual agreements, usually long-term in nature, with business establishments to transport materials and products for those firms; and common carriers, who serve the general public on any and all commodities. A contract carrier may contract with several firms: however, shipments from different firms cannot be mixed together Common carriers are granted operating certificates by the Interstate Commerce Commission (ICC) as either irregular-route carriers or regular-route carriers.

Irregular-route carriers serve the public on ‘call and demand’. They usually operate from a central, office or terminal, shipping either specified commodities (such as textile products) or general, commodities from specified points or areas to other specified areas.

Regular-route common carriers are granted authority by the ICC to operate over specified highway routes on a regular basis, using terminals located strategically to consolidate and distribute freight in a surrounding area. Commodities handled by regular-route carriers may be specified, or the carrier may have authority to handle general commodities, usually with some exceptions for which special and specific authority must be granted by the ICC. Such special goods include small-package express, armored express (for transporting items of unusual value), household goods, automobiles, and explosives, liquids carried in tank trucks, dry bulk goods, logs, and cement.

Agricultural produce (unprocessed farm products) is not subject to ICC regulation and may be handled by what are known as

unregulated motor carriers. The ability of a truck to pick up produce from several farms and bring it quickly to market makes trucking well suited for this purpose.

Today's truck is the result of recent engineering and technological advances, with economy, environmental impact, safety, and driver comfort as much a part of truck design as the load factor. A number of special types of trucks are built to perform specific functions.

The pickup truck has a carrying capacity of 0.5 to 5 U.S. tons. Smaller types usually have a conventional design, whereas larger sizes have the cab above the engine. The loading area is designed for the particular job to be performed. It may have a flatbed, open bed, stake body, or closed van. Since the 1980s, the small pickup has become a popular style. The panel truck is a completely enclosed van having a capacity of about 0.5 U.S. tons. The straight truck may have a conventional or cab over engine design. The body length is designed for the job function. Where double- and triple-trailers are used, the straight truck may be used as the tractor. The tractor may also have a conventional or cab-over-engine design. It has a so-called fifth wheel and may have rear dual wheels mounted on a single axle, or tandem axles, depending on the usage. The semitrailer is a vehicle designed to be pulled by a tractor. It has either single or tandem axles on the rear. A steel plate with a welded or molded pin that is located on the bottom front slips and locks into the fifth wheel of the tractor. A 'semi' may be an open flatbed, stake body, or fully enclosed van box. The full trailer is similar to the semitrailer except that it has front wheels as well as rear wheels and has a tongue for hooking it to a tractor or another trailer. A tandem unit consists of two trailers pulled behind a single tractor. Tandem trucks are generally not allowed on secondary or congested roads.

Trucks that are even more specialized for performing special and unusual jobs include fire engines, refrigerated vans, mobile cranes, earth-moving machinery, dump trucks, concrete mixers, garbage and trash trucks, and tank trucks for both dry and liquid-bulk hauling.

Exercise 2. Answer the following questions.

1 What is the text about? 2 What is the trucking industry made up of? 3 What are the three principal categories of carriers? 4 How do irregular-route carriers usually operate? 5 What special goods are handled by regular-route carriers? 6 Is agricultural produce subject to ICC regulation? 7 What types of trucks do you know? 8 When has the small pickup become a popular style? 9 What is the difference between the full trailer and the semitrailer? 10 What are trucks specialized for?

Exercise 3. Translate and memorize the following expressions from the text.

Trucking industry, to be engaged in, to transport products, the principal categories of carriers, raw materials, interplant movements, contractual agreements, to serve the general public, shipments from different firms, regular-route carriers, specified highway routes, to consolidate and distribute freight, to subject to, engineering and technological advances, to perform specific functions, carrying capacity, to be designed for, as well as, special and unusual jobs, earth-moving machinery.

Exercise 4. Find synonyms among the following words.

To transport, completely, agreement, advance, unusual, to perform, type, principal, general, to be located, usage, product, to design, particular, road, to devise, commodity, route, to carry, to fulfil, progress, entirely, common, main, kind, covenant, application, special, to be situated, extraordinary.

Exercise 5. Write a summary of the text, presenting the content of each paragraph in 2-3 sentences. Use the expressions:

The main idea of the text is ... The text deals with one of the most important (urgent) issues ... Much attention (consideration) is given to (classification, description)... It focuses on the matters of … The text gives an overview of... The text is mainly concerned with ... The aim of the survey is to show (demonstrate, find)... Particular emphasis is given to the analysis of... The text gives a detailed analysis of (reports on)... To sum up ... In conclusion ...

Варіант 3

Exercise 1. Read the text and translate it in written form.

NEW TECHNOLOGIES

Expanded use of computer technology, development of stronger and lighter materials, and research on pollution control will produce better, ‘smarter’ automobiles. In the 1980s the notion that a car would ‘talk’ to its driver was science fiction; by the 1990s it had become reality.

Onboard navigation was one of the new automotive technologies in the 1990s. By using the satellite-aided global positioning system (GPS), a computer in the automobile can pinpoint the vehicle’s location within a few feet. The onboard navigation system uses an electronic compass, digitized maps, and a display screen showing where the vehicle is relative to the destination the driver wants to reach. After being told the destination, the computer locates it and directs the driver to it, offering alternative routes if needed.

Some cars now are equipped with GPS locator beacons, enabling a GPS system operator to locate the vehicle, map its location and, if necessary, direct repair or emergency workers to the scene. Cars equipped with computers and cellular telephones can link to the Internet to obtain constantly updated traffic reports, weather information, route directions, and other data. Future built-in computer systems may be used to automatically obtain business information over the Internet and manage personal affairs while the vehicle’s owner is driving.

Computer control of automobile systems increased dramatically during the 1990s. The central processing unit (CPU) in modern engines manages overall engine performance. Microprocessors regulating other systems share data with the CPU. Computers manage fuel and air mixture ratios, ignition timing, and exhaust-emission levels. They adjust the antilock braking and traction control systems. In many models, computers also control the air conditioning and heating, the sound system, and the information displayed in the vehicle’s dashboard.

During the 1980s and 1990s, manufacturers trimmed 450 kg (1000 lb) from the weight of the typical car by making cars smaller. Less weight, coupled with more efficient engines, doubled the gas

mileage obtained by the average new car between 1974 and 1995. Further reductions in vehicle size are not practical, so the emphasis has shifted to using lighter materials, such as plastics, aluminium alloys, and carbon composites in the engine and the rest of the vehicle.

Looking ahead, engineers are devising ways to reduce driver errors and poor driving habits. Systems already exist in some locales to prevent intoxicated drivers from starting their vehicles. The technology may be expanded to new vehicles. Anti-collision systems with sensors and warning signals are being developed. In some, the car's brakes automatically slow the vehicle if it is following another vehicle too closely. New infrared sensors or radar systems may warn drivers when another vehicle is in their 'blind spot'.

Catalytic converters work only when they are warm, so most of the pollution they emit occurs in the first few minutes of operation. Engineers are working on ways to keep the converters warm for longer periods between drives, or heat the converters more rapidly. Diesel engines use cheaper fuel, burn it more efficiently, and produce fewer pollutants, but they are noisy. Popular in trucks and heavy vehicles, diesels are only a small portion of the automobile market.

Rolling stock operation on trains subjects electronic components to extreme conditions. Voltage fluctuations, extreme temperature and continuous vibration combine to stress components and materials. When electronics fail transportation systems grind to a halt. EIC Solutions keeps things moving with its critical electronics enclosures.

EIC Solutions is a leading global provider of electronic protection solutions, specifically focusing on thermal management. Since 1988, it has specialized in the design and manufacture of thermoelectric cooling systems for a wide range of industrial, commercial, military and defense applications.

Its thermoelectric air-conditioners, air-conditioned enclosures and air-conditioned transit cases are the ideal solution for housing and cooling electronics in stationary, mobile, harsh indoor and outdoor environments.

When human well-being and safety are paramount, EIC's cabinet cooling systems are there to keep infrastructure networks running smoothly by protecting computers, monitoring control,

communications and other electrical / electronic equipment from heat, dust, moisture and corrosion.

Exercise 2. Answer the following questions.

1 What is the text about? 2 What will produce better, 'smarter' automobiles? 3 When did onboard navigation become one of the new automotive technologies? 4 What does the onboard navigation system use? 5 What are some cars now equipped with? 6 What can cars equipped with computers and cellular telephones perform? 7 Do microprocessors regulating other systems share data with the CPU? 8 When do the car's brakes automatically slow the vehicle? 9 What are engineers working on? 10. What advantages have diesel engines?

Exercise 3. Translate and memorize the following expressions from the text.

Expanded use, computer technology, science fiction, to become reality, onboard navigation system, to pinpoint the vehicle's location, digitized maps, alternative routes, direct repair, to equip with computers, cellular telephone, route directions, to automatically obtain business information over the Internet, to manage personal affairs, looking ahead, to reduce driver errors, anti-collision system, warning signals, diesel engines, heavy vehicles.

Exercise 4. Find synonyms among the following words.

Use, to direct, to link, data, portion, to reach, constantly, automobile, to equip, error, to produce, modern, to adjust, typical, location, consumption, to create, car, position, to achieve, to control, to fit out, to connect, continually, information, to arrange, contemporary, normal, mistake, part.

Exercise 5. Write a summary of the text, presenting the content of each paragraph in 2-3 sentences. Use the expressions:
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Варіант 4

Exercise 1

SLEEPING CARS IN THE USA

The sleeping car or sleeper (often wagon-lits) is a railway/railroad passenger car that can accommodate all its passengers in beds of one kind or another, primarily for the purpose of making nighttime travel more restful. The first such cars saw sporadic use on American railroads in the 1830s and could be configured for coach seating during the day. Some of the more luxurious types have private rooms, that is to say fully and solidly enclosed rooms that are not shared with strangers.

A particularly interesting practice in sleeping car operation, one that is not currently employed in North America, is the use of "set-out" sleepers. Sleeping cars are picked up and/or dropped off at intermediate cities along a train's route so that what would otherwise be partial-night journeys can become (in effect) full-night journeys, with passengers allowed to occupy their sleeping accommodations from mid-evening to at least the early morning. Common practise on such occasions is to close the passages between sleeper cars for the night to prevent accidental wrong destinations if the sleeper is transferred to another train.

An example of a more basic type of sleeping car is the European couchette car, which is divided into compartments for four or six people, with bench-configuration seating during the day and ‘privacyless’ double- or triple-level bunk-beds at night. Even more basic is the Chinese ‘hard’ sleeping car in use today, consisting of fixed bunk beds, which cannot be converted into seats, in a public space.

The first passenger cars in the USA were high in proportion to their length, and were not fitted for movement upon rails. Their characteristics have gradually changed, so as to make them longer,

lower, safer, more comfortable and convenient. One of the most important railroad inventions in the USA was a sleeping car. The earliest trains had no sleeping cars. There was really no need for them, because early railroads were short; the longest journeys lasted only a few hours, and nearly all trains went in the daytime. As a number of railroads increased, it became possible to make longer and longer journeys and night travel became common. Long journeys by night were very tiresome and uncomfortable because it was almost impossible for passengers to sleep in the car seats.

Steamboats and sailing vessels had good sleeping rooms, and even canal boats used for passenger transportation had bunks in which travelers could rest at night. It can easily be seen that there was a real need for sleeping cars on the railroads, and especially upon the railroads of the USA, where the distance which one might travel was so large. The earliest sleeping cars had a row of double bunks on each side. Although these cars were more comfortable for night travel than the ordinary coach, they had one large defect. They could not be used for day travel. What was needed was a car in which the seats used during the day could be converted into beds at night.

George M. Pullman of Chicago invented the modern sleeping car. He built his first one in 1859. This car was much simpler in design than the sleeping cars of today but it was so much more suitable for long-distance travel than any other kind of car in use at that time. Encouraged by the success of his first car, Mr. Pullman built a much larger sleeping car a few years later, a car which was a great improvement over his first coach. This car was named the Pioneer. George Pullman received many orders for sleeping cars. In 1879 he bought the big site of land near Chicago. On this place the city of Pullman was constructed, and there the Pullman-Standard Car Manufacturing Company still has its great manufacturing plant, which is capable of producing many hundreds of all kinds of cars a year. Practically all of the sleeping cars on the USA's railroads are owned and operated by the Pullman Company.

Exercise 2. Answer the following questions.

1 What project is this text about? 2 What were the first passenger cars in the USA? 3 Who invented the modern sleeping car? 4 When was the modern sleeping car built? 5 How many hours did the longest journeys last? 6 What car was named the Pioneer? 7 What defect did the sleeping car have? 8 Why didn't the earliest trains have sleeping cars? 9 What was one of the most important railroad inventions in the USA? 10 Why were long journeys by night very tiresome and uncomfortable?

Exercise 3. Translate and memorize the following expressions from the text.

The first passenger; travelers could rest at night; length; for movement; sleeping car; suitable; for long-distance travel; more comfortable; passenger transportation; the ordinary coach; early railroads; few years later; received many orders; great manufacturing plant; longer journeys; bunks; safer; daytime; large defect; encouraged by the success; converted; much simpler in design; characteristics; much more suitable; not fitted for movement upon rails.

Exercise 4. Find synonyms among the following words.

Car; seats; rails; use; characteristics; to make; safe; comfortable; railroad; journey; increase; became; possible; common; tiresome; uncomfortable; steamboat; sailing vessel; transportation; bunk; traveler; especially; distance; row; ordinary; defect; convert; simpler; encouraged; success; improvement; plant; capable; producing; construct.

Exercise 5. Write a summary of the text, presenting the content of each paragraph in 2-3 sentences. Use the expressions:

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Варіант 5

Exercise 1

COOPERATION OF SCANDINAVIAN RAIL CAR DESIGNERS

The recent project developed by Danish State Railways' (DSB) design office includes the new four-car trainsets for Intercity express services in Denmark and Sweden.

The most interesting aspect of the design process was that of combining two railway cultures and traditions to create an interior for a train which operates not only between Denmark and Sweden but internally in each European country.

The design team spent a lot of time breaking down cultural and language barriers and generating the enthusiasm which lasted through the whole process. The result is the train based on the Scandinavian design tradition of simplicity and functionality. Modern materials such as wood veneer*, leather, and carpets with 80% wool content are used. Fluorescent lighting is concealed in order to avoid a harsh glare and is supplemented by reading lights over the seats.

Wide entrance doors and gangways as well as a low floor 600mm above the top of the rail in each set are examples of this. The low-floor area is divided into two parts. Bicycles and bulky luggage will be on the one side, whereas normal seating area with space for wheelchairs will be on the other side. The entrance doors and toilet for the handicapped are in the centre; there is enough space for fold-down seats and prams. There are two small lifts at each end allowing through-passage for catering trolleys.

Transparency is used to create a feeling of security: partitions and doors are made of glass, therefore one can almost see from one end of the train to the other.

These trains, which incorporate some of the most popular features of the IC3 sets**, are the first Intercity trains where it has not been necessary to take ferry crossings into consideration. This has given the designers more freedom regarding the train's length and width. Each set has 208 seats including 21 fold-down seats. The trains will be equipped with a satellite navigation system which, besides giving precise arrival information, will allow passengers at stations to

see where unoccupied seats are located in the approaching train. At present this system is being installed in existing Intercity trains.

DSB's blue colour combined with grey has been chosen for the external livery and, with the elegantly formed nose and sleek sides, the train promises to be a design success.

The four-car train has five bogies and is constructed of aluminium. It weighs 140 tonnes. There are four Iveco diesel engines. And the train has a top speed of 200km/h. The initial order is for 83 sets worth DKr*** 5 billion ($US 606 million). Production started in September 2001 and delivery will take place between mid- 2003 and the end of 2005. Further 67 sets have been ordered.

Notes: *veneer – шпон, облицювання;** 1C – Intercity (train) – міжміський поїзд; *** DKr – Danish krones.

SIEMENS INTRODUCES THE MODULAR VENTURIO

Siemens has developed a new type of train for inter-city and inter-regional passenger services called *Venturio*. The main feature of this train is its fully modular design, i.e. the train is built using modules. It is known that a module is a part having a standard shape and size, used in building, making furniture or even vehicles.

The new *Venturio* train family is based on a single modular platform. It has been designed to incorporate tilting equipment and will operate at speeds of between 160 km/h and 250 km/h in diesel-electric or emu form.

The length of the trains is likely to vary between three and seven (or even nine) cars. The units will be able to operate on lines electrified at 25 kV ac, or 15 kV ac, or 3 kV dc. They can also be built as multi-system versions. The modularity of the design extends to the interior furnishing which can include business facilities, upgraded seats and passenger information systems. The seats will include air conditioning for increased passenger comfort during the journey.

All the trains will be supplied with standardized spare parts. Siemens says that modularity combined with the use of proven design technology will ensure low maintenance costs.

Exercise 2. Answer the following questions.

1 What project does this text tell about? 2 What traditions were used to create an interior for these trains? 3 What are the two most important features of these trainsets? 4 What materials are used for the train interior? 5 Why is lighting comfortable in these trains? 6 What conveniences are provided for the handicapped and for babies? 7 Why do passengers feel secure when travelling in these trains? 8 What system will help passengers to get precise arrival information? 9 Will it be possible to see whether there are any vacant seats in the approaching train? 10 What are the main technical features of these trains?

Exercise 3. Translate and memorize the following expressions from the text.

a set, a trainset; a gangway; the top of the rail; a fold-down seat; bulky luggage; a catering trolley; a partition; a ferry crossing;a satellite navigation;a bogie; bulky luggage; the most interesting aspect; in order to avoid; spent a lot of time; a catering trolley; the entrance doors; system is being installed; the trains will be equipped; to create; modern materials.

Exercise 4. Find synonyms among the following words.

Project; develop; includes; aspect; use; combining; railway; to create; interior; break; generating; enthusiasm; result; simplicity; to content; concealed; to avoid; harsh; glare; supplement; gangway; to divide; bulky; transparency; to made; features; regard; consideration; approach; sleek.

Exercise 5. Write a summary of the text, presenting the content of each paragraph in 2-3 sentences. Use the expressions:

The main idea of the text is ... The text deals with one of the most important (urgent) issues ... Much attention (consideration) is given to (classification, description)... It focuses on the matters of … The text gives an overview of... The text is mainly concerned with ... The aim of the survey is to show (demonstrate, find)... Particular emphasis is given to the analysis of... The text gives a detailed analysis of (reports on)... To sum up ... In conclusion ...

Варіант №6

Exercise 1. Read the text and translate it in written form.

OTTO-CYCLE ENGINES

The ordinary Otto-cycle engine is a four-stroke engine; that is, in a complete power cycle, its pistons make four strokes, two toward the head (closed head) of the cylinder and two away from the head. During the first stroke of the cycle, the piston moves away from the cylinder head while simultaneously the intake valve is opened. The motion of the piston during this stroke sucks a quantity of a fuel and air mixture into the combustion chamber. During the next stroke, the piston moves toward the cylinder head and compresses the fuel mixture in the combustion chamber. At the moment when the piston reaches the end of this stroke and the volume of the combustion chamber is at a minimum, the fuel mixture is ignited by the spark plug and burns, expanding and exerting a pressure on the piston, which is then driven away from the cylinder head in the third stroke. During the final stroke, the exhaust valve is opened and the piston moves toward the cylinder head, driving the exhaust gases out of the combustion chamber and leaving, the cylinder ready to repeat the cycle.

The efficiency of a modern Otto-cycle engine is limited by a number of factors, including losses by cooling and by friction. In general, the efficiency of such engines is determined by the compression ratio of the engine.

The diesel engine has the highest thermal efficiency of any regular internal or external combustion engine due to its very high compression ratio. Low-speed Diesel engines (as used in ships and other applications where overall engine weight is relatively unimportant) the largest of which can have a thermal efficiency that exceeds 50 percent.

Diesel engines are manufactured in two-stroke and four-stroke versions. They were originally used as a more efficient replacement for stationary steam engines. Since the 1910s they have been used in submarines and ships. Use in locomotives, trucks, heavy equipment and electric generating plants followed later. In the 1930s, they slowly began to be used in a few automobiles. Since the 1970s, the use of

diesel engines in larger on-road and off-road vehicles in the USA increased. As of 2007, about 50 percent of all new car sales in Europe are diesel.

Theoretically, the diesel cycle differs from the Otto cycle in that combustion takes place at constant volume rather than at constant pressure. Most diesels are also four-stroke engines but they operate differently than the four-stroke Otto-cycle engines. The first, or suction, stroke draws air, but no fuel, into the combustion chamber through an intake valve. On the second, or compression, stroke the air is compressed to a small fraction of its former volume and is heated to approximately 440°C (approximately 820F by this compression. At the end of the compression stroke, vaporized fuel is injected into the combustion chamber and burns instantly because of the high temperature of the air in the chamber. Some diesels have auxiliary electrical ignition systems to ignite the fuel when the engine starts and until it warms up. This combustion drives the piston back on the third, or power, stroke of the cycle. The fourth stroke, as in the Otto-cycle engine, is an exhaust stroke.

The efficiency of the diesel engine, which is in general governed by the same factors that control the efficiency of Otto-cycle engines, is inherently greater than that of any Otto-cycle engine and in actual engines today is slightly more than 40 percent. Diesels are, in general, slow-speed engines with crankshaft speeds of 100 to 750 revolutions per minute (rpm) as compared to 2500 to 5000 rpm for typical Otto-cycle engines. Some types of diesel, however, have speeds up to 2000 rpm. Because diesels use compression ratios of 14 or more to 1, they are generally more heavily built than Otto-cycle engines, but this disadvantage is counterbalanced by their greater efficiency and the fact that they can be operated on less expensive fuel oils.

Exercise 2. Answer the following questions.

1 What kind of engine is the Otto-cycle engine? 2 Where is the mixture sucked? 3 When is the fuel mixture ignited? 4 What ignites the fuel mixture? 5 Which valve is opened during the final stroke? 6 What is the efficiency of the diesel engine? 7 Why is a diesel engine considered to be slow-speed? 8 Which engine, diesel or Otto-cycle, is

more heavily built? 9 What oil and fuel is used in a diesel engine? 10 What disadvantage of a diesel engine is mentioned in the text?

Exercise 3. Translate and memorize the following expressions from the text.

A four-stroke engine, a complete power cycle, the intake valve, the motion of the piston, a quantity of a fuel and air mixture, expanding and exerting a pressure, the mixture is ignited by, the exhaust gases, to be limited by, increase of efficiency, at constant volume, combustion chamber, to be heated to, burns instantly, auxiliary electrical ignition systems, to control the efficiency, crankshaft speed, compression ratio, can be operated.

Exercise 4. Find synonyms among the following words.

Complete, counterbalance, permanent, achieve, mixture, approximately, in general, typical, efficiency, modern, increase, operate, repeat, power, motion, entire, energy, movement, reach, on the whole, present-day, growth, effectiveness, constant, act, nearly, normal, recur, neutralize, combination.

Exercise 5. Write a summary of the text, presenting the content of each paragraph in 2-3 sentences. Use the expressions:

The main idea of the text is ... The text deals with one of the most important (urgent) issues ... Much attention (consideration) is given to (classification, description)... It focuses on the matters of … The text gives an overview of... The text is mainly concerned with ... The aim of the survey is to show (demonstrate, find)... Particular emphasis is given to the analysis of... The text gives a detailed analysis of (reports on)... To sum up ... In conclusion ...

Варіант 7

Exercise 1. Read the text and translate it in written form.

THE FUEL AND EXHAUST SYSTEMS

The fuel system starts with the fuel tank. As long as this tank isn't completely filled with gasoline, there's a certain amount of air in the tank, and the moisture in this air can condense into water. In cold weather this water can freeze into pellets of ice which cut off the fuel supply through the fuel line and stall the engine. The best way to avoid this problem is to keep your tank filled as much as possible, thus reducing the amount of air in your tank. A warning sign of icing is frost on the inside of your gas cap. To protect against gas line icing, pour a can of fuel system de-icer in the tank once a month during the winter months. However, if the gas line is frozen, leave the car in a heated garage for several hours, since the additive will not freeze the gas line.

The automatic choke provides the carburetor with a very rich mixture when the engine is starting from cold. It's a good tip to have the mechanic check the automatic choke occasionally for proper operation. When it's not operating efficiently, the automatic choke can cause lots of grief in cold weather starting, as well as wasting gasoline.

Another small but vital element in your fuel system is the fuel filter; make very sure that it's replaced at the recommended intervals. A clogged fuel filter will restrict the flow of gasoline just when you most need it.

The filter in the air cleaner must be replaced or cleaned at the recommended intervals. If this job is neglected, the carburetor and engine may be damaged, and your engine's performance will suffer. To be on the safe side if you drive on dusty roads change the filter twice as often.

The exhaust system quietens the engine and gets rid of burned gases, one of which, carbon monoxide, is deadly. Have the system inspected at least twice a year, and be on the alert constantly for any unusual noise or smell that might point to exhaust trouble. If you think there may be damage, drive to a service station for inspection with your windows open. Never switch your engine off, then on again

while driving: you just might explode your muffler. Never drive with a damaged or broken exhaust support bracket; you could be risking not only leaks but a fire. And, as everyone should realize, never run your engine inside a closed garage.

How to check the spark plugs. Many mechanics use the spark plug as a simple diagnostic tool. The normal color for the spark end of the plug is light tan or gray. If you find the spark end is black, contains any goo, or appears to be damaged, it may indicate you need a complete tune up or that you have a problem that includes more than just the spark plugs (though such plugs will have to be replaced too).

How to make the spark plugs last. A set of spark plugs can last as long as 10,000 to 12,000 miles on cars with conventional ignition systems and 15,000 to 30,000 miles on cars with electronic ignition. These figures are for optimum driving conditions. A new set of spark plugs once a year is a good investment to ensure fast winter starting. Changing spark plugs is easy, although it is not a complete tune up. For less than ten dollars you can change the plugs in most cars. The owner's manual tells you exactly what type of plugs your car needs. All you need is a spark plug wrench, which is available at most department stores.

An important factor in the proper operation of your spark plugs is the distance between the two electrodes. This is called the 'gap', and different engines require different distances. The proper gap distance can be found in your owner's manual, and it is measured by a special set of metal blades, each a different thickness.

Exercise 2. Answer the following questions.

1 Under what circumstances can the moisture in this air condense into water in the fuel tank? 2 What system gets rid of the burned gases? 3 Why shouldn't a driver run the engine m a closed garage? 4 What is used for protection against gas line icing? 5 Which gas is deadly? 6 How can a spark plug he used sometimes? 7 What is a normal color for the spark end of the plug? 8 Is the black color normal for the spark end of the plug? 9 What are the signs that a driver has a problem or needs a complete tune-up? 10 Will damaged spark plugs have to be replaced?

Exercise 3. Translate and memorize the following expressions from the text.

Fuel tank, as long as, a certain amount of, can condense into water, cut off the fuel supply, a warning sign, fuel system de-icer, exhaust system, twice a year, switch your engine off, to check the spark plugs, diagnostic tool, a complete tune up, have to be replaced, ignition system, optimum driving conditions, to be available, in the proper operation, it is measured by, to carry the electrical current.

Exercise 4. Find synonyms among the following words.

Completely, kind, replace, exscind, avoid, examination, ordinary, amount, many, protect, must, fast, figures, quantity, rapid, occasionally, change, cut off, inspection, entirely, elude, require, have to, data, type, sometimes, normal, a lot of, defend, demand.

Exercise 5. Write a summary of the text, presenting the content of each paragraph in 2-3 sentences. Use the expressions:

The main idea of the text is ... The text deals with one of the most important (urgent) issues ... Much attention (consideration) is given to (classification, description)... It focuses on the matters of … The text gives an overview of... The text is mainly concerned with ... The aim of the survey is to show (demonstrate, find)... Particular emphasis is given to the analysis of... The text gives a detailed analysis of (reports on)... To sum up ... In conclusion ...

Варіант 8

Exercise 1. Read the text and translate it in written form.

COLD LIGHT

We receive natural light from the sun, whose surface is heated to a temperature of 10,832º F. But visible light may be radiated by cold as well as by hot bodies. Substances that transform the energy they absorb into light without becoming heated are called luminofores, and the light they radiate – luminescence. There are many substances in

nature that are capable of absorbing invisible ultra-violet rays and turning them into visible light. Luminescence can also arise from the energy created by fast-moving electric charges.

There exist two forms of luminofores. In one the molecules themselves have the ability of transforming absorbed energy into visible light. This group includes certain components of oil, and many dyes and chemical compounds. The second group is made up of inorganic crystallized substances called phosphors including very small quantities of other substances, which account for the colour of the radiations, and a number of other qualities.

Luminofores are widely used in modern technique, in particular, in the production of luminescent lamps which have made the phenomenon luminescence a common feature of our everyday life. Luminescent lamps are made by coating the interior of glass tubes with a film of luminofore, the tubes being filled with mercury vapours and argon, and charged with electricity. The electric charge causes an invisible ultra-violet radiation from the mercury vapours while the luminofore on the inside of the tube absorbs rays and transforms them into powerful visible light. By using various luminofores one can make lamps of any colour.

Luminescence is also used in television, a luminous screen being an important part of television picture tubes. Luminofores enable us also to discover and observe such radiations as infra-red, ultra-violet, x-ray, and alpha, which are invisible to the eye as well as fast-moving elementary particles, produced by radio-active disintegration or artificial transformation of the atomic nucleus.

The radiation produced under the influence of elementary particles plays an important part in the study of atomic problems. Various substances giving off radiations of specific spectral composition are used for making all kinds of analyses in biology, medicine, industry, and agriculture. By observing the radiation of biological compounds, one can detect various diseases and trace their development.

Work on luminescence has been carried on a wide scale. Scientists working in this field of knowledge have established many important laws of transforming the energy in luminofores.

A NEW APPROACH TO THE PROBLEM OF ‘COLD LIGHT’

One of the most interesting and important transformations of one form of energy into another is that of turning power into light. The first and still the most widely used method of generating light depends upon the phenomenon of incandescence. Another method of considerable practical importance is that of causing radiation by the passage of an electric current through gas or vapour. The third method of converting energy into light is called electroluminescence.

When certain materials are placed in an electric field under proper conditions, they emit light directly under the influence of the electric field. This constitutes the phenomenon of electroluminescence. Since this is a direct transformation of electrical energy into light, a new field of study is revealed which offers great possibilities from both theoretical and practical view points.

STEAM TURBINES

The turbine is a heat engine consisting of a rotor carrying moving blades, a casing in which the rotor revolves, and stationary nozzles through which the steam is expanded or directed. In the steam turbine, two steps are required to convert the potential energy of the steam into useful work. First step, the pressure energy is converted into kinetic energy as the steam expands through the nozzles and the pressure drops. These stationary nozzles expand the steam from a high pressure to a lower pressure in such a way as to produce the maximum possible velocity of the steam jet. Second step, the kinetic energy of the jet is converted into useful work by changing the momentum of the steam by means of moving blades. There are basically two types of turbines: impulse turbines and reaction turbines.

Exercise 2. Answer the following questions.

1 What is the text about? 2 What do we call ‘cold light’? 3 What are luminofores? 4 What kinds of luminofores do you know? 5 How are luminofores used in the production of luminescent lamps? 6 What radiation may be discovered and observed by means of luminofores? 7 Does luminescence find any application in medicine? 8 What is the most widely used method of generating light? 9 What is called

electroluminescence? 10 Is this a direct transformation of electrical energy into light?

Exercise 3. Translate and memorize the following expressions from the text.

Visible light to absorb ultra-violet rays, fast-moving electric charges, to transform energy, certain components of oil, inorganic crystallized substance, small quantities, luminescent lamps, mercury vapours, invisible ultra-violet radiation, to absorb rays, a luminous screen, fast-moving elementary particles, elementary particles, biological compounds, to turn power into light, method of generating light, phenomenon of incandescence, practical importance, proper conditions, direct transformation.

Exercise 4. Find synonyms among the following words.

Receive (v), substance (n), transform (v), absorb (v), turn into (v), method (n), argue (v), compound (n), component (n), put together (v), final (adj), quantity (n), use (v), tube (n), find (v), get (v), matter (n), convert (v), suck in (v), transform (v), way (n), dispute (v), mixture (n), part (n), make up (v), terminal (adj), amount (n), apply (v), pipe (n), discover (v).

Exercise 5. Write a summary of the text, presenting the content of each paragraph in 2-3 sentences. Use the expressions:

The main idea of the text is … The text deals with the one of the most important (urgent) issues … Much attention (consideration) is given to (classification, description) … It focuses on the matter of … The text gives an overview of … The text is mainly concerned with … The aim of the survey is to show (demonstrate, find) … Particular emphasis is given to the analysis of… The text gives a detailed analysis of (reports on) … To sum up … In conclusion …

Варіант 9

Exercise 1. Read the text and translate it in written form.

SOLAR POWER

The sun's energy manifests itself as thermal, photo-electric and photo-chemical effects. Men have tried to use solar energy since earliest times, but no means existed to generate useful power from the sun's heat until steam and hot-air engines were invented.

Crude devices for heating water by solar energy date back many years, and production of salt by solar evaporation of sea water is probably the most ancient of man's sun-activated processes. Photo-electricity has been known for almost a century, and millions of selenium photo-cells have been used as light-meters and in similar application.

Most fundamental of all thermal solar processes is the simple fact that, when sunlight falls upon a surface of any kind, the surface becomes warmer than the surrounding air. The extent to which the surface temperature rises depends upon many factors, most important of which are the angle between the surface and the sun's rays, the absorptive of the surface and the precautions taken to prevent the surface from losing the absorbed heat.

The angle effect is caused by the fact that the sun's rays travel in straight lines. When a surface is perpendicular to the rays, their intensity is at its maximum; the surface being horizontal, the radiation intensity drops off and reaches its minimum.

The most effective way to minimize the loss of energy from the sun heated surface is to cover it with one or more sheets of a glass-like material which is transparent to the sun's rays but opaque to the longer wave lengths emitted by the warmed surface. The air space between the surface and the glass is an effective prevention of heat loss by convection.

A flat place of blackened metal covered with one or more transparent sheets of glass or plastic is known to be the simplest collector of solar energy. Once collected, heat can be used in a variety of ways. Here are some of the potential and actual applications.

Space heating is probably the most important, since nearly one-third of our energy supply is used for this purpose. Water heating can be achieved by portable solar heaters which are able to give as much as 400 litres of boiling water on a sunny day.

The distillation of sea water is another process to be accomplished by variations of the simple flat plate collector. The production of temperatures low enough for air conditioning and domestic refrigeration is a very important potential use of solar energy which is only now beginning to receive the attention it deserves.

Typical arrangements of concentrator-type solar plants with high-pressure boilers must be able to track the sun, so that its rays can be focused upon a collection-element.

We believe solar radiations to be an immense and inexhaustible source of energy our world possesses. UP to the present time, mankind has been able to produce energy from the earth's fuel, but the time will come when this energy will be scare and hence expensive. Research is needed now to learn how to use solar energy cheaply and effectively to heat and cool our homes, produce fresh water from sea water, and to generate large blocks of electric power.

Do you know that the energy of the sun's rays is known to have been used from ancient times? One of the Egyptian statues was said to produce sounds every morning to greet the rising sun. The secret of the singing statue has been discovered.

The inside of the statue was divided into two parts. The lower part was filled with water and the upper one with air. One section of the chamber was situated against the eastern wall of the statue. When the sun rose, it heated the air in the upper part of the statue. The air expanded, pressed on the water and forced it into the other section of the chamber. The water, in turn, forced out the air and sent it through pipes of different musical tone, producing various sounds.

Exercise 2. Answer the following questions.

1 What is the text about? 2 How does the sun's energy manifest itself? 3 When could useful energy from the sun be generated? 4 What is the most ancient of man's activated processes? 5 Where does photo-electricity find its application? 6 When is the intensity of the sun's

rays at its maximum and when is it at its minimum? 7 What is the effective way to minimize the loss of energy from the heated surface? 8 What is the simplest collector of solar energy? 9 What can heat from the sun be used for? 10 What was the secret of the Egyptian statue?

Exercise 3. Translate and memorize the following expressions from the text.

Photo-chemical effects, solar energy, to generate useful power, crude device, solar evaporation of sea water, light-meter, thermal solar process, surrounding air, surface temperature, absorbed heat, radiation intensity, loss of energy, heated surface, glass-like material, air space, flat plate, transparent sheets of glass, portable solar heater, distillation of sea water, high-pressure boilers, to track the sun.

Exercise 4. Find synonyms among the following words.

Solar power (n), manifest (v), earliest (adj), middle (adj), generate (v), application (n), apply (v), common (adj), similar (adj), occasion (n), prevent (v), loss (n), probably (adv), purpose (n), achieve (v), sun's energy (n), announce (v), ancient (adj), average (adj), produce (v), use (n), employ (v), ordinary (adj), resembling (adj), cause (n), ward off (v), waste (n), very likely (adv), aim (n), attain (v).

Exercise 5. Write a summary of the text, presenting the content of each paragraph in 2-3 sentences. Use the expressions:

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Варіант 10

Exercise 1. Read the text and translate it in written form.

ENERGY

Man’s entire life is linked with energy. We need more energy with each passing year. Energy was, is and will remain the foundation of economy, of the development of civilization. That's why energy problems are now among the most important problems that cause concern to the whole of mankind.

What is energy? What are its forms and sources? How is mankind's ever growing need for energy to be satisfied?

The capacity for doing work is called energy. A body possesses energy when due to its position or condition it is capable of doing work and the work it can do is a measure of its energy.

As we know, energy is of two types: potential or kinetic. Potential energy is the energy that has been stored by a body within it. A body possesses potential energy thanks to its position or condition. All fuels (coal, oil, gas, etc.) contain chemical potential energy because they produce the heat that will bring to motion modern engines and do physical work of great importance for our modern industrial world.

Water in a dam is a good example of potential (stored up) energy as well. It possesses this energy because of its higher position. When water is falling with great speed it turns huge turbine wheels and supplies them with kinetic energy. The motion of the turbine can now produce electric energy which will be transmitted to distant homes and factories. Here electric devices are serving man in a thousand of ways.

Thus, kinetic energy is the energy that a body has due to motion. The potential energy of the weight in its highest position is the same as its kinetic energy after it has fallen under the action of gravity to its lowest position. It may be very large, as the motion of the Earth, or very small as that of molecules or even electrified particles.

There are different sources and forms of energy, such as mechanical, chemical, electrical, nuclear, etc. We think of heat and

electricity as fqrms of energy since they can do work, cause motion, move trains and ships, turn water into steam.

Another form of energy is sound. It is produced by molecules of air in motion. We may say that sound is a kinetic form of energy due to the motion of molecules.

A very important feature of energy is that it can be converted or transformed from one form to another. The devices for converting energy from one form to another are called engines. A heat engine, for instance, transforms heat energy into mechanical energy of rotation by the combustion of coal, oil, gas or any other fuel. We may observe a number of such transformations. In the steam engine, for instance, chemical energy, stored in a fuel, is transformed into heat which is another form of energy. This produces steam which in its turn is changed into mechanical energy and drives the engine.

Now mechanical energy can be transformed into electrical by means of dynamo. The latter can be reconverted into mechanical energy in the motor. A turbine of water engine can transform the kinetic energy of falling water into mechanical rotational energy. The solar devices which have been built in many countries convert the sun's energy into other forms of energy that man consumes with profit. Now semiconductor photoelectric devices, solar batteries, are widely used in artificial satellites and spaceships.

All the above said is an illustration of the law of conservation of energy. According to this law energy may be transformed from one form to another, but may not be destroyed or created. This means that a definite amount of energy stored in coal, or chemical energy in a battery, may be changed into any other form of energy, such as heat or electricity.

In its progressive development mankind has always been in a constant search for new sources of energy. Scientists are looking for new and economical sources of energy. They predict that ther-monuclear energy will be the most important source of energy in the 21st century.

Exercise 2. Answer the following questions.

1 Why is the energy problem important for the whole of mankind? 2 What is energy? 3 What examples of potential energy do

you know? 4 When can water in a dam become kinetic energy? 5 What are the forms of energy? 6 What is the characteristic feature of energy? 7 How can one form of energy be changed into another one? 8 What is the law of conservation of energy? 9 What are the sources of energy? 10 Why are scientists looking for new and more economical sources of energy?

Exercise 3. Translate and memorize the following expressions from the text.

Foundation of economy, energy problems, to cause concern, to possess potential energy, thanks to, kinetic energy, to bring to motion, action of gravity, sources and forms, air in motion, to be in search for, mechanical energy, falling water, thermonuclear energy, to transform from one form to another, constant search, the most important source of energy, due to the motion, distant homes and factories, to cause motion.

Exercise 4. Find synonyms and antonyms among the following words.

synonyms: foundation, conservation, link, cause, speed, change, connect, produce, turn into, thanks to, preservation, velocity, basis, convert, transform, due to;
antonyms: huge, destroy, modern, natural, artificial, important, small, low, ancient, similar, satisfied, high, different, unsatisfied, unimportant, create.

Exercise 5. Write a summary of the text, presenting the content of each paragraph in 2-3 sentences. Use the expressions:

The main idea of the text is ... The text deals with one of the most important (urgent) issues ... Much attention (consideration) is given to (classification, description)... It focuses on the matters of … The text gives an overview of... The text is mainly concerned with ... The aim of the survey is to show (demonstrate, find)... Particular emphasis is given to the analysis of... The text gives a detailed analysis of (reports on)... To sum up ... In conclusion ...

Варіант 11

Exercise 1. Read the text and translate it in written form.

DIFFERENT KINDS OF TRANSPORT

In Washington the story is told of a director of the Patent Office who in the early thirties of the last century suggested that the Office be closed because ‘everything that could possibly be invented had been invented’. People experienced a similar feeling after the invention of the steam engine. But there was a great need for a more efficient engine than the steam engine, for one without a huge boiler, an engine that could quickly be started and stopped. This problem was solved by the invention of the internal combustion engine.

The first practical internal combustion engine was introduced in the form of a gas engine by the German engineer N. Otto in 1876. Since then motor transport began to spread in Europe very rapidly. But the person who was the first to make it really popular was Henry Ford, an American manufacturer who introduced the first cheap motor car, the famous Ford Model ‘T’.

The rapid development of the internal combustion engine led to its use in the farm tractors, thereby creating a revolution in agriculture. The use of motor vehicles for carrying heavy loads developed more slowly until the 1930s when diesel-engined lorries became general. The motor cycle steadily increased in popularity as engines and tyres became more reliable and roads improved. Motor cycles were found well suited for competition races and sporting events and were also recognized as the cheapest form of fast transport.

Buses were started in Paris in 1820. In 1828 they were introduced in London by George Shillibeer, a coach builder who used the French name ‘Omnibus’ which was obtained from the Latin word meaning ‘for all’. His omnibuses were driven by three horses and had seats for 22 passengers. Then in the 20th century reliable petrol engines became available, and by 1912 the new motor buses were fast replacing horse-driven buses.

Trams were introduced in the middle of the 19th century. The idea was that, as the rails were smoother than the roads, less effort was needed to pull a tram than a bus. The first trams were horse drawn but

the later trams were almost all driven by electricity. The electric motor driving the tram was usually with electric current from overhead wires. Such wires are also used by trolley-buses, which run on rubber tyres and do not need rails.

Another form of transport used in London, Paris, Berlin, Moscow, Kiev and some other crowded cities is the underground railway. London's first underground railway of the 'tube' type was opened in 1863. The Moscow underground, which is considered to be the best and most comfortable underground in the world, was opened in 1935.

The pipe-lines, which were in use by the ancient Romans for carrying water supplies to their houses, are now mainly used to transport petroleum. The first pipe-line of this kind was laid in Pennsylvania, the United States, in 1865.

Some of the longest oil pipe-lines connect oil-fields in Iraq and near the Persian Gulf with ports on the Mediterranean coast. A famous Pipe-Line Under the Ocean (PLUTO) was laid across the English channel in 1944.

A form of transport which is quite common in some mountainous parts of the world, especially in Switzerland, is the aerial cableway. Cableways are used at nearly all winter sports centres to pull or carry skiers to the top of the slopes. Cableways are used by many Alpine villages which lie high up the mountain-sides for bringing up their supplies from the valley below.

A locomotive is a railway vehicle that provides the motive power for a train. The word originates from the Latin loco – 'from a place', ablative of locus, 'place' + Medieval Latin motivus, 'causing motion', and is a shortened form of the term locomotive engine.

Locomotives pull trains from the front. Increasingly common is push-pull operation, where a locomotive pulls the train in one direction and pushes it in the other, and can be controlled from a control cab at the other end of the train.

Exercise 2. Answer the following questions.

1 What was the reaction of the people after the invention of the steam engine? 2 Why did the invention of the internal combustion

engine become necessary? 3 When was the first practical internal combustion engine introduced? 4 Who introduced the first cheap motor car? 5 When did diesel-engined lorries become general? 6 What kind of transport appeared by 1912? 7 When were the trams introduced first? 8 Where and when was the first underground railway opened? 9 What do the longest oil pipe-lines connect? 10 What are the cableways used for?

Exercise 3. Translate and memorize the following expressions from the text.

Invention of the steam engine, great need for, this problem was solved, internal combustion engine, began to spread rapidly, rapid development, for carrying heavy loads, diesel-engined lorries, to become more reliable, competition races and sporting events, to be driven by, petrol engines, to become available, smoother than the roads, electric current, overhead wires, another form of transport, crowded cities, underground railway, oil pipe-lines, to be common.

Exercise 4. Find synonyms among the following words.

To carry, huge, revolution, comfortable, rapidly, underground, wire, overhead, almost, to invent, many, to transport, form, competition, to spread, to begin, to create, massive, quickly, a lot of, tube, convenient, nearly, to start, to extend, type, alteration, upper, contest, cable.

Exercise 5. Write a summary of the text, presenting the content of each paragraph in 2-3 sentences. Use the expressions:

The main idea of the text is ... The text deals with one of the most important (urgent) issues ... Much attention (consideration) is given to (classification, description)... It focuses on the matters of … The text gives an overview of... The text is mainly concerned with ... The aim of the survey is to show (demonstrate, find)... Particular emphasis is given to the analysis of... The text gives a detailed analysis of (reports on)... To sum up ... In conclusion .

Варіант 12

Exercise 1. Read the text and translate it in written form.

ENGINEERING WORK

In any one area of engineering there is a wide range of functions that the engineer may participate in. The spectrum includes research and development, design, production and construction, installation, operation and maintenance, and sales and management. While mobility is free within the spectrum, it is most likely to occur in the order given than in the reverse direction. One reason is that detailed knowledge of scientific concepts becomes less and less important as one moves toward the managerial function, although the knowledge of finance and labor becomes more detailed. It is difficult for a student to predict his ultimate niche although, if he could, he might choose a somewhat different set of elective courses.

In general, the research and development engineer requires, besides a firm grounding in the fundamentals of his area, an easy familiarity with analytical and experimental techniques. A natural curiosity, creative bent, and considerable stamina are essential.

The design engineer has somewhat similar requirements, with particular accent on creativity. He also needs a broad understanding of such topics as engineering economics, optimization, and methods of manufacture, along with a particular sensitivity toward human needs. Design activity is extremely broad, so the individual is most likely to find himself one of a large team, particularly in a complex project. Senior members in such a group are likely to find themselves coordinating a variety of specialized activities. The team may, for example, include specialists in theoretical analysis, testing, computation, optimization, and esthetic design.

It is the production and construction engineers who, on any project, are responsible for the implementation of a completed design. They will have to work initially with design engineers and then with technicians actually to produce the hardware itself from the specified raw materials. A sound knowledge of materials, methods of manufacture, time estimation, and the logistics of movements of materials is important.

The area of installation, operation, and maintenance may need knowledge from civil, mechanical, electrical, chemical, or other branches of engineering, depending on the nature of the plant. A large plant may employ specialists from these branches, though a small plant may tend to employ engineers comfortable in several areas. Here the responsibility is to ensure that the equipment is installed correctly, brought into operation, and effectively maintained. The engineer must develop effective maintenance and replacement schedules and requires some knowledge of economics. Aspects of safety and pollution control could be important.

The sales area is an important division of many engineering companies, accentuated by the rapid changes and new developments that are constantly modifying products. The sales engineer needs a thorough engineering background but must also be an expert in the operation and performance of his company's products. He may have to educate a prospective customer in the principles, advantages, and limitations of the equipment. It may be important that his knowledge extend to cover his customer's operating plant so that he can illustrate how his own product may best be used. Knowledge of economics law and psychology could be useful, and a friendly personality is a decided advantage.

Many engineers after several years in one or more of the above areas eventually move into managerial positions. Here they quickly discover the merit of some knowledge of economics, financial management, and labor policies. They may need considerable courage to plan effectively and make sound, far-reaching decisions. In this regard the engineer's technical background serves him well, but he will have to acquire a familiarity with business administration also.

Mechanical engineers research, design, develop, manufacture, and test tools, engines, machines, and other mechanical devices. Mechanical engineering is one of the broadest engineering disciplines. Engineers in this discipline work on power-producing machines such as electric generators, internal combustion engines, and steam and gas turbines. They also work on power-using machines such as refrigeration and air-conditioning equipment, machine tools, material-handling systems, elevators and escalators, industrial production equipment, and robots used in manufacturing. Some mechanical

engineers design tools that other engineers need for their work. In addition, mechanical engineers work in manufacturing or agriculture production, maintenance, or technical sales; many become administrators or managers.

Exercise 2. Answer the following questions.

1 What is the text about? 2 What is the range of the engineer's functions? 3 Is the detailed knowledge of scientific concepts very important? 4 What knowledge and skills does the engineer require? 5 What are the professional requirements to the design engineer? 6 What are the production and construction engineers responsible for? 7 What specialists may be employed at a large plant? 8 What are the requirements to the sales engineer? 9 Could knowledge of economics law and psychology be useful for the sales engineer? 10 What position do many engineers eventually move into after several years in one or more of the above areas?

Exercise 3. Translate and memorize the following expressions from the text.

Area of engineering, a wide range of functions, research and development, most likely, in the reverse direction, to move toward, to become more detailed, in general, similar requirements, the implementation of a completed design, to be responsible for, to produce the hardware, methods of manufacture, to employ specialists, the equipment is installed correctly, aspects of safety and pollution control, rapid changes, constantly modifying products, to be useful, a decided advantage.

Exercise 4. Find synonyms among the following words.

To manufacture, method, useful, to install, for example, thorough, to be responsible for, several, to require, correctly, to include, quickly, rapid, important, implementation, to produce, to demand, means, fast, significant, to equip, accurately, helpful, fulfillment, rapidly, comprehensive, to be in charge of, for instance, some, to comprise.

Exercise 5. Write a summary of the text, presenting the content of each paragraph in 2-3 sentences. Use the expressions:

The main idea of the text is ... The text deals with one of the most important (urgent) issues ... Much attention (consideration) is given to (classification, description)... It focuses on the matters of … The text gives an overview of... The text is mainly concerned with ... The aim of the survey is to show (demonstrate, find)... Particular emphasis is given to the analysis of... The text gives a detailed analysis of (reports on)... To sum up ... In conclusion …

Варіант 13

Exercise 1. Read the text and translate it in written form.

REALMS OF ENGINEERING

Traditionally, engineering activities have been grouped into certain areas of specialization. Scientific discoveries and their development gave birth to a variety of fields of application. Several of the more commonly accepted categories are described below.

Electrical Engineering, in general, deals with the creation, storage, transmission, and utilization of electrical energy and information. Most of its activities may be identified with power or communications. Electrical engineering is of recent origin, dating back only to the eighteenth century, when electrical phenomena were first subjected to scientific scrutiny. After this, useful applications were quickly identified. Today, the impact of a power failure graphically illustrates our dependence on electrical power. The field encompasses information systems, computer technology, energy conversion, automatic control, instrumentation, and many other specialties.

Industrial Engineering is mainly concerned with the manufacture of useful commodities from raw materials. Since most of the other engineering fields have a bearing on this activity, the industrial engineer requires a particularly broad view. The management of men, materials, machines, and money are all within his endeavor in

achieving effective production. Plant layout, automation, work methods, and quality control are included, and, more than in most of the other traditional branches of engineering, the industrial engineer needs to have some grounding in psychology and dealing with personnel.

Mechanical Engineering develops machines for the generation and utilization of power. Mechanical engineers design turbines, engines, pumps, and their ancillary mechanisms and structures. Heating, ventilating, air-conditioning, transportation, manufacturing, and vibration are some areas falling within their domain. The art of mechanical engineering dates back to the labor-saving devices and military machines of ancient times, but it received its greatest boost in the eighteenth century with the invention of the steam engine and industrial machinery, which marked the onset of the industrial revolution.

Mining and Metallurgical Engineering, the production and use of metals, has two distinct branches. One deals with the location, extraction, and treatment of ores to obtain base metals, and the other with the transformation of these metals into useful forms and with the study of techniques for improving their performance in specific applications. The study of ceramics is often included in this field. Special topics range all the way from materials that may be used with living tissue to the development of composites for high-temperature applications such as in the heat shields used for satellite reentry.

In addition to the fields identified above, other categories of engineering are often encountered. These include aerospace, agricultural, chemical, civil, architectural, nuclear, textile engineering, etc.

ENGINEERING SOCIETIES

An engineering society is a professional organization for engineers of various disciplines. Some are umbrella type organizations which accept many different disciplines, while others are discipline-specific. Many award professional designations, such as European Engineer, Professional Engineer, Chartered Engineer, Incorporated Engineer or similar. There are also many student-run engineering societies, commonly at universities or technical colleges.

No other profession has organized itself into as many different ties as engineering has. In all, 22 societies and related groups are listed in the directory of the Engineers' Joint Council. In the main, the different societies disseminate information and exchange ideas through technical meetings and publications. They endeavor to maintain a professional consciousness and try to enhance, for example, by the improvement and accreditation of engineering education. Many also support and encourage research and development. Membership in society is possible at several levels, each requiring a specified amount of experience and achievement. It is by participating in such societies that engineers enhance their professional awareness and activities.

ASME

Founded in 1880 as the American Society of Mechanical Engineers, today's ASME is a 120,000-member professional organization focused on technical, educational and research issues of the engineering and technology community. ASME conducts one of the world's largest technical publishing operations, holds numerous technical conferences worldwide, and offers hundreds of professional development courses each year. ASME sets internationally recognized industrial and manufacturing codes and standards that enhance public safety.

Exercise. 2 Answer the following questions.

1 What does Electrical Engineering deal with? 2 What is Industrial Engineering concerned with? 3 Does the Industrial Engineer need to have some grounding in psychology and dealing with personnel? 4 What are responsibilities of Mechanical Engineers? 5 When did the art of Mechanical Engineering receive its greatest boost? 6 What are the spheres of activities in Mining and Metallurgies Engineering? 7 What other categories of engineering are often encountered? 8 Where can you find the list of Engineering Societies? 9 What are the aims and activities of these societies? 10 Is membership in such a society possible?

Exercise 3. Translate and memorize the following expressions from the text.

Scientific discoveries, in general, to deal with, to be subjected to, useful applications were quickly identified, the impact of a power failure, to encompass information systems, to be mainly concerned with, useful commodities, raw materials, to require a particularly broad view, in achieving effective production, quality control, branches of engineering, generation and utilization of power, to receive the greatest boost, specific applications, at several levels, in addition to, different societies,

Exercise 4. Find synonyms among the following words.

Ties, to include, power, commonly, manufacture, to require, field, to group, application, to endeavor, useful, today, particularly, location, broad, production, usually, wide, relation, to try, to classify, sphere, use, energy, to demand, especially, helpful, to comprise, nowadays, position.

Exercise 5. Write a summary of the text, presenting the content of each paragraph in 2-3 sentences. Use the expressions:

The main idea of the text is ... The text deals with one of the most important (urgent) issues ... Much attention (consideration) is given to (classification, description)... It focuses on the matters of … The text gives an overview of... The text is mainly concerned with ... The aim of the survey is to show (demonstrate, find)... Particular emphasis is given to the analysis of... The text gives a detailed analysis of (reports on)... To sum up ... In conclusion …

Варіант 14

Exercise 1. Read the text and translate it in written form.

TEST OF THE LOCOMOTIVE

The locomotive is subjected to a series of adjusting tests in the factory which includes test bed tests of the various machines,

assembles and equipment of the locomotive, tests of the locomotive under rheostatic load, as well as tests on the Ministry of Railways' test tracks.

The factory tests include tests of the diesel equipment, cooling devices of the diesel, of the system of hydraulic drive, of the system of centralized air supply of the electrical machines and apparatus, rectifier unit, etc.

Testbed checks of the diesel generator for stability of parameters, efficiency and wear of the main units are made, as well as for stability of the physical and technical properties of the oil and water, made according to the country's industrial standards.

The tests are carried out for maximum permissible temperatures of the water and oil. The adjusting tests in the factory, the rheostatic tests and trial runs of the locomotive facilitate the establishing of the efficiency of all systems, equipment and the locomotive as a whole. Factory tests prepare the locomotive for service tests on the railways.

The final stage of the factory tests of the new locomotive is service trial run with a passenger or freight train. During the period of preparation of the locomotive a group of specialists from the depot undergoes a special training course at the diesel locomotive plant and at other plants which manufacture components for the locomotive. Locomotive and depot repair crews also undergo training courses organized at the depot. Special groups for the engineers and technical staff are also organized.

A group is organized at the depot called the Reliability Group whose task is the continuous control of the locomotive working, its fuel and lubrication consumption and other items of performance. The depot is supplied with the necessary manuals, drawings and spare parts which facilitate the organization of the trial runs and servicing.

Besides the inspection procedure additional tests of various types of equipment are carried out, mainly for future improvements of locomotive design.

ALTERNATIVE FUELS FOR LOCOMOTIVES

One of the alternative fuels which most probably will find its use in the nearest future is liquefied natural gas (LNG). The principal

locomotive builders and several railroads in the USA have begun LNG research and development programs. In addition to emission reduction that could reach 50 per cent of those from diesel fuel, the use of LNG also promises important fuel cost savings.

The first testing of LNG was begun by Burlington Northern Railroad in 1982, and 10 years later BN began operating two LNG-fuelled locomotives in coal train service. More recently, however, BN successor Burlington Northern Santa Fe has come to the conclusion that LNG does not have significant application for medium horse-power units, and has stopped the test program.

Instead, BNSF thinks that LNG will have more application for high horse-power units, and is now converting some of its engines for LNG tests.

Early in 1994, Union Pacific started a 15 million dollars LNG test program that includes four 4000 HP road locomotives and two 1200 HP shunting locomotives. Road locomotives will be dual-fuel units operating both on gas and diesel fuel. Although all four units have now been delivered, LNG-test operation has not yet begun. UP expects to work out some engine design problems soon, and to begin test on LNG operation with at least one locomotive later.

UP is already testing two LNG shunting locomotives in the Los Angeles area. The Caterpillar 3516 engine used in the shunters uses spark ignition which reduces NOx emission. BNSF is also testing two shunters.

A truly modern steam engine, if ever such a thing could exist, wouldn't look anything like what we think of in terms of steam engines as efficiency would be key. It would be a closed loop steam system and rather than having the steam directly press against cylinders coupled to the drive wheels, it would instead turn a generator that charges batteries and powers traction motors. It would resemble the diesel engines of today far more than the steam engines of yesterday.

Exercise 2. Answer the following questions.

1 What tests the factory includes? 2 What factory tests prepare? 3 What is the final stage of the factory tests? 4 What did the

Reliability Group do? 5 What is LNG? 6 When was the first testing of LNG begun? 7 What LNG test program includes? 8 What is the Alternative Fuels? 9 What was in 1994? 10 What are the problems of some engine design?

Exercise 3. Translate and memorize the following expressions from the text.

Adjusting tests; assembles and equipment of the locomotive; assembles; equipment of the locomotive; system of hydraulic drive; the system of centralized air; supply of the electrical machines and apparatus; rectifier unit; the diesel generator; stability of parameters; the physical and technical properties; the country's industrial standards; permissible temperatures of the water and oil; the locomotive facilitate; final stage; manufacture components; fuel; lubrication; the necessary manuals; inspection procedure; alternative fuels; liquefied natural gas; dual-fuel.

Exercise 4. Find synonyms among the following words.

Subject; adjusting; factory; to assemble; equipment; device; rectifier; propertie; standards; permissible; use; made; to establish; railways; the depot; manuals; inspection; improvements; to operate; recently; converting; to deliver; to expect; spark ignition; to reduce; shunter.

Exercise 5. Write a summary of the text, presenting the content of each paragraph in 2-3 sentences. Use the expressions:

The main idea of the text is ... The text deals with one of the most important (urgent) issues ... Much attention (consideration) is given to (classification, description)... It focuses on the matters of … The text gives an overview of... The text is mainly concerned with ... The aim of the survey is to show (demonstrate, find)... Particular emphasis is given to the analysis of... The text gives a detailed analysis of (reports on)... To sum up ... In conclusion …

Варіант 15

Exercise 1. Read the text and translate it in written form

MODERNIZING LOCOMOTIVES AT LOW COST

Brazilian Federal Railways (RFSA) was going from bad to worse, with increasing financial losses and reductions in tonnage and market share. It was merely a question of time until much of the railway would probably vanish, as the government faced growing financial losses plus diminishing tonnages, and the railway lacked funds even for ordinary maintenance. RFSA could only dream of modernization – a familiar situation in many third world countries today.

Against this background, the government decided to privatize the railway in the hope that the new owners would not only stem the losses, but invest enough to begin modernization and to win back traffic that had been lost to the highways.

The private railways that came into being as a result found the network in need of heavy investment. Cutting out all nonsense, to the dismay of rail enthusiasts, they abandoned electrification and passenger trains (commuter trains are operated separately by one private and several different companies) and began to modernize their freight operations. One of the solutions the railways adopted right from the beginning was the reconstruction of retired locomotives, and the repair of existing but non-functioning locomotives. Another act, well published in Brazil, was the purchase of used locomotives from Namibia and South Africa, rebuilt and regaguged from 1067mm to the meter gauge used by more than 80 per cent of Brazil's railways.

The strategy itself was fine, but a railway in the late 1990s was using power adequate for the 1970s – that is, about 20 years obsolete! The railways were facing heavy competition from modern highways – usually built during the last 40 years and thus designed to more modern standards than the railways – on which heavy nine-axle lorries are now allowed. The railways soon realized they needed something more modern if they were to survive and prosper. Modern locomotives are available, built either in Brazil by the GE1-controlled

Gevisa plant or imported. Other than the cost involved, there is little to be said against them.

The ALL company came up with a new solution, certainly cheaper than upgrading engines as MRS was doing. It took retired GV G12s, rebuilt them as boosters, placed each one between two normal GM2 G22s, and thereby increased tractive effort by 50 per cent at low speeds. Boosters are used in the United States for switching. ALL decided to use them on main lines with steep grades. ALL has so far converted 17 retired locomotives to boosters. It estimates that a retired locomotive can be converted into a booster for $US 250,000, which is considered to be a profitable bargain3 as locomotive prices go up these days! Both FCA and MRS have announced they would test the concept. FCA will take a retired Montreal GE-built 160kW locomotive and convert it into a booster to operate between two similar locomotives. MRS is still studying what will be the first prototype it will build. Boosters can't always be used, which explains MRS's recent import of used locomotives, even at the cost of regauging.

Meanwhile United States Class 1 railways sold some of their older locomotives to regional railways. As GM and GE will finance new locomotives even for regionals, MRS decided to take advantage of the fact and buy these locomotives. In fact, some of the locomotives the Class 1were selling dated from the 1980s, have much more modern equipment than the power inherited from RFSA. RFSA had stopped buying locomotives in the 1970s with very few exceptions, a problem that occurred in many developing countries.

But what about regauging? This can be costly, but MRS tried to solve the problem buying second-hand standard-gauge locomotives and fitting them with the bogies of old broad-gauge units. The mechanical parts of the standard-gauge bogies were installed on the old broad-gauge bogies. A standard-gauge locomotive runs on broad-gauge bogies without the cost of regauging! MRS has bought nine locomotives in the United States, GE C36-8s, to be converted using bogies from retired GE U23Cs. Gevisa will begin the rebuilding in Brazil. If it works as expected, it means a railway anywhere in the world can buy a used standard-gauge locomotive and regauge it.

Notes: 1) GE – General Electrics; 2) GM – General Motors; 3) a bargain – сделка: 4) a regional – местная (региональная) железная дорога.

Exercise 2. Answer the following questions.

1 What railways does this text tell about? 2 Why did the government decide to privatize the railway? 3 What was the first step taken by the new owner? 4 Did the private railway begin modernization with electrification? 5 What was the solution adopted by the railway right from the beginning? 6 What is the gauge on the Brazilian railway? 7 Why were the railways facing heavy competition from modern highways? 8 In what way did the railway increase tractive effort? 9 Is Brazil the only country to use boosters? 10 What are the railways mentioned in the text?

Exercise 3. Translate and memorize the following expressions from the text.

merely, tonnage, modernization, private, enthusiast, strategy, separately, purchase, adequate, survive, bargain, prototype, logistics, dilapidated, obsolete, inherit, occur, regauging, whether, available, obviously; Brazilian Federal Railways, financial losses, tonnage share, ordinary maintenance, familiar situation, retired locomotives, recent import, microprocessor control, with very few exceptions, second-hand standard-gauge locomotives, latest technology products.

Exercise 4. Find synonyms among the following words.

to haul; initial; a tilting train; a schedule; to vanish; the concept; to diminish; obsolete; to prosper; the highways ; to survive; the reconstruction; to upgrade; the newer; to use; dilapidated; tonnages; to convert; solution; to inherit; available; to purchase; calculate; involve; exception.

Exercise 5. Write a summary of the text, presenting the content of each paragraph in 2-3 sentences. Use the expressions:

The main idea of the text is ... The text deals with one of the most important (urgent) issues ... Much attention (consideration) is given to (classification, description)... It focuses on the matters of …

The text gives an overview of... The text is mainly concerned with ... The aim of the survey is to show (demonstrate, find)... Particular emphasis is given to the analysis of... The text gives a detailed analysis of (reports on)... To sum up ... In conclusion …