

Міністерство освіти і науки України
Відокремлений структурний підрозділ
«Ковельський промислово-економічний фаховий коледж
Луцького національного технічного університету»



Англійська мова

(за професійним спрямуванням)

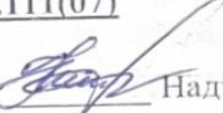
Методичні вказівки до практичних занять
для здобувачів освітньо-професійного ступеня фаховий молодший бакалавр
спеціальності 274 Автомобільний транспорт
денної форми навчання



Ковель, 2023

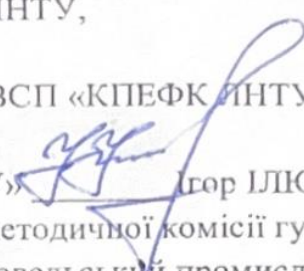
УДК 811.111(07)

А - 64

До друку  Надія КОВАЛЬЧУК. Перший проректор. Голова
Навчально-методичної ради ЛНТУ

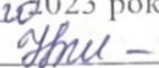
Затверджено Навчально-методичною радою ЛНТУ,
протокол № 7 від 21 03 2023 року.

Затверджено до видання методичною радою ВСП «КПЕФК ЛНТУ»
протокол № 6 від 16 лютого 2023 року.

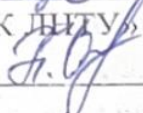
Голова методичної ради ВСП «КПЕФК ЛНТУ»  Ігор ІЛЮШИК

Розглянуто і схвалено на засіданні циклової методичної комісії гуманітарних
та соціально-економічних дисциплін ВСП «Ковельський промислово-
економічний фаховий коледж ЛНТУ»,

протокол № 6 від 09 лютого 2023 року.

Голова циклової методичної комісії  Ніна БАЙЧУК

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А
64
Англійська мова [Текст]: Методичні вказівки до практичних занять для
здобувачів освітньо-професійного ступеня фаховий молодший бакалавр
спеціальності 274 Автомобільний транспорт денної форми
навчання/уклад. Тетяна Вегера, Ольга Хилюк – Ковель: ВСП «КПЕФК
ЛНТУ», 2023. – 84с.

Видання містить методичні вказівки до практичних занять і
рекомендовану літературу. Завдання направлені на формування у здобувачів
навичок практичного набуття та поглиблення знань, розвиток професійної
компетенції.

Призначене для здобувачів освітньо-професійного ступеня фаховий
молодший бакалавр спеціальності 274 Автомобільний транспорт денної форми
навчання.

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Передмова

Методичні вказівки передбачені для вивчення англійської мови (за професійним спрямуванням) студентами спеціальності 274 Автомобільний транспорт денної форми навчання.

Методичні вказівки складено згідно з вимогами навчальної програми з іноземної мови (за професійним спрямуванням) для підготовки фахових молодших бакалаврів технічного профілю і охоплюють базовий лексичний мінімум та нормативну граматику англійської мови.

Ціль вивчення англійської мови (за професійним спрямуванням) у коледжі полягає у практичному оволодінні мовою, навиками читання і перекладу літератури помірної складності зі спеціальності й навиками усної мови із актуальних фахових тем передбачених програмою, і охоплює основні питання пов'язані з автомобільним виробництвом, будовою автомобіля, основними комплектуючими частинами автомобіля, несправностями і способами їх усунення і т. д.

Методичні вказівки складаються з двох розділів, які містять окрему технічну проблему – тему, і включають автентичні, спеціалізовані тексти, які є основою для ведення бесіди або нескладної дискусії. До текстів пропонуються передтекстові і післятекстові вправи та завдання на відпрацювання мовленнєвих навичок і вмінь, використання лексичного матеріалу, що вивчається. Завдання направлені на формування у студентів навичок практичного набуття та поглиблення знань, розвиток професійної компетенції. Побудова системи завдань до кожного тексту визначається методичним призначенням цих текстів. Підібрані вправи дають можливість не лише краще закріпити даний матеріал, але й проконтролювати навички усного та писемного мовлення по даному матеріалу. При розробці системи завдань і вправ використовувались елементи функціонально-комунікативного навчання в іноземній мові, при якій явище мови (лексика і граматики) розглядається не тільки як система правил і особливостей, але і як система комунікативних функцій.

Методичні вказівки слугують введенням у спеціальність, оскільки відображають тісні міжпредметні зв'язки з теорією та конструкцією автомобілів, автомобільними двигунами, електрообладнанням автомобілів, технічною експлуатацією автомобілів, технологією конструкційних матеріалів, що сприяє формуванню професійної компетенції у процесі вивчення англійської мови (за професійним спрямуванням).

Методичні вказівки можуть бути використані здобувачами освітньо-професійного ступеня фаховий молодший бакалавр, викладачами іноземної

мови, абітурієнтами ЗО, учнями спеціалізованих шкіл із поглибленим вивченням англійської мови, слухачами курсів іноземних мов.

Part I

Lesson 1

Automobile Production

I study at the industrial and economic applied college, at the automobile transport department. When I graduate from the college I shall become a technician. All specialists in automobile industry dealing with manufacturing automobiles (cars or trucks) must know that the production of the automobile comprises the following phases:

- designing;
- working out the technology of manufacturing processes;
- laboratory tests;
- road tests;
- mass manufacturing (production).

It is important to know all these facts, as before the automobile is put into mass production it should be properly designed and the car must meet up-to-date requirements. What are these requirements?

The automobile must have high efficiency, long service life, driving safety, ease of handling and maintenance, pleasant appearance. Also it must be comfortable and ecological. In order to obtain these qualities the specialists should develop up-to-date methods of designing cars using new types of resistant to corrosion light materials. Also it is important to know computer sciences because computers offer quick and optimal solutions of the problems. Besides they are used for better operation of mechanisms in cars.

Before the car is put into mass production the units of the car are subjected to tests in the works laboratory and then the car undergoes a rigid quality control in road tests. Why are these tests required? What qualities are required of the automobile? They are needed because the modern automobile must be rapid in acceleration, have smooth acting clutch, silent gearbox, dependable braking and steering systems, dependable ignition system, low fuel consumption and be stable on the road.

Active Vocabulary

A technician – технік,

to deal with manufacturing cars – мати справу з виробництвом автомобілів,

to work out the technology of manufacturing processes – розробляти технологію виробничих процесів,

to put into mass production – запускати у масове виробництво,

to subject to tests – піддавати випробуванням,

dependable brakes – надійні гальма,

driving safety – безпека керування автомобілем,
a long service life – довгий термін служби (експлуатації),
rapid acceleration – швидкий розгін,
ease of maintenance – простота техобслуговування,
to meet up-to-date demands (requirements) – відповідати сучасним вимогам,
to be stable on the road – бути стійким на дорозі,
ignition system – система запалювання,
fuel consumption – витрата палива,
a car – легковий автомобіль,
a truck – вантажний автомобіль.

Comprehensive Questions

1. What department do you study at?
2. What will you become after graduating from the college?
3. What should automobile specialists know?
4. What phases does the production of the automobile comprise?
5. Why is it necessary to know all these facts?
6. What requirements must modern automobiles meet?
7. Why are automobile units and mechanisms subjected to laboratory and road tests?
8. What qualities are required of the automobile?
9. Why is it important to know computer sciences?
10. Why are computers used in cars?

Text Study

Exercise 1. Find and write down from the text the words to:

- a) до виробництва автомобіля;
- b) до характеристик автомобіля. Дайте їх українські еквіваленти.

Exercise 2. Fill in the blanks with the proper prepositions and translate the sentences into Ukrainian.

1. After graduating ... the college I shall deal ... manufacturing cars.
2. The production ... the automobile comprises five phases.
3. Specialists ... automobile industry should develop up-to-date methods ... designing cars.
4. In producing automobiles new types ... resistant... corrosion light materials should be used.
5. All cars undergo a rigid quality control ... tests.
6. The car is put ... mass production after laboratory and road tests.
7. Technicians must know the technology ... manufacturing processes ... cars.

Exercise 3. Complete the sentences choosing the right variant.

1. An automobile specialist deals with ...
 - a. working out technological processes;
 - b. constructing and manufacturing cars;
 - c. producing new resistant to corrosion light materials.
2. The production of the automobile comprises ...
 - a. designing and mass production;
 - b. manufacturing and tests;
 - c. designing and working out technological processes, laboratory and road tests and mass production.
3. The cars are subjected to tests in order...
 - a. to work out new technological processes;
 - b. to meet up-to-date requirements;
 - c. to shorten the time between designing and manufacturing.
4. The qualities required of the automobile are ...
 - a. high efficiency, long service life, driving safety and pleasant appearance;
 - b. smooth acting clutch, silent gearbox, dependable braking and steering systems;
 - c. new types of resistant to corrosion materials.
5. The car must have the following units:
 - a. high efficiency, long service life, driving safety and pleasant appearance;
 - b. smooth-acting clutch, silent gearbox, dependable braking and steering systems;
 - c. new types of resistant to corrosion materials.

Exercise 4. Translate the sentences into Ukrainian paying attention to the special terms.

1. After graduating from the college I shall become a technician.
2. I shall deal with manufacturing cars.
3. The production of the automobile comprises five phases, such as: designing, working out the technology of manufacturing processes, laboratory tests, road tests, mass production.
4. The automobile of today must have high efficiency, long service life, driving safety, ease of maintenance and be stable on the road.
5. The automobile must meet up-to-date demands, that is, it must have rapid acceleration, smooth-acting clutch, silent gearbox, dependable braking and steering systems, dependable ignition system.
6. Before the car is put into mass-production it must be subjected to laboratory and road tests.
7. Technicians should know the technology of manufacturing processes.

Exercise 5. Translate the sentences into English.

1. Я навчаюся на факультеті Автомобільний транспорт промислово-економічного фахового коледжу.

2. Після закінчення коледжу я стану фахівцем автомобільної промисловості.
3. На мою думку, кожен фахівець повинен знати, що автомобіль має пройти стендові і дорожні випробування.
4. Ці випробування необхідні для того, щоб автомобіль відповідав сучасним вимогам.
5. Сучасний автомобіль повинен володіти такими якостями: мати швидкий розгін, плавне зчеплення, безшумну коробку передач, надійні гальмівну і рульову системи, бути зручним в управлінні.
6. Двигун автомобіля також повинен мати невелику витрату палива і бути екологічним.

Exercise 6. Read and translate the dialogues, write down the unknown words and do the exercises.

DIALOGUE 1

Nick: Hello, Boris!

Boris: Hello, Nick. How are things?

N.: Perfectly well, thank you. I entered the industrial and economic applied college.

B.: That's nice, what will you become after graduating from the college?

N.: I'll become a technician and deal with manufacturing new cars.

B.: Why did you choose this profession?

N.: I enjoy learning about a car. I enjoy working with a metal. And most of all I enjoy being able to construct cars.

B.: Do you enjoy this?

N.: Yes, of course.

B.: Tell me about your profession in details, please?

N.: With great pleasure. As you know an automobile must be safe, have smooth acting clutch, silent gears, excellent brakes and steering system. And in order to achieve these qualities a lot of work must be done.

B.: Thank you very much for your information. I believe you like your profession very much.

N.: Oh, yes, very much, indeed.

DIALOGUE 2

Anton: Where do you study?

Boris: I study at the industrial and economic applied college.

A: Whom does the college train?

B: It trains specialists for the automobile industry.

A: Why did you decide to become a technician?

B: I enjoy working with machines. I enjoy learning about a car. I understand every part of it.

A: What can you tell me about the car?

B: Well, the car of today must be rapid in acceleration, it must have dependable clutch, brakes, and steering system, be stable on the road and have pleasant appearance.

A: Do you enjoy the course?

B: Yes, very much. I have learned a lot of things. For example, I know that the production of the car comprises five phases.

A: What are they?

B: They are designing, working out the technology, laboratory tests, road tests, mass production.

A: And why are laboratory and road tests needed?

B: The cars are subjected to tests in order to meet up-to-date demands.

A: And what are these demands?

B: They are high efficiency, long service life, driving safety, ease of maintenance and so on.

A: I think you will become an expert in automobile engineering.

B: I'll try. The cooperative plan of an academic program with practice at a plant will help me to become a good specialist.

Exercise 7. Answer the questions.

1. What college do you study at?
2. What will you become after graduating from the college?
3. What will you deal with?
4. What phases does the production of the automobile comprise?
5. Why are the cars subjected to laboratory and road tests?
6. What qualities must the car have?
7. What units must the car have?

Exercise 8. Translate the following words and word-combinations from the dialogues.

Вчитися в промислово-економічному фаховому коледжі, технік, любити працювати з машинами, сучасний автомобіль, надійні гальма, плавне зчеплення, приємний зовнішній вигляд, масове виробництво автомобілів, стендові випробування, відповідати сучасним вимогам, довгий термін служби, легкість техобслуговування, надійність, швидко розганятися, піддаватися жорстким дорожнім випробуванням.

Exercise 9. Find in the right column the translation to the words and word-combinations in the left.

- | | |
|--|---------------------------------|
| 1. industrial and economic applied college | a. тривалий термін експлуатації |
| 2. to graduate from the college | b. просте техобслуговування |
| 3. low fuel consumption | c. запустити у масове |

- | | |
|---|-----------------------------------|
| 4. to deal with | d. піддавати випробуванням |
| 5. designing cars | e. плавне зчеплення |
| 6. mass production | f. відповідати сучасним вимогам |
| 7. long service life | g. мати справу |
| 8. driving safety | h. надійні гальма |
| 9. to work out | i. навчальна програма |
| 10. ease of maintenance | j. розробляти |
| 11. the technology of manufacturing processes | k. система запалювання |
| 12. to put into mass production | l. безпека керування |
| 13. to subject to tests | m. промислово-економ. коледж |
| 14. a rigid quality control | n. жорсткий контроль якості |
| 15. to meet up-to-date demands (requirements) | o. безшумна коробка передач |
| 16. rapid acceleration | p. конструювання автомобілів |
| 17. smooth-acting clutch | q. закінчити коледж |
| 18. silent gearbox | r. технологія виробничих процесів |
| 19. dependable brakes | s. фахівці |
| 20. steering system | t. масове виробництво |
| 21. an academic program | u. система рульового управління |
| 22. experts | v. мала витрата палива |
| 23. ignition system | w. швидкий розгін |

Exercise 10. Complete the sentences choosing the words and word-combinations given below.

- I study at
- After graduating from the college I shall become
- I shall deal with
- All specialists must know that the production of the automobile comprises.....
- It is necessary to know these facts because the automobile of today must meet.....
- The modern automobile must have
- In road tests the automobile undergoes.....

A technician, a specialist in automobile industry, the production of the automobile, designing, working out the technology of manufacturing processes, laboratory tests, road tests, mass production, high efficiency, long service life, driving safety, ease of maintenance, rigid quality control, rapid acceleration, smooth-acting clutch, silent gearbox, dependable brakes, dependable steering system, the industrial and economic applied college, up-to-date demands (requirements).

Exercise 11. Put the questions to the sentences.

- I study at the industrial and economic applied college.

2. After graduating from the college I'll become a specialist in automobile construction.
3. I'll deal with manufacturing automobiles.
4. The production of the automobiles comprises the following phases: designing, working out technological processes, laboratory and road tests and mass manufacturing.
5. The automobile must meet up-to-date requirements.
6. The car must have high efficiency, long service life, pleasant appearance and driving safety.
7. The car must have smooth-acting clutch, silent gearbox, dependable braking and steering systems, dependable ignition system.

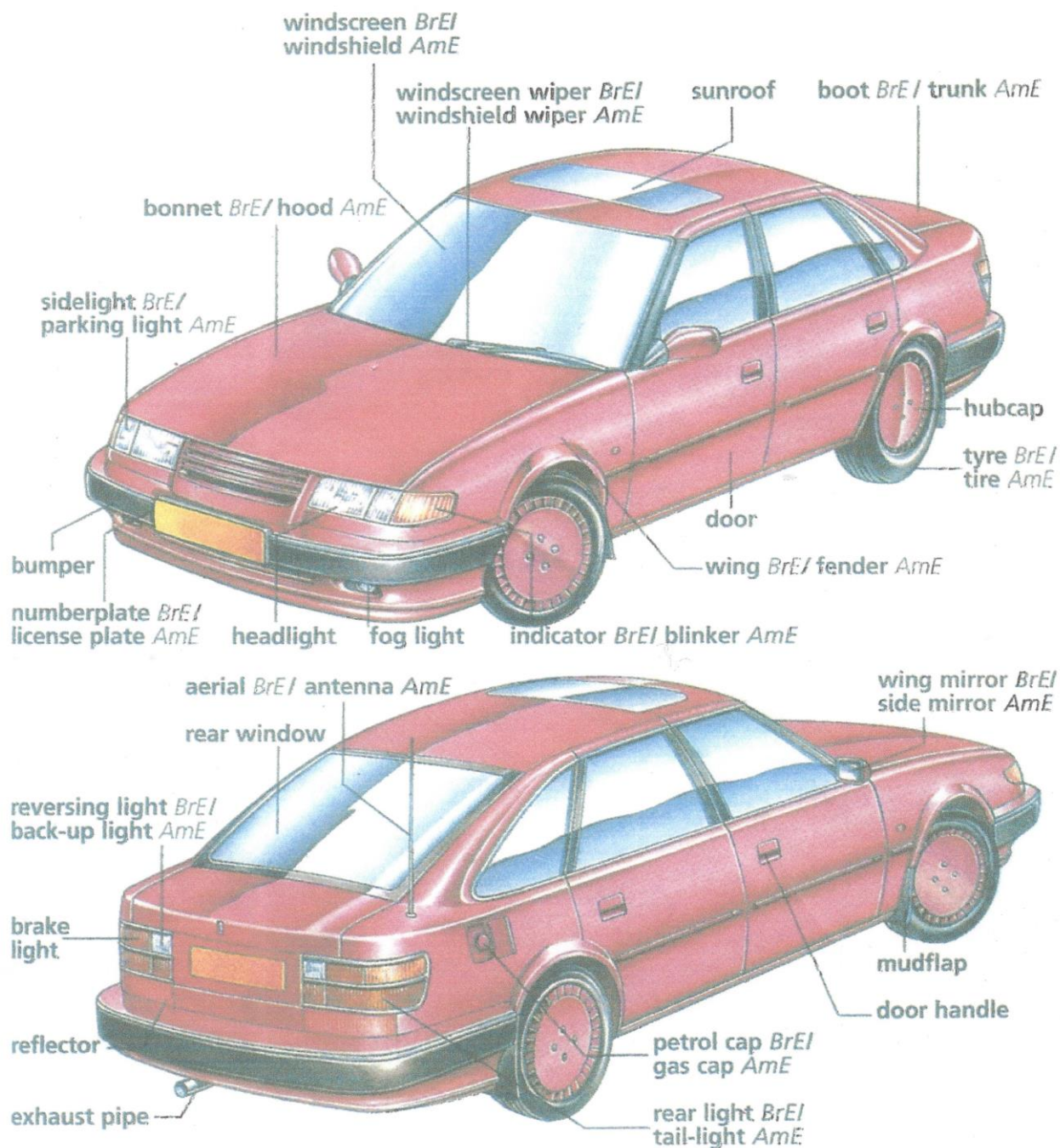
Lesson 2

Materials a Car is Made of

A car is made of different materials. The windscreen, for example, is made of glass. The headlights are also made of glass. The tyres are made of rubber. They are filled with air. The air in the tyres is compressed (to approximately $1,5\text{gm/cm}^3$). The body is made of metal. The metal is painted. The steering wheel is made of plastic. The mirrors are made of plastic and glass. This car has two mirrors. The rear-view mirror is fixed to the windscreen. The wing mirrors are fixed to the doors.

The engine is made of different metals. The pistons are made of aluminium and the valves are made of steel. The springs are also made of steel.

When we think of cars, we think of metal. And it's true that car manufacturers use **steel** to build the frames of cars and trucks. They use **cast iron** for its durability to make engine blocks. And **lightweight aluminum** is perfect for wheel rims. But **plastic** and **fiberglass** make up much of car bodies these days. **Glass** is used to make windows and mirrors. And black **rubber** goes into almost every tyre on the road. Of course, there are softer materials, too. **Leather** is commonly used to line the interior of the finest cars.



Active Vocabulary

A windscreen – лобове скло,
 headlights – фари,
 a tyre – шина,
 a body – кузов,
 a steering wheel – кермо, рульове колесо,
 rear – view mirror – дзеркало заднього виду,
 to fix – прикріплювати,
 a wing mirror – бокове дзеркало,
 a piston – поршень,
 a valve – клапан,

springs – ресори,
 a motorcycle – мотоцикл,
 a fuel tank – паливний бак,
 a saddle – сидіння,
 a handlebars – руль,
 a motorbike – мопед,
 a frame – рама,
 wheel rim – диск.

Text Study

Exercise 1. Complete the sentences choosing it corresponding part from the right column.

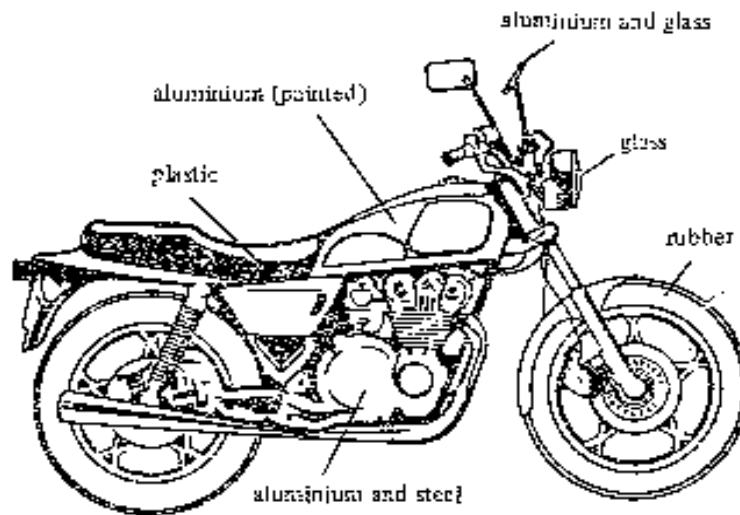
1. A car is made of...	... plastic.
2. The windscreen is made of...	... metal.
3. The headlights are made of...	... different materials.
4. The body is made of...	... glass.
5. The steering wheel is made of...	... is fixed to the roof.
6. The mirrors are made of...	... plastic and glass.
7. The rear –view mirror...	... aluminium and the valves are made of steel.
8. The wing mirror...	... are fixed to the doors.
9. The pistons are made of...	... glass.

Exercise 2. Match the words (1-5) with the definitions (A-E).

1. _ leather 4. _ lightweight
 2. _ cast iron 5. _ fiberglass
 3. _ glass

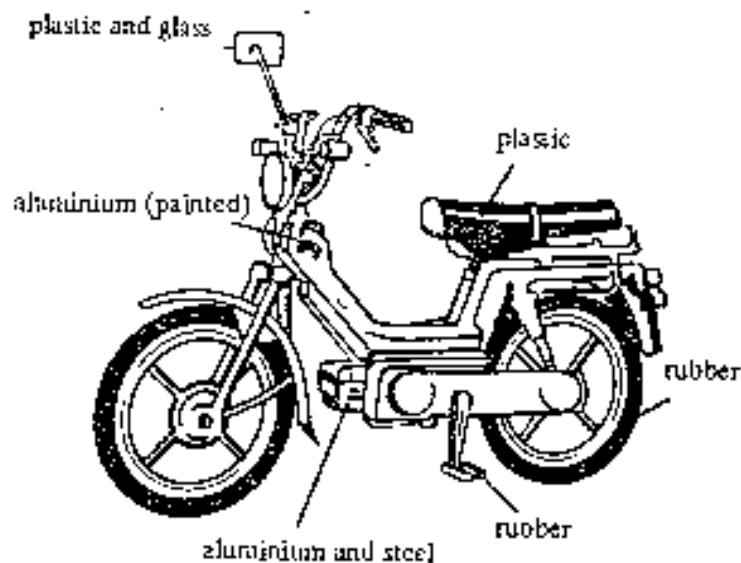
- A** a brittle material used to make windows
B a durable metal used to make engine blocks
C low in mass relative to volume
D material composed of fine filaments
E a flexible material made from animal skin

Exercise 3. Complete the sentences using the picture.



A motorcycle is made of different The headlights, for example, The tyres They ... air . The fuel tank The metal The saddle The engine ... steel and aluminium. The mirrors ... glass. They are ... to the handlebars.

Exercise 4. Describe a motorbike represented on the picture using the previous exercise as a model.



Exercise 5. Complete the sentences choosing the right adverbial modifier of time.

1. Electric cars will help to provide traffic safety
2. They supplied the new calculations for designing the engine... .
3. She will become an engineer
4. The plant produces a great number of machines
5. They finished school
6. We worked at this plant
7. My friend works at the research institute
8. Several scientists work at this problem
9. The automobile industry produces many cars and lorries

in the past, in the future, last year, next year, now, last month, in 5 years, every year.

Lesson 3

Inside a Car

Let's have a look at the car. We are inside a car. There is a seat for a driver and a passenger seat in the front and three seats for the passengers in the back. All round the car are windows to see out – except in the front. This is the windscreen and there are windows wipers to sweep rain off it.

When we drive the car we steer with the steering wheel. If there are obstacles in the way we stop the car with the brake – we brake the car. When the way is clear to go again we accelerate to help us move off. The car has a gear-box and five gears. There is also a gear level. We change gears by pushing the gear level from one gear to the next. To help us to do this we have a foot-pedal. We call it the clutch. We put the clutch out to disengage the engine and we put the clutch in to make it drive again. When we want to stop the car we put on the hand-brake. To start the engine we switch on the ignition and press the starter. And lastly to change direction we signal with the indicators. With our hands we steer with the steering wheel, change gear with the gear level and put on the hand-brake. With our feet we accelerate by using the accelerator, stop by using the foot-brake and change gear by using the clutch.

Now let us look round the outside of the car. Front and rear comes the bumpers to protect the bodywork. In the four corners are the wheels. The bonnet covers the engine. There is also the compartment to contain your luggage, the tools for the car and the spare wheel. We call this compartment the boot. But when the tyre goes flat all the air comes out of it because it has a puncture. So, we lift the car on a jack, change the wheel and drive.

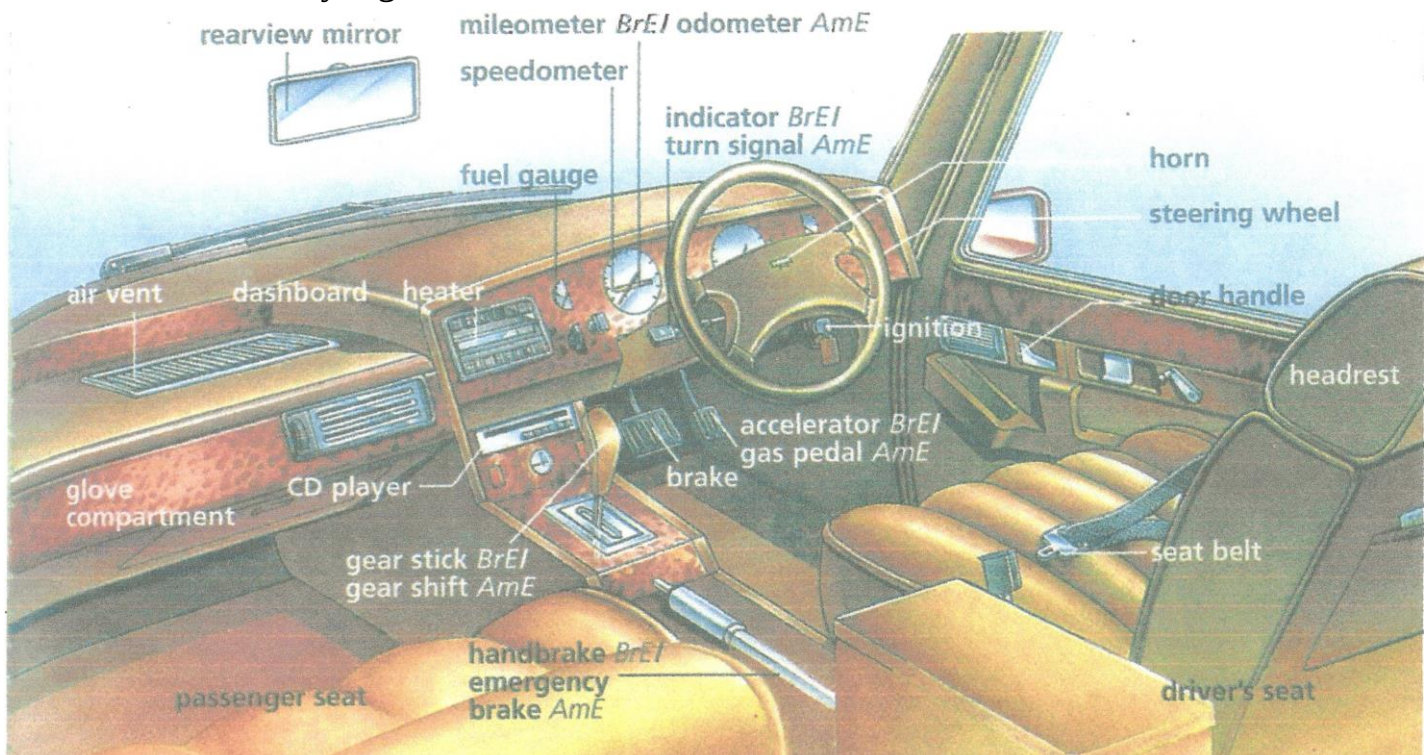
Active Vocabulary

A windscreen wiper – склоочисник, «двірник»,
to steer – керувати,
to accelerate – збільшувати швидкість,
a gear-box – коробка передач,
a gear level – важіль для перемикання передач,
a foot-pedal – педаль,
a clutch – зчеплення,
to disengage – відключити двигун,
the hand-brakes – ручні гальма,
to put on – застосовувати,
ignition – запалювання,
a bumper – бампер,

a bodywork – кузов,
 a bonnet – капот,
 a boot – багажник,
 to go flat – спустати (про шину),
 a puncture – прокол, пошкодження,
 a jack – домкрат,
 a spare wheel – запасне колесо.

Comprehensive Questions

1. What seats are in the front and in the back of the car?
2. Where are the windows wipers?
3. What helps us to steer the car?
4. What helps us to stop the car?
5. How many gears are there in the car?
6. How do we change gears?
7. Why do we use the clutch?
8. What do we do to start the engine?
9. What helps us to accelerate the car?
10. What protects the bodywork?
11. What covers the engine?
12. What do we call the boot?
13. When does the tyre go flat?



Text Study

Exercise 1. Translate into Ukrainian the words and word-combinations from the text.

A seat for a driver, a passenger seat, to see out, obstacles in the way, to brake the car, to disengage the engine, to change direction, to press the starter, the spare wheel, to change the wheel.

Exercise 2. Translate into Ukrainian the words paying attention to the prefixes, suffixes and endings.

To drive – a **driver** – **driving**; to steer – **steering**; to direct – **direction**; to use – **using**; to engage – **disengage**; to ignite – **ignition**; to protect – **protection**; to push – **pushing**; last – **lastly**.

Exercise 3. Complete the sentences choosing it corresponding part from the right column.

1. There is a seat for a driver and a passenger seat... .	1. with the steering wheel.
2. There are three seats for the passengers	2. with the indicators.
3. There are windows wipers	3. switch on the ignition and press the starter.
4. When we drive the car we steer	4. to disengage the engine, to make it drive again.
5. If there are obstacles in the way	5. pushing the gear level from one gear to the next.
6. When the way is clear to go again	6. in the back.
7. We change gears by	7. to sweep rain off the windscreen.
8. We put the clutch out ... and we put the clutch in	8. in the front.
9. To start the engine we	9. we accelerate to help us move off.
10. To change direction we signal	10. we brake the car.

Exercise 4. Put the questions to the sentences.

1. There is a seat for a driver and a passenger seat in the front and three seats for the passengers in the back.
2. If there are obstacles in the way we stop the car with the brake – we brake the car.
3. When we drive the car we steer with the steering wheel.
4. The car has a gear-box and five gears.

5. We put the clutch out to disengage the engine and we put the clutch in to make it drive again.
6. With our hands we steer with the steering wheel, change gear with the gear level and put on the hand-brake.
7. Front and rear the car comes the bumpers to protect the bodywork.
8. The bonnet covers the engine.
9. There is also the compartment to contain your luggage, the tools for the car and the spare wheel.
10. When the tyre goes flat, we lift the car on a jack, change the wheel and drive.

Exercise 5. Translate the sentences into English.

1. Коли ми їдемо на автомобілі, ми керуємо ним за допомогою керма.
2. Склоочисники знаходяться на лобовому склі, щоб змивати дощ.
3. Скільки є пасажирських місць у цьому автомобілі?
4. Ми гальмуємо автомобіль, якщо на шляху є перешкода.
5. В автомобілі є коробка передач із п'ятьма передачами.
6. Важіль для перемикання передач допомагає перемикати передачі.
7. Що ти робиш, коли хочеш завести двигун?
8. Бампери захищають кузов автомобіля від пошкодження.
9. В багажнику ми можемо розмістити наш багаж, інструменти для авто та запасне колесо.
10. Коли шина спустила, ми піднімаємо авто на домкраті і замінюємо колесо.

Lesson 4

Components of the Automobile

The automobile is made up of three basic parts: the power plant, or the engine, the chassis and the body.

The engine is the source of power that makes the wheels rotate and the car moves. It includes fuel, cooling, lubricating and electric systems. Most automobile engines have four or six cylinders.

The chassis includes a power train (power transmission), a running gear, steering and braking systems as well.

The power train carries the power from the engine to the car wheels.

The power transmission, in turn, contains the clutch, gearbox, propeller or cardan shaft, final drive, differential, rear axle and axle shafts. The running gear consists of a frame with axles, wheels and springs.

The body has a hood, fenders and accessories: the heater, stereo tape recorder, windshield wipers, conditioner, speedometer and so on.

Active Vocabulary

Accessories – допоміжні пристрої,
cooling – охолодження,
axle shafts – півосі,
a body – кузов,
conditioner – кондиціонер,
to consist of – складатися з,
to engage – включати, з'єднувати,
fenders – крила,
a final drive – головна передача,
a flywheel – маховик,
a frame – рама,
a heater – обігрівач,
a hood – капот,
in turn – у свою чергу,
to include – містити,
lubricating (lubrication) – змазка,
to measure — вимірювати,
a pedal – педаль,
a power train (transmission) – силова передача (трансмісія),
a power plant – силова установка,
propeller (cardan) shaft – карданний вал,
a rear axle – задній міст,
to release the engine – від'єднати двигун,
a running gear – ходова частина,
a source of power – джерело енергії,
a speedometer – спідометр,
a tachometer — тахометр,
windshield wipers – склоочисники.

Comprehensive Questions

1. What main parts is the automobile made up of?
2. What is the function of the engine?
3. What systems does the engine include?
4. What does the chassis consist of?
5. What units does the power transmission comprise?
6. What assemblies does the running gear consist of?
7. What has the body?

Text Study

Exercise 1. Choose and write down the special terms to: the engine (двигун); the chassis (шасі); the body (кузов). Translate them into Ukrainian.

Fuel system, axle shaft, accessories, cooling system, frame with axles, running gear, lubricating system, steering system, heater, propeller shaft, power transmission, final drive, windshield wiper, clutch, wheels and axle shafts, gearbox, electric system, differential.

Exercise 2. Complete the sentences choosing it corresponding part from the right column.

1. The automobile is made up of...	1. a power transmission, running gear, steering and braking systems.
2. The engine is ...	2. the clutch, gearbox, propeller shaft, final drive, differential and axle shafts.
3. The engine includes ...	3. a hood, fenders and accessories.
4. The chassis consists of...	4. the engine, the chassis and the body.
5. The power transmission comprises ...	5. a frame with axles, wheels and springs.
6. The running gear consists of.. .	6. the source of power.
7. The body has ...	7. fuel, cooling, electric and lubricating systems.

Exercise 3. Translate the sentences into English.

1. Автомобіль складається з трьох основних частин: двигуна, шасі і кузова.
2. Двигун – це джерело енергії.
3. Двигун включає в себе паливну, охолоджуючу, змащувальну і електричну системи.
4. Шасі включає в себе силову передачу, ходову частину, рульову і гальмівну системи.
5. Силова передача (трансмісія), у свою чергу складається із зчеплення, коробки передач, карданного вала, головної передачі, диференціала, заднього моста і півосей.
6. Ходова частина включає в себе раму з осями, колеса і ресори.
7. Кузов включає в себе капот, крила і допоміжні аксесуари: обігрівач, склоочисники, магнітолу, кондиціонер і т.д.

Exercise 4. Read and translate the dialogue, write down the unknown words and do the exercises.

DIALOGUE

A: Do you know what parts the automobile is made up of?

B.: Certainly. It is made up of the engine, the chassis and the body.

A: What is the source of power?

B: The source of power is the engine. It includes fuel, cooling, lubricating and electric systems.

A: And what does the chassis consist of?

B: It consists of a power transmission, running gear, steering and braking systems. By the way, the power transmission, in turn, comprises the clutch, gearbox, propeller shaft, final drive, differential, rear axle and axle shafts.

A: And what has the body?

B: The body has a hood, fenders and accessories, such as: the heater, stereo tape recorder, windshield wipers, conditioner and so on.

A: Thank you very much for your information.

B: Don't mention it. I am glad to help you.

Exercise 5. Translate the following words and word-combinations from the dialogue.

Зроблений з; шасі; кузов; включати в себе; паливна, охолоджуюча, змащуюча і електрична системи; трансмісія, ходова частина, рульова і гальмівна системи, карданний вал, головна передача, диференціал, задній міст, півосі, капот, крила, допоміжні пристрої; склоочисники.

Exercise 6. Complete the sentences choosing the words and word-combinations given below.

A: What parts does the automobile ... ?

B: It is made up of...

A: What is...?

B: The source of power is the ...

A: What systems does the engine ...?

B: It includes ...

A: What does the chassis ... ?

B : The chassis

A: What does the power train include?

B: The power train includes ...

A: What units does the body comprise?

B: It comprises ... and accessories such as ...

A: Thank you for your

Engine, chassis, body, power train, running gear, steering system, brakes, clutch, gearbox, propeller shaft, final drive, differential, rear axle, axle shafts, hood and fenders, heater, windshield wipers, information, conditioner, consist(s) of, the source of power, include, fuel, cooling, lubricating, electric systems.

Exercise 7. Find in the right column the translation to the words and word-combinations in the left.

1	power plant	a.	зчеплення
2	chassis	b.	силова передача
3	body	c.	головна передача
4	power train	d.	колеса
5	running gear	e.	система рульового керування
6	steering system	f.	капот
7	brakes	g.	півосі
8	clutch	h.	ходова частина
9	gearbox	i.	паливна система
10	propeller shaft	j.	склоочисники
11	final drive	k.	коробка передач
12	rear axle	l.	система змащування
13	axle shafts	m.	силова установка
14	frame	n.	рама
15	wheels	o.	у свою чергу
16	springs	p.	гальма
17	hood	q.	ресори
18	fenders	r.	також
19	windshield wipers	s.	шасі
20	fuel system	t.	карданний вал
21	cooling system	u.	задній міст
22	lubricating system	v.	джерело енергії
23	in turn	w.	система охолодження
24	as well	x.	крила
25	source of power	y.	кузов

Exercise 8. Choose and write down the mechanism that responds to the disruption.

- Mechanism which is used to stop the car.
a) clutch; b) brakes; c) gearbox; d) steering system.
- Mechanism which is used to guide the car.

a) clutch; b) brakes; c) gearbox; d) steering system.

3. Mechanism which engages or disengages the engine and the car wheels.

a) clutch; b) brakes; c) gearbox; d) steering system.

4. Mechanism which is used to change the speed of the car.

a) clutch; b) brakes; c) gearbox; d) accelerator.

5. Mechanism which is used to guide the car in one or the other directions.

a) clutch; b) brakes; c) gearbox; d) steering system.

6. Device which is designed to measure the speed of the car.

a) heater; b) windscreen; c) speedometer; d) tachometer.

Part II

AUTOMOBILE SYSTEMS

Lesson 1

Ignition System

You try **to start your car** and nothing happens. Compare your car's symptoms to our troubleshooting list to see what's wrong.

When you turn the key:

Symptom: The lights don't work and the engine is silent.

Diagnosis: The battery could be dead. Check the cables and **ground connections**.

Symptom: The lights work. The engine makes a clicking noise but it doesn't turn over.

Diagnosis: There could be a loose connection involving the starter or **starter relay**.

Symptom: The lights work but the engine is silent. The starter could be bad, or you have a failing **ignition switch**.

A mechanic can replace your ignition switch, battery cables, or starter. If your **battery** is dead, you can replace or charge it yourself after a jump start. Your car should start normally once it's charged. However, if the battery doesn't hold the **charge**, there could be problems in the charging system. Have a mechanic check the **alternator, voltage regulator**, and battery.

Active Vocabulary

to start a car – завести автомобіль,

troubleshooting list – список з усунення несправностей,

turn the key – повернути ключ,

symptoms – проблеми,

ground connections – наземні з'єднання,

dead battery – розряджений акумулятор,
to turn over – обертатися,
loose connection – нещільне з'єднання,
starter relay – стартове реле,
ignition switch – вимикач запалювання,
a battery – акумулятор,
jump start – поштовх, «прикурити»,
charge – заряд,
alternator – генератор змінного струму,
voltage regulator – регулятор напруги.

Exercise 1. Read the troubleshooting guide. Mark the following statements as true (T) or false (F).

1. _ If an ignition switch is bad, a car's lights won't work.
2. _ The article recommends that professionals handle all work with batteries.
3. _ A malfunctioning alternator could lead to a dead battery.

Exercise 2. Read the sentence pair. Then, choose where the words best fit the blanks.

1. turn over / charge

A Because of a bad starter, the engine won't _____ .

B A dead battery has no _____ .

2. charging system / key

A Every car has a unique _____ .

B If the battery is dead, check the _____ .

Exercise 3. Fill in the blanks with the correct words and phrases from the word bank.

Word bank

alternator turn over jump start ground starter relay clicking

1. Attach these cables to your battery before the _____ .
2. When I turned the key, I heard a(n) _____ sound.
3. Electric current is sent by the _____ .
4. A bad _____ can lead to a dead battery.
5. When the engine doesn't _____, the car doesn't start.
6. A(n) _____ is attached to a battery's negative terminal and completes the circuit.

Lesson 2

Fuel System

Date April 18

Customer: Charles Warner

Make: Tolento

Model: Racer

Year: 2019

Area of Inspection:

fuel system (Type: gasoline direct injection).

Customer notes: Customer suspects the **fuel injection** system is malfunctioning

REPORT

Fuel lines: Visually checked steel and rubber **fuel lines**. Removed hoses and clamps and checked for damage. Two hoses were replaced.

Filters: Removed and replaced the **fuel filter**. Removed and replaced the **air filter**.

Pumps: Checked **fuel pump** operating pressure.

Lines: Checked condition of fuel lines going to **fuel tank**. Checked hoses carrying fuel to injectors.

Injectors: Checked and cleaned **fuel injectors**.

Air intake: **Cleaned cold air collection box.**

Carburetor: No carburetor on this model.

Inspection summary: The fuel system had not been serviced since purchase. Two rubber hoses had signs of wear and small cracks. The fuel injectors were slightly clogged. Mr. Warner is advised not to drive with little fuel in his tank to reduce the amount of sediment in fuel injectors.

Active Vocabulary

Area of inspection – зона обстеження,

gasoline direct injection – пряме впорскування бензину,

malfunction – ставати несправним,

to check visually – перевірити візуально,

to remove – замінювати,

fuel injection – паливні форсунки,

fuel lines – паливні лінії,

hoses and clamps – трубки і хомути,

to check for damage – перевірити на пошкодження,

fuel filter – паливний фільтр,

air filter – повітряний фільтр,

air intake – введення повітря,

cold air collection box – колектор холодного повітря,

to be clogged – бути забитим,

the amount of sediment – кількість осаду.

Exercise 1. Read the mechanic's inspection report. Then, mark the following statements as true (T) or false (F).

1. ___ The steel fuel lines were damaged.
2. ___ The fuel system had not been serviced before.
3. ___ This model of a car does not use a carburetor.

Exercise 2. Match the words (1-5) with the definitions (A-E).

- | | |
|----------------|-------------------|
| 1 _ fuel line | 4 _ fuel filter |
| 2 _ carburetor | 5 _ fuel injector |
| 3 _ fuel tank | |

A a part that mixes fuel and air

B a device that screens out dirt in the fuel

C a storage container for fuel

D a tube that delivers fuel to the engine

E a pump that delivers fuel to the combustion chamber of the engine

Lesson 3

Lubrication System

You depend on your car. That's why getting regular maintenance from the experts at Express Oil is so important.

Here at Express Oil, we care about you and your car. As professionals, we offer more than just **oil changes**. We watch over your **lubrication system**. Our selection of **oils** offer the right **viscosity** and **detergent** properties to prevent **sludge** buildup. We can change your **oil filter**, monitor the **oil pressure** and test the **oil pump**.

And we know: it's tempting to change your oil at home. But a mistake could allow **heat** and **friction** to damage your car. Our professional **grease guns** and **zerks** will **reduce** wear and tear and **lubricate** the suspension better than any home grease gun can.

Active Vocabulary

regular maintenance – регулярне техобслуговування,

oil changes – заміна масла,

to watch over – стежити,

the right viscosity and detergent properties – хороша в'язкість та миючі властивості,

to prevent sludge buildup – запобігати накопиченню осаду,

oil filter – масляний фільтр,

to monitor the oil pressure – перевірити тиск масла,

oil pump – масляний насос,
heat and friction – тепло і тертя,
grease gun – мастильний пістолет,
grease zerk – маслянка,
a slippery substance – слизька речовина,
wear and tear – знос.

Exercise 1. Read the advertisement for an oil change shop. Then, mark the following statements as true (T) or false (F).

- 1 _ An oil change at Express Oil removes detergent buildup.
- 2 _ Express Oil changes oil pumps with each oil change.
- 3 _ A poorly lubricated suspension will experience friction.

Exercise 2. Match the words (1-5) with the definitions (A-E).

- | | |
|---------------|----------|
| 1 _ viscosity | 4 _ oil |
| 2 _ detergent | 5 _ zerk |
| 3 _ sludge | |

A a part that works with a grease gun

B the thickness of a fluid

C a slippery substance used to keep parts moving

D a chemical used to clean things

E a thick substance produced by burning oil

Exercise 3. Fill in the blanks with the correct words and phrases from the word bank.

Word bank

lubricate oil pressure reduce oil filter grease gun heat

1. The oil pump creates _____ .
2. A _____ is used to pump grease.
3. The _____ screens out dirt.
4. Grease is used to _____ engine parts.
5. Lubrication systems _____ damage caused by heat.
6. Parts rubbing together cause _____ .

Lesson 4

Exhaust System

Do you have **muffler** trouble? Did you fail an **emissions** test?

Come into JJ's Muffler and Automotive. We are a family-owned shop that provides the best customer service at unbeatable prices. We offer vehicle emission inspections and diagnostics and repairs, as well as high quality **emission controls** and installations. We honor our promise to provide free visual inspections upon request and will perform engine scans when necessary. Our services include:

Exhaust services and repairs
to:

- Catalytic converters
- Exhaust manifolds
- Exhaust manifold gaskets
- Exhaust pipes
- PCV valves
- Heat shields

Custom and performance installations of:

- True dual exhaust systems
- Diesel exhaust systems
- Mid-range and high performance mufflers
- Custom-made tailpipes

Active Vocabulary

muffler trouble – проблема з глушником,
to fail an emissions test – не пройти перевірку на токсичність викидів,
the best customer service – найкраще обслуговування клієтів,
unbeatable prices – неперевершені ціни,
to offer vehicle emission inspections – пропонувати перевірку на токсичність викидів,
diagnostics and repairs – діагностика і ремонт,
high quality emission controls – високоякісний контроль за токсичністю викидів,
engine scans – сканування двигуна,
exhaust services and repairs – вихлопні послуги і ремонт,
catalytic converter – каталітичний нейтралізатор,
exhaust manifolds – вихлопні колектори,
exhaust manifold gaskets – прокладки вихлопних колекторів,
PCV valves (pollution control valves) – клапани запобігання забруднення навколишнього середовища,
heat shield – теплозахисний екран,
true dual exhaust systems – справжня подвійна вихлопна система,
diesel exhaust system – дизельна вихлопна система,
mid-range and high performance muffler – середній діапазон і високопродуктивний глушник,
custom-made tailpipes – виготовлені на замовлення вихлопні труби.

Exercise 1. Before you read the passage, talk about these questions.

1 How do gases leave a car?

2 What are some parts of a car exhaust system?

2 Read the advertisement. Then, mark the following statements as true (T) or false (F).

1 _ The shop performs emission inspections.

2_ The shop installs custom heat shields

3 _ The shop can install multiple types of exhaust systems.

Exercise 2. Match the words (1-5) with the definitions (A-E).

1 _ pollution

4 _ exhaust system

2 _ PCV valve

5 _ exhaust manifold

3 _ heat shield

A a vehicle's waste-disposal system

B an emissions control device

C substances harmful to the air a device used as protection from heat

D a device used as protection from heat

E a structure that carries gases to the exhaust pipe

Exercise 3. Read the sentence pair. Choose where the words best fit the blanks.

1 exhaust pipe / catalytic converter

A The _____ carries gases to the muffler.

B A(n) _____ reduces the harmful gases in exhaust.

2 muffler/tailpipe

A The purpose of a _____ is to limit sound.

B The last part of the exhaust system is the _____.

Lesson 5

Cooling System

Any driver can keep a car's **cooling system** healthy. Professionals only need to be consulted when something has to be replaced or fixed.

First, the easiest way to maintain your engine's cooling system is to keep adequate **antifreeze** levels. Also known as **coolant**, antifreeze works to keep the fluid in the cooling system from **boiling** or **freezing**. A **coolant recovery system** provides a reservoir for the **radiator**. It collects overflowing coolant that can be returned to the radiator after cooling.

Next, check the radiator. The **upper radiator hose** should be delivering liquid to the radiator, and the **lower radiator hose** should be releasing liquid from the radiator by the force of the **water pump**. A **serpentine belt** and **pulleys** may power

the water pump, so inspect these pieces carefully. Also, make sure the **heater hoses** are connected to the heater core and that the thermostat is operating.

Finally, the **fan** should be pulling cool air through the radiator fins while the car is idling.

Active Vocabulary

to keep adequate antifreeze levels – підтримувати належний рівень антифризу,

a coolant – охолоджуюча рідина,

a coolant recovery system – система відновлення охолоджуючої рідини,

a reservoir – резервуар,

overflowing – переповнений,

upper radiator hose – верхній шланг радіатора,

lower radiator hose – нижній шланг радіатора,

to release liquid – випустити рідину,

pulleys – шківи,

heater hoses – шланги обігрівача,

heater core – сердечник обігрівача,

a fan – вентилятор,

to pull cool air – втягувати прохолодне повітря,

radiator fins – ребра радіатора,

the car is idling – автомобіль працює на холостому ході.

Exercise 1. Before you read the passage, talk about these questions.

1. What parts keep an engine cool?
2. What belt apparatus powers the water pump?

Exercise 2. Read the chapter on auto repair. Then, choose the correct answers.

1 What is the main idea of the article?

A maintaining the cooling system

B comparing types of cooling systems

C replacing parts of the cooling system

D identifying problems in the cooling system

Exercise 3. According to the passage, what is the easiest way to keep a cooling system functioning?

A by keeping fans functioning

B by testing the thermostat monthly

C by replacing the water pump annually

D by keeping the right amount of coolant

Exercise 4. Which of the following does NOT cool a radiator'

A fan

C heater hose

B water pump

D coolant recovery system

Exercise 5. Match the words (1-7) with the definitions * (A-G).

1 _ fan

5 _ heater hose

2 _ pulley

6 _ cooling system

3 _ radiator

7 _ serpentine belt

4_ antifreeze

A the system that keeps the engine cool

B a rubber tube that connects to the heater core

C an electric device that blows air

D a device with a wheel and a grooved rim

E the device used to cool liquid in a cooling system

F a type of coolant used to prevent water from freezing

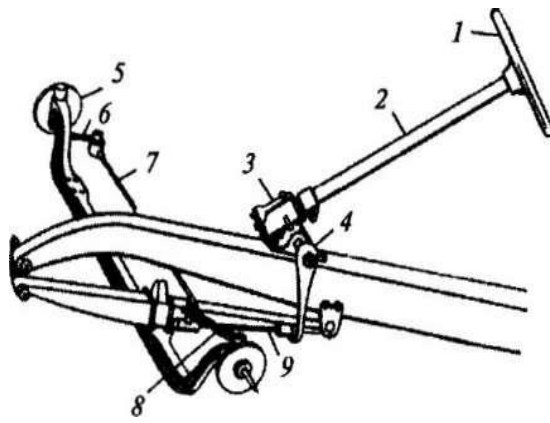
G a rubber belt that winds through pulleys

Lesson 6

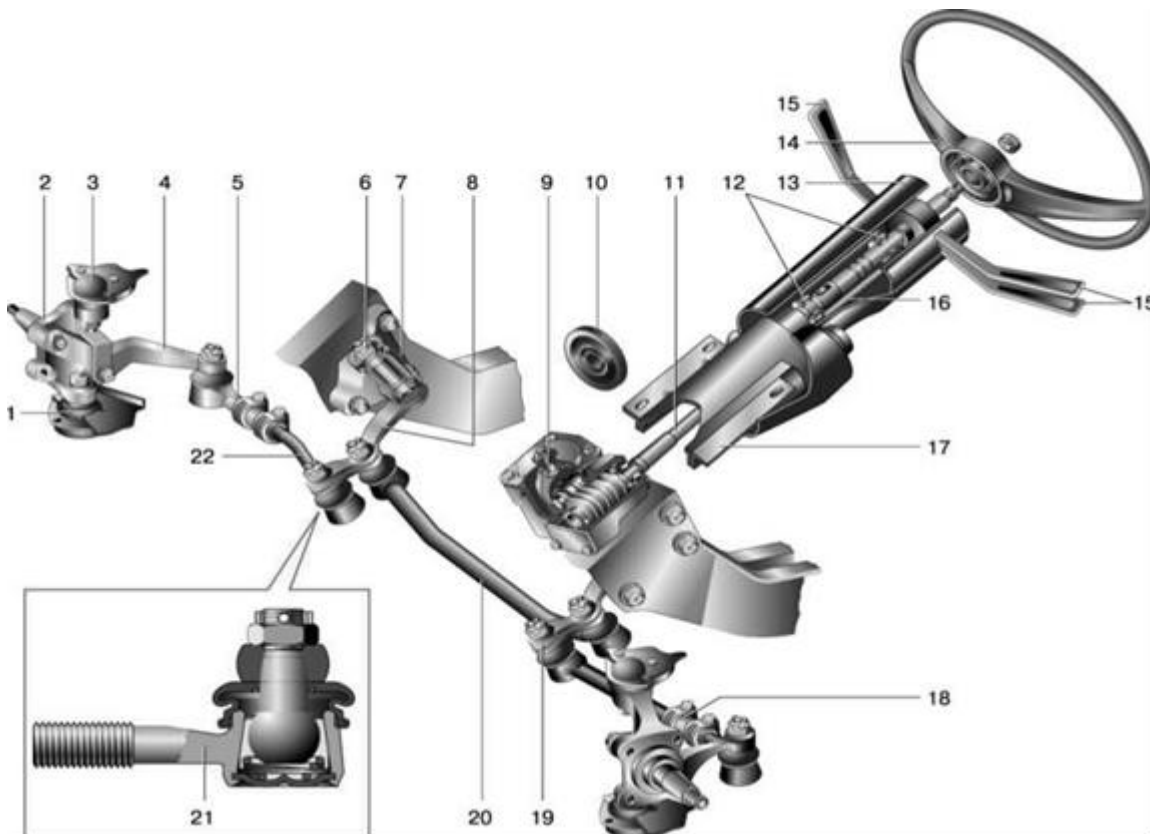
Steering System

To guide the car, it is necessary to have some means of turning the front wheels so that the car can be pointed in the direction the driver wants to go. The steering wheel in front of the driver is linked by gears and levers to the front wheels for this purpose. The front wheels are on pivots so they can be swung to the left or right. They are attached by steering knuckle arms to the rods. The tie-rods are, in turn, attached to the pitman arm.

When the steering wheel is turned, gearing in the steering gear assembly causes the pitman arm to turn to the left or right. This movement is carried by the tie-rods to the steering knuckle arms, and wheels, causing them to turn to the left or right.



Steering system



1 - нижній кульовий шарнір; 2 - поворотний кулак; 3 - верхній кульовий шарнір; 4 - важіль поворотного кулака; 5 - наконечник рульової тяги; 6 - вісь маятникового важіля; 7 - кронштейн маятникового важіля; 8 - маятниковий важіль; 9 - редуктор рульового механізму; 10 - ущільнювач вала; 11 - вал рульового управління; 12 - голчасті підшипники верхнього вала; 13 - облицювальний кожух; 14 - рульове колесо; 15 - підрульові перемикачі; 16 - труба кронштейна; 17 - кронштейн рульового вала; 18 - регулювальна муфта; 19 - рульова сошка; 20 - середня тяга; 21 - рульовий наконечник з шарніром в розрізі; 22 - бічна тяга.

1. Steering wheel – кермо,

2. steering column, steering mast – рульова колонка,

3. steering gear – рульовий механізм,

4. steering arm, steering lever, (steering) pitman arm – сошка керма,

5. steering knuckle – поворотний кулак,

6. steering knuckle lever, steering knuckle arm – важіль поворотного кулака,

7. single tie-rod – нерозрізна поперечная рульова тяга,
8. drag link, steering gear connecting rod, steering drag rod — повздовжня рульова тяга.

The steering system incorporates: the steering wheel and column, steering gear, pitman arm, steering knuckle arm, front axle, steering knuckle pivot, tie-rods.

There are several different manual steering gears in current use, such as the rack and pinion type and the recirculating ball type. The rack and pinion steering gear is widely used. Another manual steering gear which is popular in imported cars is the worm and sector type.

The steering wheel and column are the source of injury to the driver, air bags and other devices being developed now to save the life of a driver.

Energy-absorbing columns must stop the steering wheel and column from being pushed to the rear as the front of the car is crushed in an impact.

Energy-absorbing columns must also provide the driver with a tolerable impact as he moves forward and strikes the wheel with his chest.

Active Vocabulary

To absorb – поглинати,
air bag – подушка безпеки,
bending – згин, згинання,
excessive – надмірний,
for this purpose – для цієї цілі,
to guide the car – керувати автомобілем,
a hydraulic pump – гідравлічний насос,
leakage – витік,
a lever – важіль,
leverage – важільний механізм,
linkage – з'єднання,
means of turning – засіб повороту,
pitman arm – рульова сошка,
pitman shaft – рульовий вал,
pivot – шарнір,
rack and pinion assembly – рейково-шестерний механізм,
rack and pinion type steering gear – рульовий механізм із рейкою і шестернею,
recirculating ball type steering gear – рульовий механізм із кульковою гайкою,
steering box – картер рульового механізму,
steering column – рульова колонка,
steering knuckle arm – важіль поворотного кулака,
steering wheel – рульове колесо,
swing (swang, swung) – повертатися,

tie-rod – поперечна тяга,

worm and sector type – рульовий механізм із червяком і сектором.

Comprehensive Questions

1. What mechanism is necessary to guide the car?
2. How is the steering wheel connected to the front wheels?
3. Why can the front wheels be swung to the left or to the right?
4. What does the manual steering system incorporate?
5. What types of manual steering gears in use do you know?

Text Study

Exercise 1. Translate into Ukrainian the words and compare them with Ukrainian meaning.

Column, spindle, system, hydraulic, pump, reservoir, popular, type, effective, effectiveness, effectively, energy, function, to deform, deformation.

Exercise 2. Translate into Ukrainian the words paying attention to the suffixes and prefixes.

Rotate – rotation, apply – application, move – movement, develop – development, drive – driver, form – reform – deform – deformation, guide – guidance.

Exercise 3. Translate into Ukrainian paying attention to the Gerund.

1. To guide the car it is necessary to have some means of turning the front wheels.
2. The steering wheel in front of the driver is linked by gears and levers to the front wheels for turning the car in the direction the driver wants to go.
3. Without using the steering system the car moves only in the direct position.
4. Manufacturers can use rack and pinion type steering gear without choosing another type because "rack and pinion" type steering is very dependable.
5. Energy-absorbing columns must stop the steering wheel from being pushed to the rear when the front of the car is damaged in an impact.

Exercise 4. Translate into Ukrainian without a dictionary.

To turn the car you must have some means of turning the front wheels. For this purpose the steering wheel and steering column are linked to the front wheels. The front wheels are on pivots and can be swung to the left or to the right.

When the driver turns the steering wheel and column the front wheels (being on pivots) attached by the steering knuckle arms to the tie rods are also turned.

Exercise 5. Read, translate into Ukrainian and remember the information.

Troubles of Steering Gear Components

Steering gear and linkage may have the following basic troubles: excessive steering-wheel free play, bending of steering rod, oil leakage from the steering-gear case, disadjustment of steering gear.

What to do

1. Check the steering-wheel free play and steering gear performance while the car is running.
2. Check the steering-gear case for oil leakage by visual inspection.
3. Adjust the steering gear. Steering gear of the worm and roller type is adjusted by end playing in the steering worm shaft bearings.

Exercise 6. Complete the sentences choosing it corresponding part.

1. The front wheels are on pivots so...
 2. When the steering wheel is turned...
 3. The steering wheel is linked.
 4. Most manufacturers use...
 5. Steering gear may be...
 6. Steering knuckle arms and wheels are turned...
-
- a. by the tie-rods.
 - b. rack and pinion type, recirculating ball type, worm and sector type.
 - c. gearing in the steering system causes the pitman arm to turn.
 - d. rack and pinion type.
 - e. they can be swung to the left or right.
 - f. by gears and levers to the front wheels.

Exercise 7. Translate into English.

1. Для керування автомобілем необхідна система рульового управління.
2. Рульове управління включає в себе: рульове колесо і рульову колонку, зубчасте з'єднання, рульову сошку, важіль поворотного кулака і шарнірні з'єднання, важілі і поперечні тяги.
3. Існують різні типи рульових механізмів, а саме: рейково-шестерний тип, механізм із кульковою гайкою, механізм із черв'яком і сектором.
4. Коли водій повертає кермо вліво чи вправо, то рульовий механізм змушує рульову сошку повертатися вліво чи вправо. Цей рух передається поперечними тягами до важілів поворотних кулаків і до коліс, змушуючи їх повертатися вліво чи вправо.

Exercise 8. Read and translate the dialogue.

DIALOGUE

Stas: Look here. I have some troubles with the steering system.

Vlad: What troubles?

S.: The first is excessive free play of the steering wheel.

V.: You should check free play of the steering wheel and steering gear performance.

S.: The second problem is oil leakage from the steering gear case.

V.: Check the steering gear case for oil leakage visually. Anything else?

S.: Sure. It is disadjustment of the steering gear. And I don't know what to do.

V.: You see, in this case it is better for you to go to a repairing shop. Good specialists should do this job.

S.: Thank you very much.

V.: Not at all.

Text 7

Chassis

The main units of the chassis are: the power transmission, the running gear and the steering mechanism. The power transmission includes the whole mechanism between the engine and the rear wheels. This entire mechanism consists of the clutch, gearbox, propeller (cardan) shaft, rear axle, final drive, differential and axle shafts.

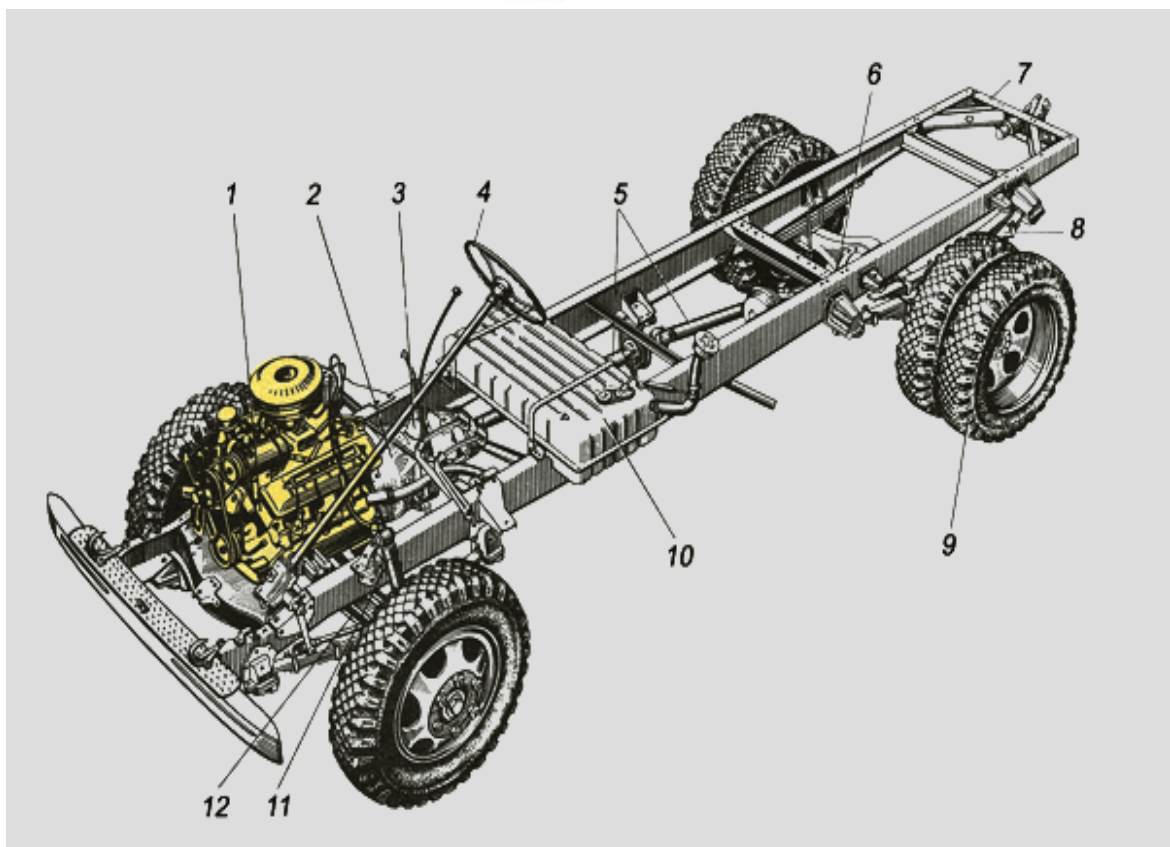
At the front end of the car is the engine. On the back of it is the flywheel. Behind the flywheel is the clutch. The clutch is a friction device connecting the engine with the gears of the gearbox. The main function of the gearbox is to change the speed of the car.

The power is always transmitted by the cardan shaft to the back axle. The final drive reduces the high speed of the engine to the low speed of the driving wheels. The differential enables the driving wheels to turn at different speeds which are necessary when turning the car. The foundation of the automobile is the frame to which different chassis units are attached.

The rear axle is capable of moving up and down about the frame. The rear axle is an important part of the transmission. It carries the greater portion of the weight of the car.

The steering mechanism is designed for changing the direction of the car.

The brakes are used for stopping the car, for decreasing its speed and for holding the car position.



Active Vocabulary

To adjust – регулювати,
 to attach – прикріплювати,
 to be capable – бути здатним,
 breather channel – канал сапуна,
 a check – перевірка,
 to decrease the speed – зменшувати швидкість,

driving wheels – ведучі колеса,
engine crankshaft – колінчатий вал двигуна,
fastening bolts – кріпильні болти,
to fit properly – підганяти належним чином,
free travel – вільний хід,
greater portion of the car weight – більша частина ваги автомобіля,
to hold the car position – утримувати автомобіль в потрібному напрямку,
housing – картер, корпус,
incomplete disengagement – неповне відключення (зщеплення),
a level – рівень,
malfunction — неполадки, несправна робота,
to mount – встановлювати,
to move up and down – рухатися вгору та вниз (підстрибувати на нерівній дорозі),
rear wheels – задні колеса,
run out – знос,
self-demeshing of gears – самороз’єднання шестерень (саморозчеплення),
to support – підтримувати, (спиратися на),
to tighten – закріплювати, затягувати,
torque – крутний момент,
tractive effort – тягове зусилля,
travelling speed – швидкість їзди,
a trouble – несправність,
trunnion cross – хрестовина кардана,
universal-joint forks – вилки кардана,
to wash – промивати,
within the range – в межах.

Comprehensive Questions

1. What main units does the chassis consist of?
2. Where is the engine located?
3. Where is the flywheel fixed?
4. Where is the clutch placed?
5. What is the gearbox designed for?
6. By what shaft is the power transmitted to the back axle?
7. What does the rear axle do?
8. What is the function of the differential?
9. What purpose is the steering system designed for?
10. What is the function of the brakes?

Text Study

Exercise 1. Translate into Ukrainian the words paying attention to the suffixes.

to transmit – **transmission**; to connect — **connection**;

to found — **foundation**; to move — **movement**.

Exercise 2. Translate into Ukrainian the international words.

Transmission, system, mechanism, radiator, friction, automobile, cardan, portion, final, accelerator, pedal, position.

Exercise 3. Translate into Ukrainian.

1. The chassis includes the running gear, the power transmission and the steering mechanism.
2. The power transmission consists of the clutch, gearbox, cardan shaft, rear axle, final drive, differential and axle shafts.
3. The clutch connects the engine with the driving wheels.
4. The gearbox changes the speed of the car movement.
5. The steering mechanism changes the direction of the car.

Exercise 4. Translate into Ukrainian paying attention to the Complex Subject.

1. Transmission, running gear and steering mechanism **are known** to be the main units of the chassis.
2. The clutch **is known** to connect the engine with the driving wheels of the car.
3. The gearbox **is known** to change the speed of the car.
4. The steering mechanism **is known** to change the direction of the car.
5. Brakes **are considered** to be one of the most important mechanisms of the car.

Exercise 5. Translate into English.

1. Основними вузлами шасі є: трансмісія, ходова частина і рульовий механізм.
2. Радіатор розташований в передній частині автомобіля.
3. Маховик кріпиться на задній частині двигуна.
4. Зчеплення з'єднує двигун з коробкою передач.
5. Коробка передач призначена для зміни швидкості руху автомобіля.
6. Зусилля передається карданным валом.
7. Головна передача знижує високі оберти двигуна до невисоких обертів ведучих коліс.
8. Диференціал дозволяє ведучим колесам обертатися з різною швидкістю при повороті автомобіля.
9. Рульовий механізм призначений для зміни напрямку руху автомобіля.
10. Гальма використовуються для зупинки або зниження швидкості автомобіля.

Exercise 6. Read and translate the dialogue, write down the unknown words.

DIALOGUE

Transmission Mechanism

Teacher: Let's speak about the transmission mechanism. What main units does the transmission include?

Student: The transmission is the entire mechanism between the engine and the rear wheels. It includes the clutch, gearbox, cardan shaft, rear axle, final drive and differential.

T.: What does the clutch connect?

S.: The clutch connects the engine with the gearbox.

T.: And what does the gearbox do?

S.: The gearbox changes the speed of the car.

T.: What does the differential enable?

S.: The differential enables the driving wheels to move at different speeds when turning the car.

T.: For what purpose is the steering system used?

S.: The steering system is used for changing the direction of the car movement.

T.: And what is the function of the brakes?

S.: Brakes are used to slow or stop the car.

T.: That's right. You know the subject very well.

Exercise 7. Translate into Ukrainian in written form the text.

Basic Troubles of Transmission Mechanism

The transmission of the engine torque to the driving wheels of the automobile must be smooth. There should be no vibration in the operation of transmission mechanism within the range of travelling speeds.

The indications of malfunctions in the transmission mechanism components are as follows:

1. incomplete disengagement of the clutch;
2. difficult engagement or self-demeshing of gears;
3. run out and vibration of the cardan-drive shaft.

What to do in these cases:

1. Check the free travel of the clutch pedal and adjust it.
2. Check the oil level in the gearbox housing and wash breather channel.
3. Check to see that all the fastening bolts are securely tightened and that the trunnion crosses fit properly the bearings, and the bearings, in turn, the universal-joint forks.

Lesson 8

Frame

The foundation of the automobile chassis is the frame which provides support for the engine, body and power-train members. Cross members reinforce the frame. The frame is rigid and strong so that it can withstand the shocks, vibrations, twists and other strains to which it is put on the road.

The frame provides a firm structure for the body, as well as a good point for the suspension system. There are two types of frames, namely: conventional frames and integral (unibody) frames (frameless constructions).

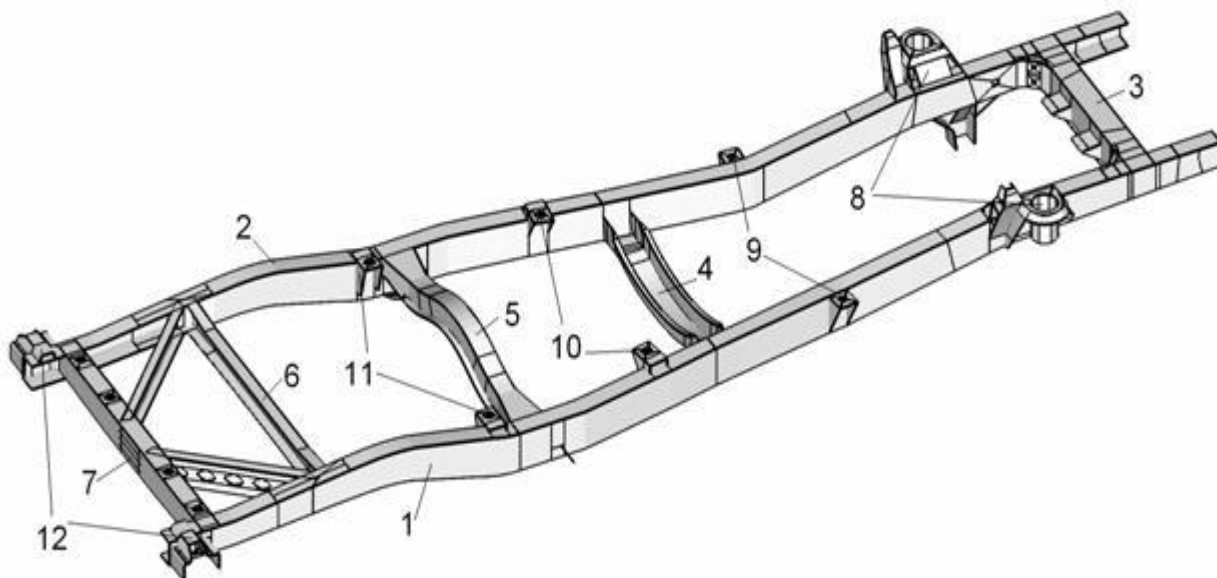
Conventional frames are usually made of heavy steel channel sections welded or riveted together. All other parts of the car are attached to the frame.

In order to prevent noise and vibrations from passing to the frame and from there to the passengers of the car, the frame is insulated from these parts by rubber pads.

It is also important to insulate the frame in order to prevent metal-to-metal contacts.

Frameless (unibody) constructions are called so because they are made integral with the body. The body parts are used to structurally strengthen the entire car. Some unibody frames have partial front and rear frames for attaching the engine and suspension members.





Рама автомобілів УАЗ-3741:

1 – лонжерон; 2,3,8,9,10,14 – поперечини; 4 – передній кронштейн підвіски двигуна;
 5 – кронштейн кріплення переднього амортизатора; 6 – кронштейн кріплення кузова;
 7 – підсилювач лонжерона; 11 – кронштейн кріплення заднього кінця ресори; 12 –
 кронштейн кріплення заднього амортизатора; 13 – кронштейн кріплення переднього кінця
 ресори; 15 – кронштейн проміжний кріплення троса стоянкової гальмівної системи;
 16 – кронштейн кріплення радіатора; 17 – кронштейн кріплення переднього гальмівного
 шланга; 18 – кронштейн кріплення важеля стояночної гальмівної системи; 19 – кронштейн
 кріплення картера рульового механізму; 20 – передній кріюк.

Active Vocabulary

Alignment – вирівнювання,
 to attach – прикріплювати,
 conventional frame – звичайна (стандартна) рама,
 extremely rigid – дуже жорсткий,
 to fasten – скріплювати, закріплювати,
 a firm structure – міцна конструкція,
 a frame – рама,
 heavy steel – міцна сталь,
 integral frame – цілісна рама,
 a pad – подушка,
 to provide – забезпечувати,
 to reinforce – укріплювати, підсилювати,
 to rivet – заклепувати,
 rubber installation – гумова прокладка,
 to strengthen – підсилювати,
 suspension system – система підвіски,
 to weld – зварювати,
 to insulate – ізолювати.

Comprehensive Questions

1. What does the frame provide?
2. Why is the frame rigid and strong?
3. What types of frames are there?
4. What is the conventional frame made of?
5. By what is the frame insulated from the other car parts? For what purpose?
6. What do you know about unibody frames?

Text Study

Exercise 1. Translate into Ukrainian the international words.

Chassis, structure, system, integral, construction, steel, vibration, passenger, metal, contact.

Exercise 2. Translate into Ukrainian the words paying attention to the suffixes.

To found – **foundation**; frame – **frameless**; to construct – **construction**; structure – **structural** – **structurally**; to attach – **attachment**; to vibrate – **vibration**; to insulate – **insulation**; usual – **usually**.

Exercise 3. Translate into English the special terms.

Лонжерони, поперечки, жорсткий, міцний, витримувати навантаження, підвіска, звичайна (загальноприйнята) рама, безрамна конструкція, порожнисті секції, зварені або заклепані, прикріплювати до рами, гумові прокладки, зміцнювати.

Exercise 4. Find in the right column the translation to the words and word-combinations in the left.

1.The frame provides support for....	a. channel sections welded together.
2.Conventional frames are made of....	b. prevent noise and vibrations from passing to the passengers.
3. Frameless constructions are made....	c. cross members.
4.The frame is insulated from other parts in order to	d.. the engine, body and power train members.
5.The frame is reinforced by....	e. integral with the body.

Exercise 5. Translate into Ukrainian paying attention to the Complex Subject.

1. We know the frame to be the structural centre of any car.
2. Car specialists consider the conventional frame to be extremely rigid and strong.
3. We know the frame to be insulated from the other parts by rubber pads to prevent metal-to-metal contacts.
4. Many specialists consider the body parts to be used to structurally strengthen the entire car.
5. The manufacturers believe the unibody constructions to be called so because they are made integral with the body.

Exercise 6. Translate into Ukrainian the text.

The frame is a structural centre of any car as it provides support for the engine, body, wheels and power-train members.

Cross members reinforce the frame and provide support for the engine and wheels. The frame is extremely rigid and strong. The engine is attached to the frame in three or four points and insulated from these points by some rubber pads to prevent vibration and noise from passing to the frame and thus to the passengers. There are two types of frames: conventional construction and unibody one.

Exercise 7. Translate into English

1. Рама забезпечує опору для кузова, двигуна і вузлів силової передачі.
2. Вона складається з лонжеронів і поперечин, які підсилюють раму.
3. Рама повинна витримувати вібрацію, кручення та інші навантаження (напруги).
4. Рами бувають двох типів: звичайні (стандартні) і виконані воєдино з кузовом.
5. Стандартні рами виготовлені зі сталевих порожнистих секцій, зварених або заклепаних разом.
6. Безрамні конструкції виконані воєдино з кузовом.
7. Рама ізолюється від кузова гумовими прокладками для того, щоб шуми і вібрації не проходили до пасажирів автомобіля.

Exercise 8. Read and translate the dialogue.**DIALOGUE**

Stas: Hi! Seen you for ages! How are you?

Vlad: Hi! I'm perfectly well! I am working at a repairing shop. Very interesting I can tell you.

S.: What are you doing there?

V.: Now, we are testing the frame. You see, the driver has got into trouble. Something is wrong with his car. He thinks it is the frame.

S.: Has the car a conventional frame or a unibody frame?

V.: Unibody frame.

S.: I think you have to do a lot of work as body parts strengthen the entire car.

V.: Sure. We are testing all parts in order to find out the damage.

S.: I think you will cope with the problem.

Notes:

seen you for ages – давно тебе не бачив,

perfectly well – чудово,

to get into trouble – потрапити в халепу,

to be wrong with – щось не так,

sure – звичайно (без сумніву),

to find out the damage – знайти пошкодження,

to cope with – впоратися (з проблемою).

Exercise 9. Translate into Ukrainian the words paying attention to the suffixes and prefixes.

Connect — **disconnect** — connection — **disconnection**; operate — operation; friction — **frictional**; engage — engagement — **disengagement**.

Exercise 10. Translate into Ukrainian the international words.

Start, disc, friction, frictional, material, base, principal, control, pedal.

Lesson 9

Clutch

The clutch is a friction device. It connects the engine to the gears in the gearbox. It is used for disconnecting the engine from the gearbox, for starting the car and for releasing the engine from the car wheels.

The clutch is fixed between the flywheel of the engine and the gearbox and consists of two plates (discs): the friction disc and the pressure disc. The friction disc is situated between the flywheel and the pressure plate and has a hard-wearing material on each side.

The basic principal operation of the clutch is frictional force acting between two discs. The clutch is controlled by the clutch pedal. When the pedal is at rest the clutch is engaged and the running engine is connected to the gearbox. When the pedal is pressed down the clutch is disengaged and the engine runs idly.

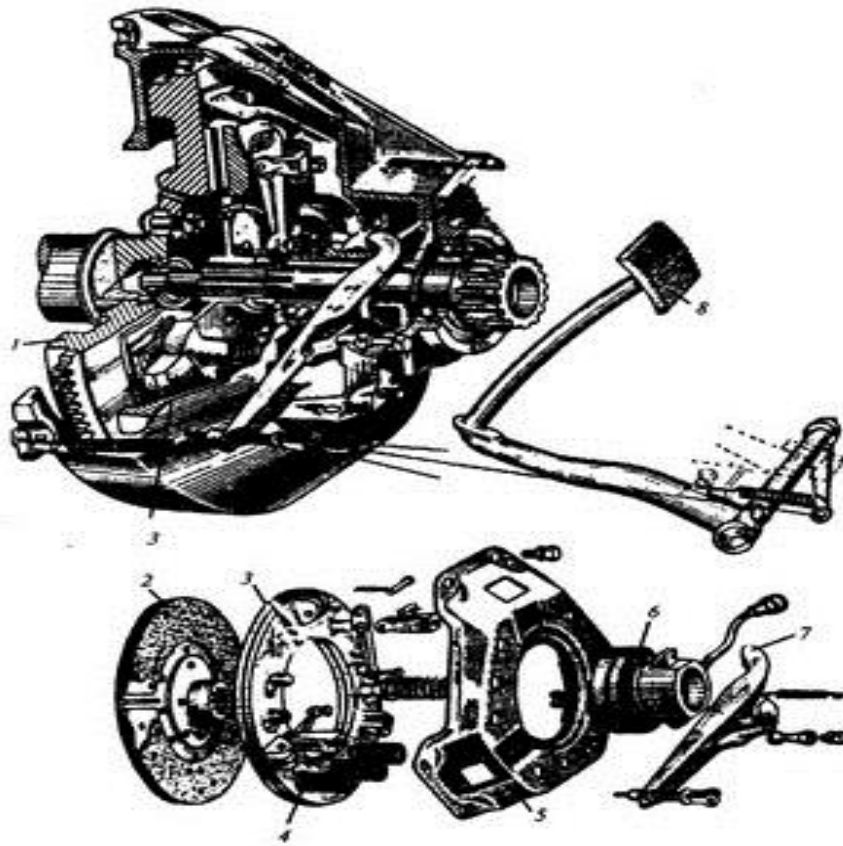


Рис. 2. Clutch

- | | |
|-------------------------------------|---------------------------------------|
| 1. flywheel – маховик | 5. cover – крышка |
| 2. friction disc – фрикционный диск | 6. thrust bearing – упорный подшипник |
| 3. pressure disc – нажимной диск | 7. lever – рычаг |
| 4. spring – пружина | 8. pedal – педаль. |

Active Vocabulary

To be at rest – бути у вихідному положенні (у спокої),
 car wheels – колеса автомобіля,
 clutch – зчеплення,
 a clutch pedal – педаль зчеплення,
 to connect – з'єднувати,
 to control – управляти,
 to disconnect – від'єднувати,
 to disengage – відключати, вимикати,
 to engage – вмикати,
 to fix – фіксувати, встановлювати
 a flywheel – маховик,
 a friction plate (disc) – фрикційний (ведений) диск (зчеплення),
 frictional force – сила тертя,
 a gear – шестерня; передача,
 a gearbox – коробка передач,
 hard-wearing material – зносостійкий матеріал,
 to press down the pedal – натискати на педаль,

pressure plate (disc) – натискний диск (зчеплення),
a principle of operation – принцип дії,
to release – відпускати,
to run idly – працювати вхолосту,
a running engine – двигун, який працює.

Comprehensive Questions

1. What device is the clutch?
2. What units does it connect?
3. What is the clutch used for?
4. Where is the clutch placed?
5. What plates does the clutch consist of?
6. What is the basic principal operation of the clutch?
7. What is the clutch controlled by?
8. What takes place when the clutch pedal is at rest?
9. When does the engine run idly?

Text Study

Exercise 1. Translate into Ukrainian words and word-combinations from the text.

Friction device, clutch, gearbox, to free, to start, to release, flywheel, pressure plate, basic principle of operation, to fix, hard-wearing material, to consist of, to be controlled by, running engine, to run idly, to engage, to disengage, to press down, to be at rest.

Exercise 2. Complete the sentences choosing the right ending.

1. The clutch is a device connecting
 - a). the rear axle and axle shafts.
 - b). the gearbox and differential.
 - c). the engine and the gearbox.
2. The clutch is situated between
 - a). the gearbox and cardan shaft.
 - b). the flywheel and the gearbox.
 - c). the gearbox and rear axle.
3. The clutch is controlled by
 - a). the brake pedal
 - b). the clutch pedal.
 - c). the gearbox and rear axle.
4. The clutch is engaged
 - a). when the clutch pedal is pressed down.
 - b). when the clutch pedal is at rest.

5. The clutch is disengaged
- a). when the clutch pedal is at rest.
 - b). when the clutch pedal is pressed down.

Exercise 3. Read and translate the dialogue, write down the unknown words and do the exercises.

DIALOGUE

A.: What is the function of the clutch?

B.: You see, it serves three functions. It is used for freeing the engine from the gearbox, for starting the car and for freeing the engine from car wheels.

A.: Is it a friction device?

B.: Yes, of course. It is fixed between the flywheel of the engine and the gearbox and usually consists of two discs.

A.: What discs?

B.: The friction disc (driven disc) and the pressure disc.

A.: I suppose the principle of operation of clutches is a frictional force between discs. Am I right?

B.: Yes, you are. When the clutch is fully engaged the frictional force makes discs rotate at the same speed.

A.: And by what is the clutch controlled?

B.: By the clutch pedal. When it is at rest the clutch is engaged and when it is pressed down the clutch is disengaged and the engine is disconnected from the car wheels.

A.: Thank you. And what types of clutches do you know?

B.: Positive clutches and gradual engagement clutches.

A.: Thank you very much for your information.

B.: Not at all. Glad to help you.

Exercise 4. Translate into English the special terms.

Функція зчеплення, для відключення двигуна від коробки передач, кріпиться між маховиком і коробкою передач, фрикційний (ведений) диск, натискний диск, фрикційна сила, зчеплення включено, педаль у вихідному положенні, педаль зчеплення натиснута.

Exercise 5. Find in the right column the translation to the words and word-combinations in the left.

1 a friction device	a. завести автомобіль
2 gearbox	b. фрикційний диск
3 to start the car	c. маховик
4 to release the engine	d. зносостійкий матеріал

5 is fixed	е. працювати вхолосту
6 flywheel	ф. з'єднуватися
7 the friction disc	г. сила тертя
8 the pressure disc	h. роз'єднуватися
9 hard-wearing material	і. фрикційний прилад
10 frictional force	ј. знаходитися в спокої
11 the clutch pedal	к. закріплений
12 to be engaged	l. педаль зчеплення
13 to be at rest	м. натиснути на педаль
14 to be disengaged	п. від'єднати двигун
15 to press down on the pedal	о. натискний диск
16 to run idly	р. коробка передач

Exercise 6. Complete the sentences choosing the words and word-combinations given below.

A.: What three functions does the clutch ... ?

B.: It is used for

A.: Where is it... ?

B.: It is ... between the flywheel of the engine and the

A.: By what is the clutch ... ?

B.: It is ...by the....

A.: What takes place when the pedal is ... ?

B.: The clutch is

A.: And when the driver pushes down on the pedal?

B.: The clutch is

freeing the engine from the gearbox, serve, fixed, gearbox, controlled, starting the car, freeing the engine from the car wheels, pedal, at rest, engaged, disengaged, do, located.

Exercise 6. Translate into English.

1. Зчеплення – це фрикційний пристрій.
2. Зчеплення з'єднує двигун і коробку передач.
3. Зчеплення розташоване між маховиком двигуна і коробкою передач.
4. Як правило, зчеплення складається з двох дисків: веденого і натискного.
5. Зчеплення управляється педаллю зчеплення.
6. Коли педаль зчеплення перебуває у спокої, диски зчеплення з'єднані і працюючий двигун з'єднаний з коробкою передач і колесами.
7. Коли водій натискає на педаль зчеплення, диски відходять, зчеплення від'єднується і двигун працює в холосту.

Lesson 10

Gearbox

The gearbox is placed between the clutch and the propeller shaft. The principal function of the gearbox is to vary the speed of the car movement to meet the road conditions. The gearbox provides fourth (fifth) forward speeds and one reverse, as follows:

1. First or low gear;
2. Second gear;
3. Third gear;
4. Fourth (fifth) or top gear;
5. Reverse gear.

There are many constructional arrangements of gearboxes, which can be classified as follows:

1. Sliding-mesh type;
2. Constant-mesh type;
3. Epicyclic (planetary) type.

The sliding-mesh type is the simplest one and is the oldest historically. The constant-mesh type is the most widely used type. They are termed "ordinary" gearing, the characteristic feature of which is that the axes of the various gears are fixed axes. The gears simply rotate about their own axes.

The characteristic feature of epicyclic (planetary) gearing is that one gear rotates about its own axis and also rotates bodily about some other axis.

To secure the several speeds of the car the clutch shaft is mounted in direct line with the gearbox shaft. The gearbox shaft carries on it the sliding gears which are used for shifting to secure the forward speeds and the reverse drive.

Active Vocabulary

A gearbox – коробка передач,

to assemble – складати, монтувати,

axis – вісь,

axle – вал,

breather channel – канал сапуна,

constant-mesh gearbox – коробка передач з постійним зачепленням шестерень,

to disassemble – розбирати, демонтувати,

a drain hole – зливний отвір,

epicyclic (planetary) gearbox – епіциклічна (планетарна) коробка передач,

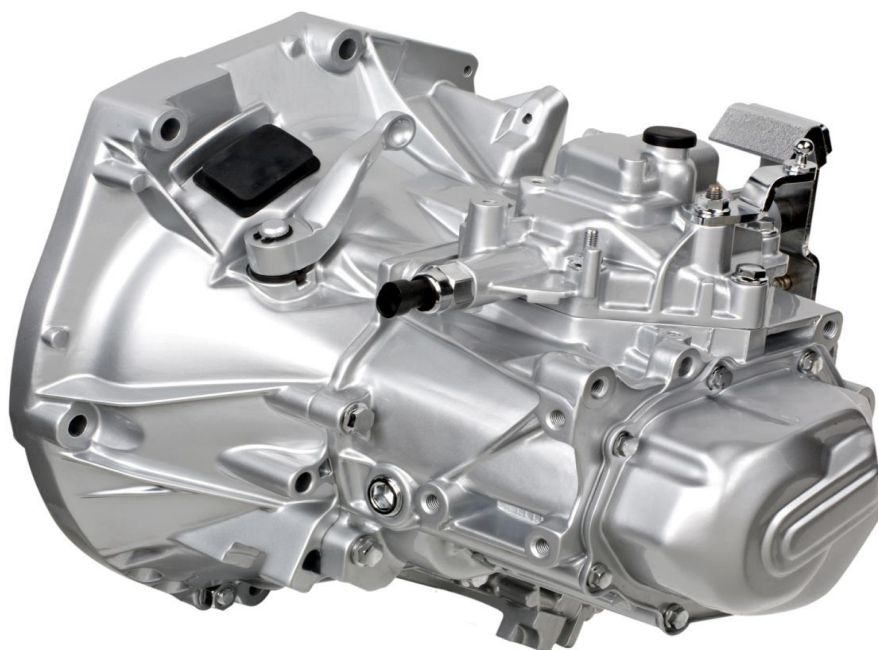
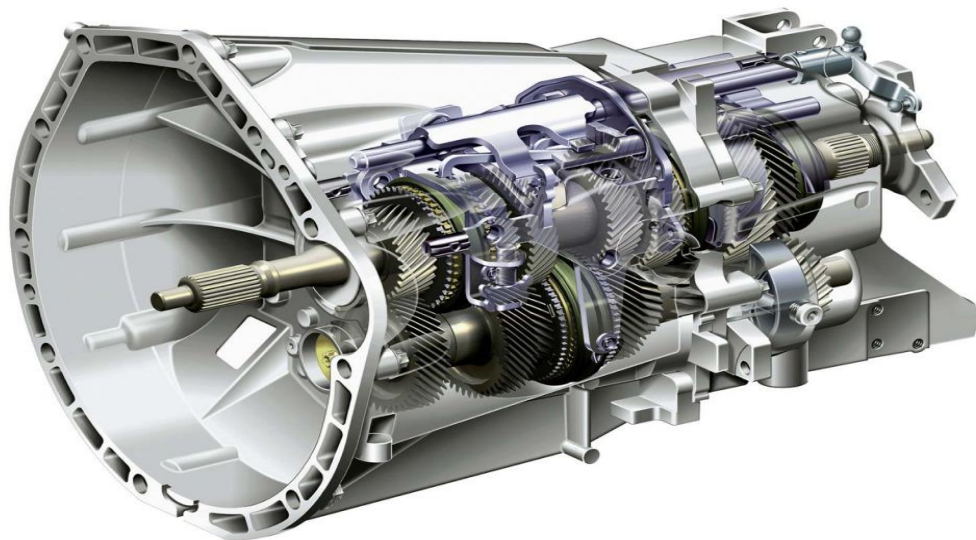
forward speed – передня швидкість,

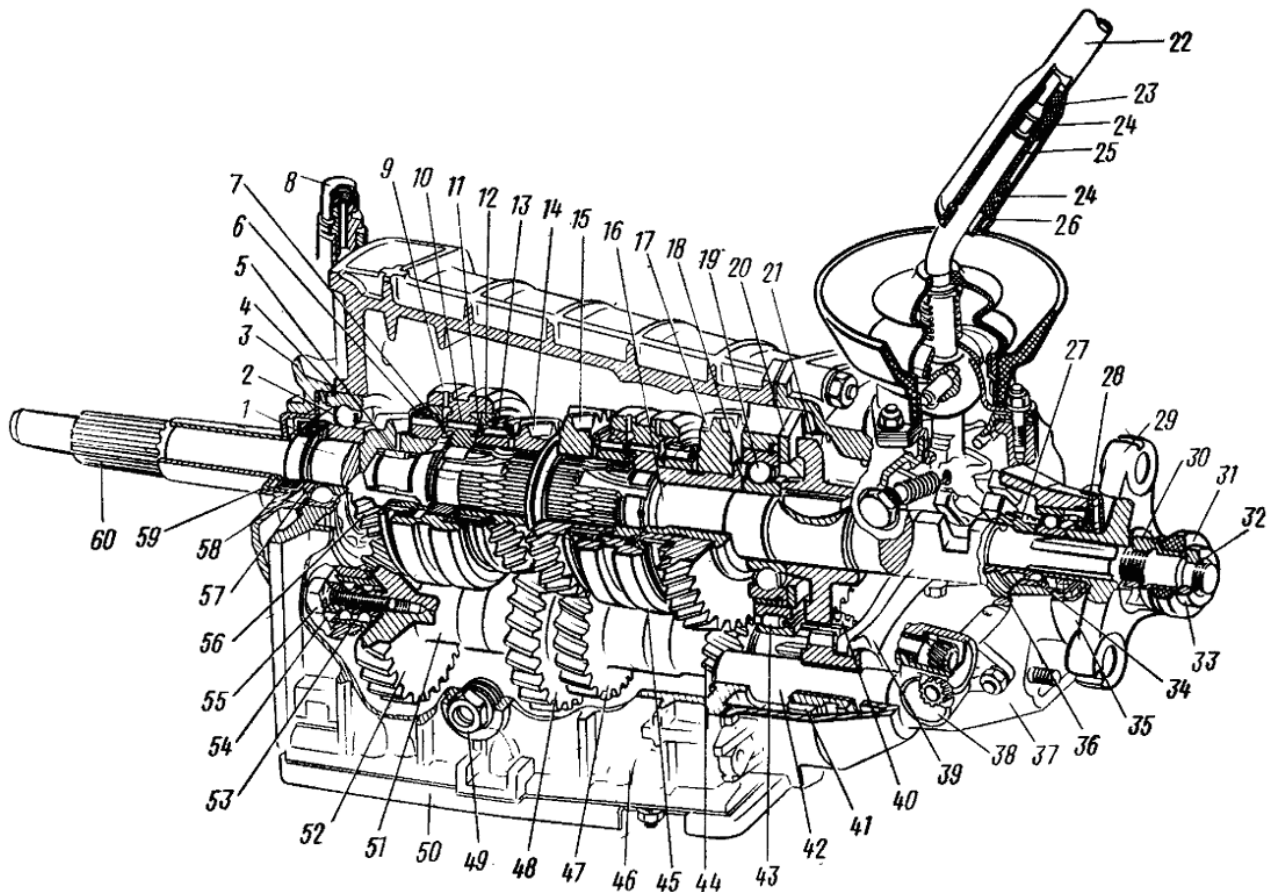
gearbox casing – картер коробки передач,

gearing – зубчасте з'єднання,

to get into trouble – потрапити в халепу,

lubrication – змазка,
oil level – рівень масла,
to repair – ремонтувати,
repairing shop (workshop) – ремонтна майстерня,
reverse drive – задній хід,
shifting – переключення,
sliding-mesh gearbox – коробка передач із ковзаючими шестернями,
a stand – стенд,
thin oil – легке (рідке) масло.





Коробка передач

1- сальник первинного вала; 2 - задній підшипник первинного вала; 3 - картер щеплення; 4 - установчне кільце підшипника; 5 - голковий підшипник вторинного вала; 6 - упорна шайба пружини синхронізатора IV передачі; 7 - зубчатий вінець синхронізатора IV передачі; 8 - сапун; 9 - муфта синхронізатора III і IV передач; 10 - ступиця муфти синхронізатора; 11 - стопорне кільце блокуючого кільця синхронізатора; 12 - блокуюче кільце синхронізатора; 13 - пружина синхронізатора; 14 - ведена шестерня III передачі; 15 - ведена шестерня II передачі; 16 - вторинний вал; 17- ведена шестерня I передачі; 18 - втулка шестерні I передачі; 19 - проміжний підшипник вторинного вала; 20 - стопорна пластина; 27 - ведена шестерня заднього ходу; 22 – стержень важеля; 23 - упорная подушка; 24 - гнучка подушка; 25 - дистанційна втулка; 26 – запорна втулка; 27 - ведуча шестерня приводу спідометра; 28 - сальник вторинного вала; 29 - фланец еластичної муфти; 30 - гайка; 31 - ущільнювач центруючого кільця; 32 - стопорне кільце; 33 - центруюче кільце; 34 - задній підшипник вторинного вала; 35 - брудовідображувач; 36 - відома шестерня приводу спідометра; 37 – задня кришка коробки передач; 38 - привід спідометра; 39 - вилка включення заднього ходу; 40 - ведуча шестерня заднього ходу; 41 - проміжна шестерня заднього ходу; 42 - вісь проміжної шестерні; 43 - задній підшипник проміжного вала; 44 - ведуча шестерня I передачі; 45 - муфта синхронізатора I і II передач; 46 - картер коробки передач; 47 - ведуча шестерня II передачі; 48 - ведуча шестерня III передачі; 49 - пробка заливного і контрольного отвору; 50 - нижня кришка коробки передач; 51 - проміжний вал; 52 - шестерня постійного зачеплення проміжного вала; 53 - передній підшипник проміжного вала; 54 - зажимна шайба підшипника; 55 - гвинт; 56 - шестерня постійного зачеплення первинного вала; 57- пружинна шайба; 58 - стопорне кільце; 59 - передня кришка коробки передач; 60 - первинний вал.

Comprehensive Questions

1. Where is the gearbox situated?

2. What is the function of the gearbox?
3. What speeds does the gearbox provide?
4. What types of gearboxes do you know?
5. Why is the clutch shaft mounted in direct line with the gearbox shaft?

Text Study

Exercise 1. Translate into Ukrainian the international words.

Principal, function, construction, constructional, class, classify, type, planet, planetary, history, historical.

Exercise 2. Translate into Ukrainian the words paying attention to the suffixes.

Move — **movement**, construct — **construction** — **constructional**, arrange — **arrangement**, history — **historical** — **historically**, wide — **widely**, vary — **various**, simple — **simply**, body — **bodily**.

Exercise 3. Find in the right column the translation to the words and word-combinations in the left.

- | | |
|---|--|
| 1. The principal function of the gearbox is.... | a). sliding-mesh type, constant mesh type and planetary type |
| 2. The gearbox provides | b). the simplest one and historically oldest |
| 3. Gearbox can be | c). to vary the speed of the car |
| 4. The sliding-mesh gearbox is ... | d). four forward speeds and one reverse |
| 5. The constant-mesh gearbox is.... | e). the most widely used. |

Exercise 4. Read and translate the dialogue and do the exercises.

DIALOGUE

Mike: Peter, do you remember what our teacher told us last time?

What do you know about gearboxes?

Peter: I know that the gearbox is used to change the speed of the car.

M.: And how many speeds does the gearbox provide?

P.: It can provide four (fifth) forward speeds and one reverse.

M.: Into what types are the gearboxes divided according to their arrangements?

P.: They are divided into sliding-mesh type, constant-mesh type and epicyclic type.

M.: What type is the simplest?

P.: The sliding-mesh one.

M.: Thank you very much for your help.

P.: You are welcome. Glad to help you.

Exercise 5. Translate into English.

1. Коробка передач призначена для зміни швидкості руху автомобіля.

2. Коробка передач забезпечує чотири (п'ять) передні швидкості і задній хід.
3. Коробки передач можуть бути: з ковзаючими шестернями, з постійним зчепленням шестерень і планетарного типу.
4. Найпростішими є коробки передач із легкими шестернями.
5. Коробки передач з постійним зачепленням шестерень використовуються найчастіше.
6. Ковзаючі шестерні на валу коробки передач використовуються для забезпечення передніх швидкостей і зворотного ходу.

Exercise 6. Translate the text into Ukrainian in written form.

Gearboxes are assembled and disassembled on special stands using special mechanisms. In case of trouble in change-speed gearbox it can be repaired only in the workshop. But in order not to get into trouble you should do the followings steps:

- a). check the oil level in the gearbox casing;
- b). wash the breather channel;
- c). change the oil in accordance with the lubrication schedule;
- d). wash the gearbox with a thin mineral oil;
- e). drain the used oil through the drain hole.

Lesson 11

Brakes

Brakes are used to slow or stop the car where it is necessary. It is one of the most important mechanisms of the car as upon its proper performance the safety of passengers depends. Car brakes can be divided into two types, namely: drum brakes and disc brakes. The drum type may be either a band brake or a shoe brake. Depending on their functions, the automobile has foot brakes and hand brakes (parking brakes). According to their mode of operation, the brakes are classified as: mechanical brakes, hydraulic brakes, airbrakes, electric brakes. Brakes are controlled by the brake pedal.

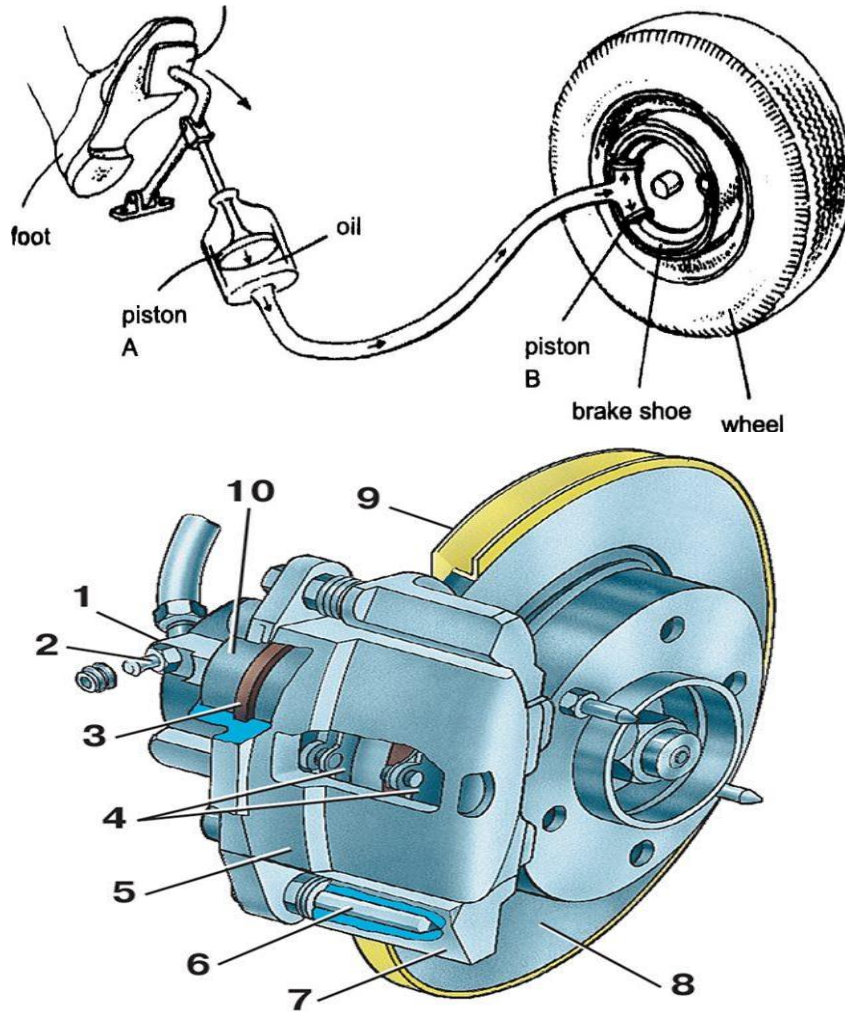
Most braking systems in use today are hydraulic. This system consists of a master cylinder mounted on the car frame and wheel cylinders. When the driver pushes down on the brake pedal, it forces the piston to move in the master cylinder and brake fluid is delivered from them to the wheel cylinders. The piston movement causes brake shoes to move and the brakes are applied (the brake shoes are pressed against the brake drums).

The air brake uses compressed air to apply the braking force to the brake shoes.

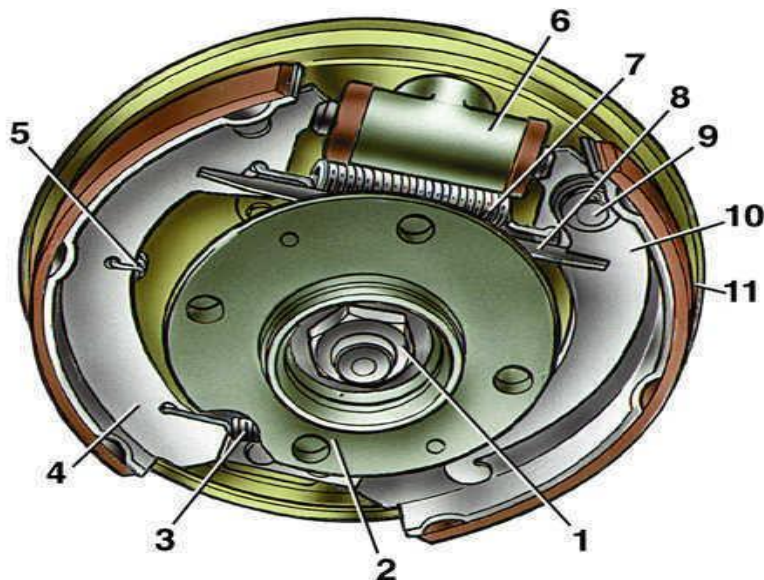
Electric brakes use electromagnets to provide the braking effort against the brake shoes.

Formerly brakes were applied only to the two rear wheels, but now all cars are equipped with all-wheels brakes. Today many improvements are being made in brakes.

Brake System



Гальмівний механізм переднього колеса: 1 – циліндр; 2 – клапан випуску повітря; 3 – ущільнює кільце; 4 – гальмівні колодки; 5 – суппорт; 6 – палец направляючий; 7 – направляюча колодок; 8 – гальмівний диск; 9 – щит гальм; 10 – поршень



1. гайка кріплення ступиці; 2. ступиця колеса; 3. нижня стяжна пружина колодок; 4. гальмівна колодка; 5. направляюча пружина; 6. колісний циліндр; 7. верхня стяжна пружина; 8. розжимна планка; 9. палець важеля приводу стоянкового гальма; 10. важіль приводу стояночного гальма; 11. щит гальмівного механізму.

Active Vocabulary

Air brakes – пневматичні гальма,
 bund brake – стрічкове гальмо,
 brake drum — гальмівний барабан,
 brake fluid — гальмівна рідина,
 brake pedal — гальмівна педаль,
 brake shoe — гальмівна колодка,
 brakes are applied – гальма спрацьовують,
 braking effort – гальмівне зусилля,
 common axis – загальна вісь,
 disk brakes – дискові гальма,
 drum brakes – барабанні гальма,
 electric brakes – електричні гальма,
 fluid – рідина,
 foot brakes – ніжні гальма,
 the main braking system – основна гальмівна система
 to force (cause) – змушувати,
 hand brake – ручні гальма,
 hydraulic brakes – гідравлічні гальма,
 leakage – витік,
 master cylinder – головний циліндр,
 mechanical brakes – механічні гальма,
 poor — поганий, слабкий,
 proofness – стійкість,
 to release – відпускати, роз'єднувати,
 sticking – заїдання, прилипання,

tightness – герметичність,
 troubles – несправності,
 wheel cylinder – колісний гальмівний циліндр,
 mode of operation (drive) – тип приводу.

Comprehensive Questions

1. What is the function of the brakes?
2. What types are brakes divided into?
3. What brakes do you know according to their mode of operation?
4. What braking systems are used today?
5. By what are brakes controlled?
6. When are brakes applied?

Text Study

Exercise 1. Translate into Ukrainian the international words.

Mechanism, passenger, type, hydraulic, cylinder, vacuum, function, classify, classification, mechanical, electric, electromagnet.

Exercise 2. Translate into Ukrainian the words paying attention to the suffixes.

Safe – safety; to improve – improvement; to move – movement; to drive – driver; to apply – application; to attach – attachment; to arrange – arrangement; to perform – performance; name – namely; to operate – operation; to equip – equipment.

Exercise 3. Translate into English the special terms.

Гальма, безпека пасажирів залежить від правильної роботи гальм, барабанні гальма, дискові гальма, гальма з підсилювачем, гідравлічний привід гальм, рідина під тиском, гальма спрацювають, гальмівне зусилля, натиснути на гальмівну педаль.

Exercise 4. Find in the right column the translation to the words and word-combinations in the left.

1.performance	a. залежати від
2.the safety of passengers	b. барабанні гальма
3.to depend upon	c. гальма спрацювають
4.namely	d. гальма із гідравлічним приводом
5.drum brakes	e. робота (дія)

6. disc brakes	f. a same
7. brakes are applied	g. гальма з підсилювачем
8. hydraulic assisted brakes	h. під тиском
9. power assisted brakes	i. натиснути на гальмівну педаль
10. to press down on the brake pedal	j. дискові гальма
11. under pressure	k. безпека пасажирів

Exercise 5. Complete the sentences choosing its corresponding part from the right column.

- | | |
|---------------------------------|--|
| 1. Brakes are used for... | a. disc brakes and drum brakes |
| 2. Brakes are one of ... | b. the driver pushes down on the pedal |
| 3. Brakes may be of 2 types:... | c. the brake pedal |
| 4. Brakes are applied by... | d. stopping the car |
| 5. Brakes are applied when ... | e. the most important mechanism of the car |

Exercise 6. Translate into English.

- Гальма є найбільш важливим механізмом автомобіля.
- Гальма використовуються для сповільнення руху чи зупинки автомобіля.
- Гальма можна розділити на два типи, а саме: барабанні гальма і дискові гальма.
- На більшості автомобілів використовується гідравлічний чи пневматичний привід.
- Гальма спрацьовують, коли водій натискає на гальмівну педаль.

Exercise 7. Read and translate the dialogue.

DIALOGUE

Alex: Why are brakes used?

Boris: They are used to stop or to slow the car.

A.: Well, it is one of the most important mechanisms of the car, isn't it?

B.: Of course, the safety of the passengers depends upon their proper performance.

A.: What types of brakes are used today?

B.: Drum brakes, disk brakes and others.

A.: And in what way are they applied?

B.: They are applied by the brake pedal. When the driver pushes down on the pedal they are applied.

A.: Thank you. It was very nice of you to tell me this information.

B.: Don't mention it. I was glad to serve you.

Exercise 8. Find the paragraphs where is retelling about the clutch and brakes and write them down in two columns.

Two stories — in one

1. They are the most important mechanism of the car. They are used to slow or stop the car where it is necessary.
2. It is a friction device. It connects the engine to the wheels in the gearbox. It is used for freeing the engine from the gearbox, for starting the car and for releasing the engine from the car wheels.
3. It is fixed between the flywheel of the engine and the gearbox.
4. They are divided into 2 types, namely: drum brakes and disc brakes.
5. Most cars of today use hydraulic or power assisted brakes.
6. They may be of 2 plates: friction disc and pressure disc. The friction disc is situated between the flywheel and the pressure disc.

Exercise 9. Read and translate the text.

Troubles in Braking System

The basic troubles of the braking system are as follows:

1. poor braking action;
2. sticking brake shoes which would not return to the initial position after a brake pedal is released;
3. non-uniform braking of the left and the right wheels on a common axis;
4. leakage of brake fluid and air leakage in the hydraulic brake and air brakes;
5. poor air tightness of the pneumatic brake control.

What to do:

1. Check the action of the foot and hand brakes and leak proofness of the brake hoses connections, components of the hydraulic and pneumatic controls of the brakes, as well as of the vacuum-power system.
2. Inspect the friction linings, wheel-brake springs, master and wheel cylinders of the hydraulic brake and the air compressor of the pneumatic brake using a test manometer to check it.

Exercise 10. Read, translate and try to remember the information.

In the Brake Shop

Whether you need new **brake pads** or a completely new **brake system**, we have what you want!

Our services include:

- Brake system inspection*.
- Brake fluid **changes****
- Brake line **repairs**

- Brake shoe **replacements**
- Brake **master cylinder** inspection / repair
- **Caliper** inspection / replacements
- Power **brake booster** repair / replacements
- Detailed inspection and diagnostics for **anti-lock braking systems (ABS)**

We know brakes like no one else does. Whether you are driving with **hydraulic brakes, disc brakes, power brakes, or drum brakes**, we know what to do.

Remember, you need to see a brake specialist immediately if you are experiencing:

- A brake warning light that stays on
- Squealing or grinding brakes
- **A hard brake pedal**

*recommended twice a year

** recommended every two years

Exercise 10. Translate into English.

1. В залежності від приводу гальма класифікують на механічні, гідравлічні, пневматичні і електричні.
2. Гальма керуються гальмівною педаллю.
3. Гальма спрацьовують, коли водій натискає на гальмівну педаль (гальмівні колодки притискаються до гальмівних барабанів).
4. У пневматичних гальмах для створення гальмівного зусилля використовується стиснуте повітря.
5. В електричних гальмах для створення гальмівного зусилля використовується електромагніт.
6. У сучасних автомобілях використовуються гальма з приводом на всі колеса.

Lesson 12

Using a Computer

Ever since the car was first invented, a breaker point ignition has been used to transform battery voltage into 20,000 volts to fire the spark plugs. With government intervention and regulation, more advanced system was needed. This system had to meet emission control levels, gas mileage, and provide a smooth and continuous operation. The answer was found in an on-board computer system. The computer mounted on modern cars has two components. One is the hardware and the other is the software.

The computer hardware on an automobile uses a Central Processing Unit (CPU), which, when made in an integrated circuit, is referred to as a microprocessor. The integrated circuit (IC) combines transistors, diodes, and capacitors, which are placed on a tiny chip of semiconductor material that is smaller and thinner than an

eraser on a pencil. The material used most of the time is silicon. Silicon, like any semiconductor, does not conduct electricity until either voltage, a magnetic field, heat, or light is directed to the semiconductor. A program instructs the microprocessor what to do.

The computer software on a car carries a program. The program (tells the computer what to do, and when to do it in a specific sequence. The program is stored in a permanent memory, which is referred to as Read Only Memory (ROM). The computer knows only what is placed in its memory.

There is another variation, which is called the Programmable Read Only Memory (PROM), which can be readily removed and replaced, while the ROM cannot. This makes it less expensive if the memory becomes defective. Only the PROM has to be replaced, not the entire microprocessor. The microprocessor contains a ROM (or PROM) and a RAM. RAM stands for Random Access Memory, which can be accessed without going through a specific sequence. The technician interfaces with the RAM whenever trouble codes are accessed. Not all computerized ignition systems have trouble codes, however. Some computers have the ability to learn. This is referred to as an adaptive memory. When a value falls outside of a specified limit, due to engine wear, the adaptive memory makes a slight adjustment in the program to compensate. The car must be driven from 20 to 30 miles, as it takes the computer this long to learn. Any time that power is disconnected from the computer, it will have to relearn everything.

Active Vocabulary

Access – доступ,

adaptive memory – адаптивна пам'ять,

adjustment – регулювання,

breaker – вимикач,

breaker point ignition – преривчасте запалювання,

capacitor – конденсатор,

to carry a program – виконувати програму,

defective – дефектний, несправний,

due to – завдяки,

engine wear – знос двигуна,

eraser – гумка,

to fire the spark plug – запалювати свічкою запалювання,

gas mileage – пробіг палива,

hardware – програмне забезпечення комп'ютера,

integrated circuit – інтегральна схема,

light – світло (фари),

to meet emission control levels – відповідати вимогам щодо обмеження рівня шкідливих компонентів у вихлопних газах,

on-board computer system – бортовий комп'ютер,
permanent memory – постійна пам'ять,
PROM – Programmable Read Only Memory – програмний постійно
запам'ятовуючий пристрій, ППЗУ,
RAM – Random Access Memory – оперативна пам'ять, оперативно
запам'ятовуючий пристрій, ОЗУ,
ROM – Read Only Memory – постійна пам'ять, постійно запам'ятовуючий
пристрій, ПЗУ,
semiconductor – напівпровідник,
Sentral Processing Unit (SPU) – центральний процесор,
silicon – кремній,
since – з тих пір,
spark plugs – свічки запалювання,
specific sequence – певна послідовність дій (операцій),
the ability to learn – здатність запам'ятовувати, (заучувати),
tiny chip – маленький чіп,
trouble codes – коди, які повідомляють про неполадки.

Comprehensive Questions

1. How many components has the computer on modern cars? What are they?
2. How do we call the computer hardware on the automobile?
3. What does an integrated circuit combine?
4. What material is used in the integrated circuit? Why?
5. What does the computer software do?
6. Why is the computer used on board the car?
7. What does the program tell to the computer?
8. Where is the program stored?
9. What is ROM?
10. What is PROM?
11. What is RAM?

Text Study

Exercise 1. Translate into Ukrainian the words and compare them with Ukrainian meaning.

Transform, battery, voltage, regulation, system, computer, microprocessor, transistor, diode, chip, material, electricity, magnetic, program, defective, limit, compensate, variation, code.

Exercise 2. Translate into Ukrainian the words paying attention to the suffixes and prefixes.

Ignite – ignition, transform – transformation, regulate – regulation, break – breaker, conduct – conductor, process – processor, specify – specific, adapt –

adapter – **adaptive**, expense – **expensive**, adjust – **adjustment**, connect – **disconnect**, learn – **relearn**.

Exercise 3. Translate into English.

1. Багато сучасних автомобілів оснащені бортовими комп'ютерними системами для кращої роботи автомобіля.
2. Програма такого комп'ютера має тільки два запам'ятовуючих пристрої: постійну пам'ять (ПЗУ) і оперативну пам'ять (ОЗУ).
3. Комп'ютерна програма повідомляє комп'ютеру, що необхідно робити і коли необхідно виконати певну дію у відповідній послідовності.
4. Програма зберігається у постійній пам'яті комп'ютера.
5. Мікропроцесор містить у собі постійну і оперативну пам'ять.
6. Комп'ютери мають здатність запам'ятовувати (заучувати). Це відноситься до адаптивної пам'яті.

Exercise 4. Read and translate the dialogue.

DIALOGUE

Anton: What is the purpose of using computers on board the car?

Vlad: You see. As I know computer is used to advance the engine operation as well as the performance of other units.

A.: What components does the on-board computer consist of?

V.: It consists of two components. One is the hardware and the other is the software.

A.: What is hardware?

V.: The computer hardware uses a Central Processing Unit (CPU) which is referred to as a microprocessor.

A.: What is software?

V.: The computer software on a car carries a program. The program tells the computer what to do and when to do it.

A.: And where is the program stored?

V.: It is stored in a permanent memory which is called Read Only Memory (ROM).

A.: And what is Programmable Read Only Memory (PROM)? What is the difference between ROM and PROM?

V.: In case the memory becomes defective PROM can be readily removed and replaced, while ROM cannot.

A.: And what is RAM?

V.: RAM is Random Access Memory (main memory), which can be accessed without going through a specific sequence. The technician interfaces with RAM whenever trouble codes are accessed.

A.: Thanks a lot for your explanation.

V.: You are welcome. See you later.

A.: Goodbye.

Lesson 13

A Bright Future for Hybrids

Just a few years ago, hybrids were viewed with a mix of suspicion and awe. Some saw them as the car of the future. Others worried their lithium ion batteries would run out at crucial moments even though they had generators on board. In a short time, however, they caught on. Rising gas prices played a part. But so did improvements to their technology.

The first generation of successful hybrids were parallel hybrids. With an internal combustion engine that could work alongside the electric motor, the cars were reliable for commutes or long-distance trips. Improvements to their regenerative braking systems increased their ability to charge on the go, and a continuously variable transmission has only added to their appeal.

Today, two new varieties of hybrids give us a glimpse of what's ahead. Plug-in hybrids are decreasing the dependency on an internal combustion engine. Another type, the two-mode hybrid, takes existing hybrid technology to the next level of efficiency. Both are selling well, which means the industry will almost certainly invest in creating even more powerful and effective hybrid technologies.

Active Vocabulary

a hybrid – гібридний автомобіль,
mix of suspicion and awe – поєднання підозри та побоювання,
lithium ion battery – літій-іонний акумулятор,
run out – (тут) розрядитися,
generator – генератор,
to catch on – стати модним,
parallel hybrid – гібридний паралельний автомобіль (поєднує бензиновий та електричний привод),
commute – поїздка на роботу,
regenerative braking system – система рекуперативного гальмування,
to charge on the go – заряджатися на ходу,
continuously variable transmission – безступінчаста трансмісія,
plug-in hybrid – гібридний автомобіль, який підключається,
to decrease dependency – зменшити залежність,
two-mode hybrid – двохрежимний гібрид.

Exercise 1. Before you read the passage, talk about these questions.

- 1 How are hybrids different from other cars?
- 2 How popular are hybrid cars in your country?

Exercise 2. Read the magazine article. Then, choose the correct answers.

1 What is the article mostly about?

- A the evolution of hybrid technologies
- B consumer responses to plug-in hybrid
- C comparing two types of hybrids
- D predicting future demand for hybrids

2 What initially worried consumers about hybrids?

- A limited power
- B high costs
- C inefficiency on highways
- D reliability of batteries

3 What will likely happen according the author?

- A Three-mode hybrids will be developed.
- B Companies will develop even better hybrids.
- C More hybrids will result in lower gas prices.
- D Cars will become completely electric powered.

Exercise 3. Check the sentence that uses the underlined parts correctly.

1 ___ A When you charge a battery, it fills up.

___ B A plug-in hybrid uses gasoline.

2 ___ A A lithium ion battery replaces the motor in some cars.

___ B Some engines use a generator to make electricity.

3 ___ A A two-mode hybrid has two electrical motors.

___ B A hybrid has two electrical motors.

4 ___ A A regenerative braking system is electrically powered.

___ B A parrel hybrid has an electric motor and an gas-powered engine.

Exercise 4. Write a word that is similar in meaning to the underlined part.

1 A partially electrically-powered car with a plug obtains electrictity from a wall socket. l _ _ _ n _ _ b _ _ _

2 Some vehicles use a(n) electrical storage device to provide electrical power. i _ _ u _ _ n _ _ t _ _ _

3 Most hybrids use brakes that collect energy. g _ _ _ _ _ t _ _ _ r _ _ _ _ _ s _ _ _

4 An electric and gasoline powered vehicle is most efficient when driving at higher speeds. o _ _ m _ _ _ _ _ _ _ _ d

Exercise 5 With a partner, act out roles below based on the given statements.

Use language such as:

Actually, that's not correct ...

Their key selling point ...

So you don't ...

Student A: You are a salesperson. Talk to Student B about:

- pros and cons of plug-in hybrids
- pros and cons of two-mode hybrids
- models you have available

Student B: You are a car buyer. Talk to Student A about hybrids.

Lesson 14

The Isotope

The Isotope is an Earth-friendly car that can save you money and reduce your carbon footprint. When you drive the Isotope, there's no need to stop for gas. The onboard charger lets you power up at your home charging dock for less than 2 per charge. Just plug an electric cord into the charging port and you're good to go.

With the Isotope, you can complete your commute to work and errands without needing a drop of gas. Isotope has a range of 100 miles per charge, so there's no need to worry about reaching your destination. And Planetary Motors is developing a network of national charging stations. Soon you will be able to drive and recharge wherever your heart desires.

Most importantly, the Isotope is safe for the environment. Although the Isotope's electric motor provides speeds up to 90 MPH, it doesn't harm our planet. Unlike conventional cars, the Isotope has zero tail pipe emissions. Even its backup system is eco-friendly. The Isotope's photovoltaic system charges the emergency battery through small solar panels located on the hood. So, what were you waiting for? Come check out the Isotope and see what zero emission driving can be.

Active Vocabulary

Isotope – ізотопний автомобіль,

Earth-friendly car – екологічно чистий автомобіль,

carbon footprint – викиди вуглецю,

onboard charger – вбудований зарядний пристрій,

charging dock – док-станція для заряджання,

electric cord – електричний шнур,

charging port – зарядний порт,

a range of 100 miles per charge – зарядка на відстань до 100 миль,

to harm - завдавати шкоди,

tail pipe emission – викиди вихлопної труби,

backup system – резервна система,

photovoltaic system – фотоелектрична система,

emergency battery – аварійний акумулятор,

solar panel – сонячна панель.

Exercise 1. Before you read the passage, talk about these questions.

- 1 How are electric cars powered?
- 2 What do people think of electric cars in your country?

Exercise 2. Read the advertisement for a new electric cars. Then, mark the following statements as true (T) or false (F).

- 1 ___ Isotope owners can install a charging dock at home.
- 2 ___ Planetary Motors recently completed a system of charging stations.
- 3 ___ The photovoltaic system powers the electric motor.

Exercise 3. Match the words (1-5) with the definitions (A-E).

- 1 ___ onboard charger
 - 2 ___ range
 - 3 ___ solar panel
 - 4 ___ tail pipe emissions
 - 5 ___ charging station
- A the gases produced by an engine
B the distance a car can travel on one charge
C a device that changes sunlight into electricity
D a business that provides electricity for cars
E the device on the car that supplies power to the battery

Exercise 4. Fill in the blanks with the correct words and phrases from the word bank.

charging dock electric car miles per charge photovoltaic charging port

- 1 The range of John's new car is 50 _____ .
- 2 To charge the battery Mary plugged the power cord into the _____ .
- 3 Solar panels are part of a(n) _____ system.
- 4 Mike had a(n) _____ installed in his house so that he can charge his car at home.
- 5 Fred's _____ produces zero tail pipe emissions.

Exercise 5 With a partner, act out roles below based on the given statements.

Use language such as:

I'm not sure I like those cars.

Actually, that's not true.

We have to check the ...

Student A: You are a mechanic. Talk to Student B about:

- doubts about electric cars
- popularity of electric cars
- problems with an electric car

Student B: You are a mechanic. Talk to Student A about electric cars

Exercises for Selfcontrol

Exercise 1. Translate into Ukrainian the words and word-combinations.

Двигун, зчеплення, коробка передач, карданний вал, задній міст, головна передача, диференціал, ресори, колеса, система рульового управління, гальма.

Exercise 2. Read and translate the dialogue.

DIALOGUE

Teacher: Can you tell me English equivalents to: двигун, зчеплення, коробка передач, гальма і ручне керування?

Student: Yes, I can. They are the engine, clutch, gearbox, brakes and steering system.

T.: Do you know what main units the automobile consists of?

S.: Yes, I do. They are the chassis, the body and the engine.

T.: What is the source of power?

S.: The engine is. It makes the car wheels rotate and the car move.

T.: What unit of the car carries the power to the wheels?

S.: The transmission does.

T.: What mechanisms does the transmission consist of?

S.: It consists of the clutch, gearbox, propeller shaft, rear axle, final drive and differential. It also includes brakes and steering system.

T.: And what is the clutch used for?

S.: It is used for disengaging the engine from the car wheels.

T.: What is the function of the brakes?

S.: They are necessary to slow or stop the car.

T.: And what about the steering system?

S.: It is used to turn the car in the direction the driver wants to go.

T.: That is right. You know the subject very well.

Exercise 3. Translate into Ukrainian the word-combinations, then check your translation.

1. Фара, заблокована з вказівником повороту;
2. Радіатор системи охолодження;
3. Акумуляторна батарея;
4. Розподільник запалювання;
5. Повітряний фільтр;
6. Двигун;
7. Вакуумний підсилювач із головним циліндром гідроприводу гальм;
8. Головний циліндр гідроприводу виключення зчеплення;
9. Рульове колесо;
10. Внутрішнє дзеркало заднього виду;
11. Заднє сидіння;
12. Запасне колесо;
13. Задні гальма;
14. Пружина задньої підвіски;
15. Амортизатор задньої підвіски;
16. Задній міст;
17. Карданна передача;
18. Переднє сидіння;
19. Зовнішнє дзеркало заднього виду;
20. Важіль стоянкового гальма;
21. Важіль переключення передач;
22. Коробка передач;
23. Педаль гідроприводу зчеплення;
24. Педаль гідроприводу гальм;
25. Педаль акселератора;
26. Рульовий механізм;
27. Передні гальма;
28. Пружина передньої підвіски з амортизатором;
29. Паливний насос;
30. Масляний фільтр.

1. cornering lamp; 2. cooling system radiator; 3. accumulator battery; 4. ignition distributor; 5. air filter; 6. engine; 7. vacuum-power with master cylinder of hydraulic drive brakes; 8. master cylinder of hydraulic drive of clutch disengagement; 9. steering wheel; 10. inside (interior) mirror; 11. back seat; 12. spare wheel; 13. rear wheel brakes; 14. rear suspension spring; 15. rear suspension shock absorber; 16. rear axle; 17. cardan shaft; 18. front seat; 19. outside mirror; 20. parking brake lever; 21. gear change lever; 22. gearbox; 23. clutch pedal; 24. brake pedal; 25. accelerator pedal; 26. steering mechanism; 27. front wheel brake; 28. front suspension spring with shock absorber; 29. fuel pump; 30. oil filter.

Exercise 4. Complete the sentences using the words and word-combinations given below.

1. The automobile is made up of....

- 2.The engine is
- 3.The chassis consists of
- 4.The transmission carries the power from
- 5.The transmission consists of....
- 6.The body has ...

- a.engine, chassis, body.
- b.hood, fenders and accessories.
- c.the engine to the wheels.
- d.clutch, gearbox, propeller shaft, rear axle, final drive and differential.
- e.the source of power.
- f.transmission and running gear (frame, wheels and springs).

Exercise 5. Read and translate the text.

WHERE DOES THE WORD "AUTOMOBILE" COME FROM?

The word *automobile* is not English. It **consists of** two words: *autos* and *mobilis*. *Autos* is a Greek word **meaning** “self”, *mobilis* — a Latin word meaning “movable”. The two words taken together mean “self-moving”. Thus, an *automobile* means a **self-moving vehicle**. The synonyms of automobile are: auto, car, auto-car, **motor car**.

The role and **importance** of an automobile **arise** from the fact that it can move along roads **unprovided** with rails. In this respect, it **substantially differs** from a **street car** (tram) and a **railway car** (train). In fact, it often replaces street cars, railway cars, and other **agencies of transportation and communication**. In short, the automobile is a vehicle **well adapted** for **ordinary road conditions**.

The automobile has long since ceased to be a **matter of luxury** or sport and has become a **decisive factor** in the **economic development** of many countries. **This accounts for the fact that the world at large uses a great number of** automobiles. In some countries where automobiles are **found** in millions they are playing a most important part in the **solution** of many problems of transport.

The development of automobiles is also accountable **to a large extent** for the progress in road **maintenance, improvement and construction**.

Exercise 6. Complete the sentences according to the content of the text and translate the sentences into Ukrainian.

1. An automobile means _____ .
2. The role and importance of an automobile arise from the fact that it can _____ rails.

3. The automobile is a vehicle _____ for ordinary road conditions.
4. The automobile has become _____ in the economic of many countries.

Exercise 7. Analyze the sentences, put the omissions between the words and write down the sentences.

1. The automobile has long since ceased to be a matter of luxury or sport and has become a decisive factor in the economic development of many countries.
2. This accounts to the fact that the world at large uses a great number of automobiles.
3. In some countries where automobiles are found in millions they are playing a most important part in the solution of many problems of transport.

Exercise 8. Analyze the sentences, correct the sentences where omissions are put incorrectly and write them down.

1. There could import and export of an automobile arise from the fact that it can move a long road unprovided with rails.
2. In this respect it substantially differs from a street car, tram and a railway car train.
3. In fact, it often replaces street cars, railway cars and other agencies of transportation and communication.
4. In short, the automobile is a vehicle adapted for ordinary road conditions.

APPENDIX

THE EARLY DAYS OF THE AUTOMOBILE

Like most other great human achievements, the motor car is not the product of any single inventor.

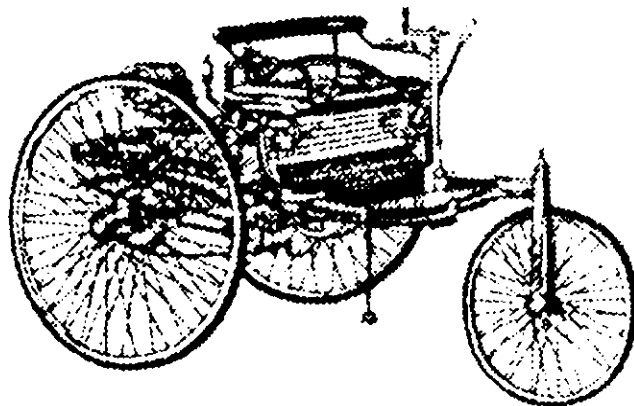
One of the earliest attempts to propel a vehicle by mechanical power was suggested by Isaac Newton. But the first self-propelled vehicle was constructed by the French military engineer Cugnot in 1763. He built a steam-driven engine which had three wheels, carried two passengers and ran at maximum speed of four miles per hour.

In 1784 the Russian inventor Kulibin built a three-wheeled carriage.

In his vehicle he used for the first time such new elements as brakes, rollers and a gearbox.

In 1825 a steam engine was built in Great Britain. The vehicle carried 18 passengers and covered 8 miles in 45 minutes. However, the progress of motor cars met with great opposition in Great Britain. Further development of motor car lagged because of the restrictions resulting from legislative acts. The most famous of these acts was the Red Flag Act of 1865, according to which the speed of the steam-driven vehicles was limited to 4 miles per hour and a man with a red flag had to walk in front of it.

In Russia there were cities where motor cars were outlawed altogether. When the editor of the local newspaper in the city of Uralsk bought a car,



**Fig. 1. The world's first car, made by
Karl Benz in 1886. The engine produced
3/4 horsepower, and achieved the speed of
13 kph / 8 mph.**

the governor issued these instructions to the police: "When the vehicle appears in the streets, it is to be stopped and escorted to the police station, where its driver is to be prosecuted."

Diesel Engines

The oil engine (diesel engine) is also a form of internal combustion engine. It has the usual arrangement of cylinder, piston, connecting rod, crank, inlet and exhaust valves as we find in petrol engine. In place of carburetor and sparking plug it has an injection pump and a fuel injection valve (injector). Unlike spark-ignition engines it uses the heat of compression to fire the fuel and is, therefore, called compression-ignition engine.

It utilizes a fuel known as diesel oil, which is forced in the form of a fine spray through a suitable nozzle directly into the combustion space. No mixture of fuel and air is introduced into the cylinder, the compression-ignition draws in pure air only. This air is then compressed by the ascending piston to a high pressure. As a result of it the temperature of the air is raised considerably so that the fuel oil injected into the cylinder ignites rapidly. Thereafter the gaseous products expand providing the energy for the power stroke.

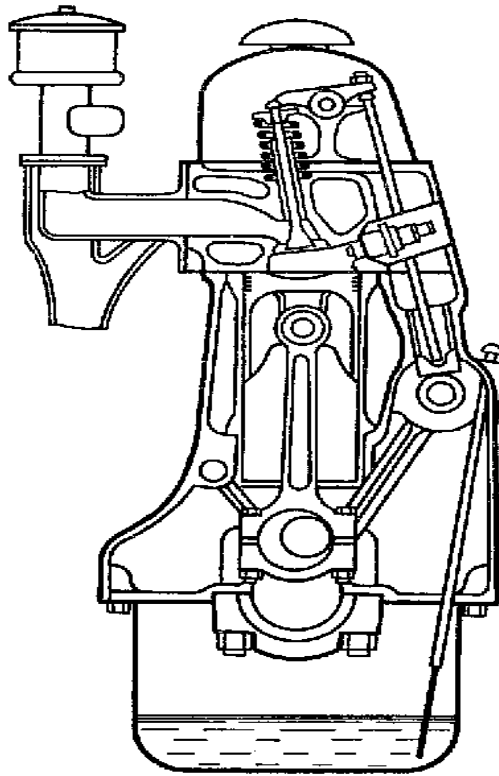
The high-output oil engines are nearly all of two-stroke type. The charge is filled into the cylinder by means of a blower which assists both the intake and exhaust processes. One cycle completed within one revolution, in two strokes-compression and expansion.

Engines

The heat engine is a machine that converts heat energy to mechanical energy. The engines of motor-cars, motor-cycles, farm tractors, motor boats, etc. are heat engines, which belong to the subgroup of internal combustion engines. Combustion engines may be divided into several types according to the number of piston strokes. Most of modern automotive engines operate on four-stroke cycle. There are also engines which operate on two-stroke and six-stroke cycles.

The diesel engine is a machine which produces power by burning oil in a body of air which has been squeezed to a high pressure by a moving piston. Diesel engines are especially suitable where an independent source of power is required, as in ships, locomotives, mobile equipment of all sorts and isolated power plants.

Steam, gas and oil engines were known and used prior to the invention of the diesel engine. The steam engine converts the heat energy of steam to mechanical energy. A typical steam reciprocation engine consists of a cylinder fitted with a piston. A connecting rod and crankshaft change the piston to-and-fro motion into rotary motion. The steam pressure on the piston varies during the stroke, and it is a flywheel which maintains a constant output velocity.



The Nature of Plastics

The word “plastics” has been adopted as a general name for a group of materials because it means “capable of being molded”. The word, however, is used to describe not only the material which can be molded but also the material obtained after it has been fabricated into an object and may no longer be moldable. Plastics are the wonder engineering materials of the modern age, provided that they are properly employed. They are known to possess a great variety of valuable properties and can be used in a wide range of things. Plastics have performance possibilities matched by nothing else but to obtain them may require a special thought of an engineer how to utilize plastics taking advantage of their desirable properties.

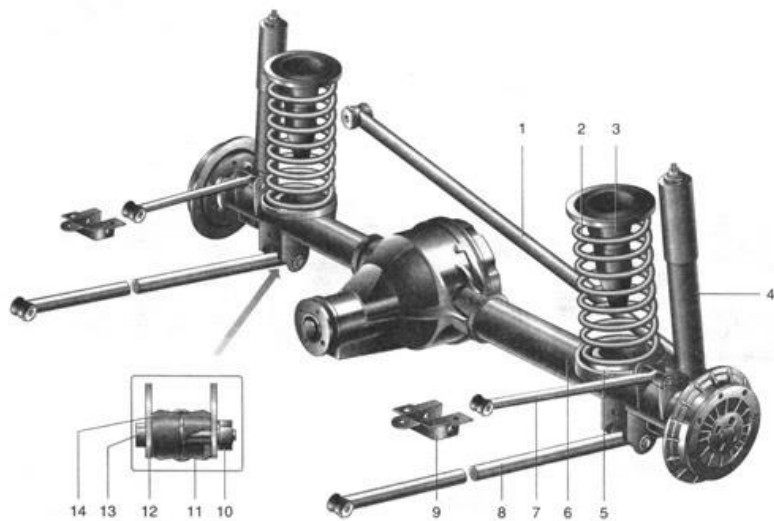
To solve this problem successfully it is necessary to know the nature and behavior of plastics, while for selection a suitable plastic for the design of plastic parts it is important to know their general advantages and disadvantages.

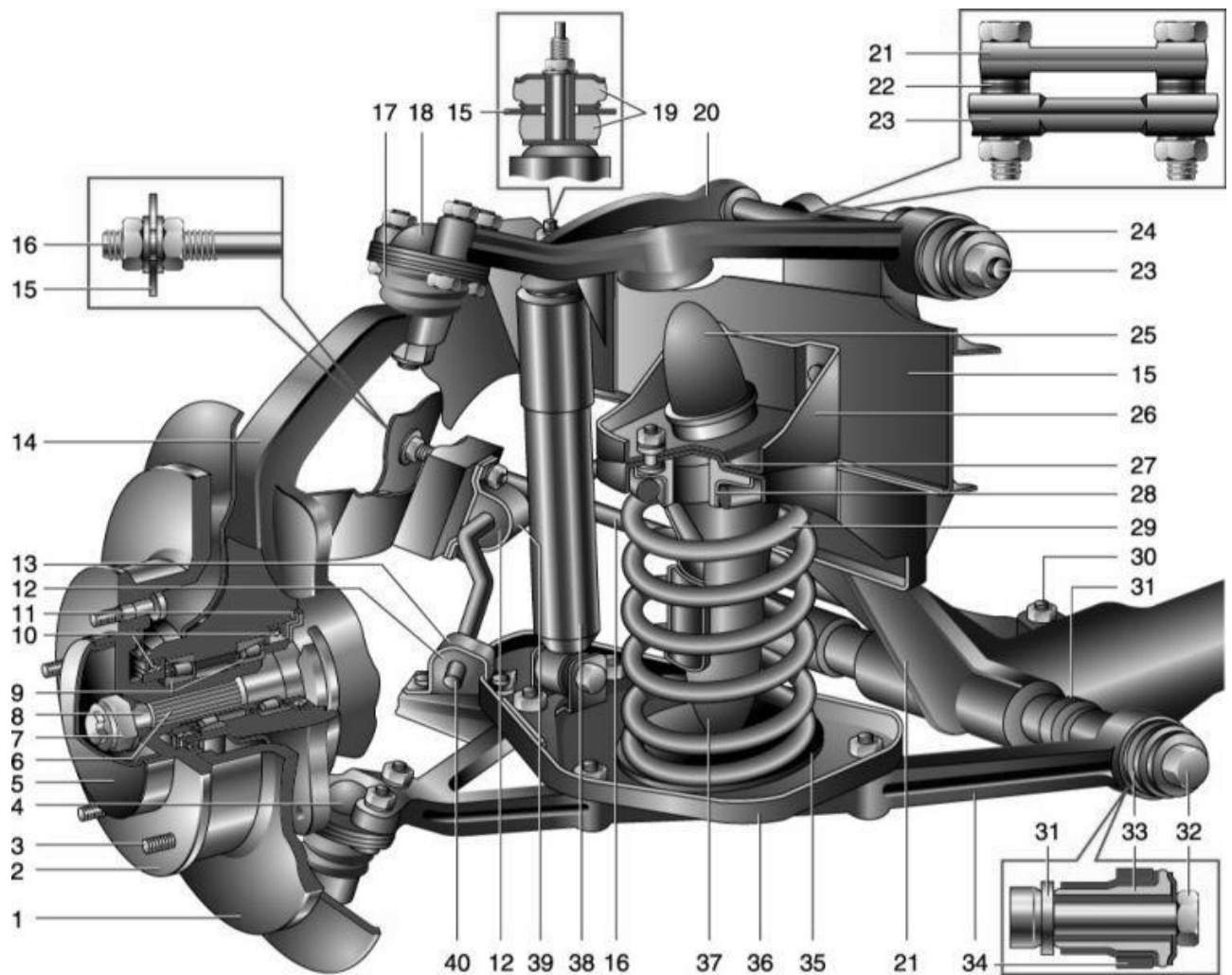
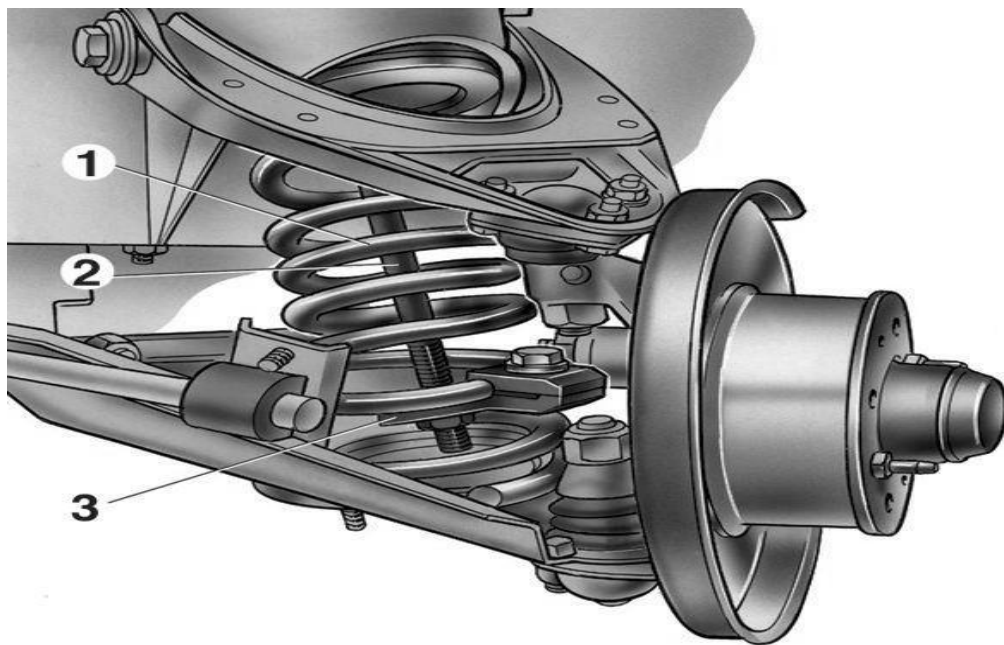
The advantages of the plastic material include:

- a) The ease of fabrication and adaptability to mass production methods at low unit cost.
 - b) Resistance to corrosion as most plastic parts are inert to rust, rot and corrosion.
 - c) Plastics are good thermal and electric insulators, all having dielectric strength.
- Plastics are poor heat conductors and if they were exposed to a high temperature for a short period, the interior temperature of the plastics would remain lower than would be the case with metals.

d) Plastics easily combine with other materials like wood, fibres, paper and combine light weight with good strength as well. The highest strength is obtained with glass fibre and this reinforcement is now used to a considerable extent. Plastics, obtained from various kinds of primaries are to an ever increasing extent winning themselves a place of high prominence in trade and industry. Having made a rather modest appearance in the turn of the century as substitutes for some costly materials, plastics have now invaded all branches of industry, agriculture, household needs, medicine and even art.

Running Gear





Final Drive

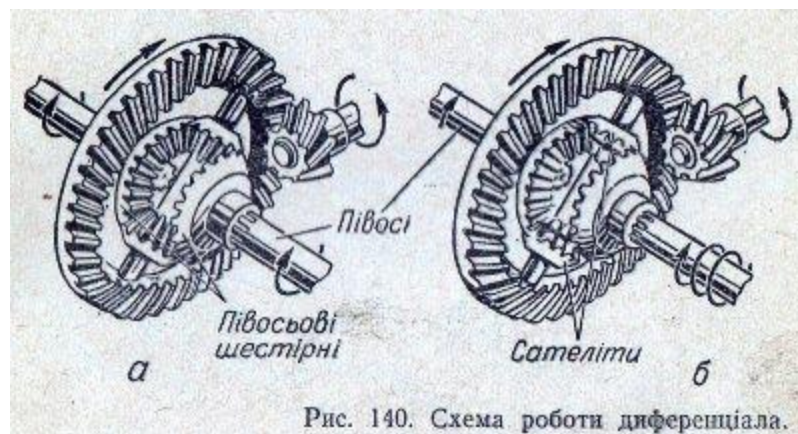
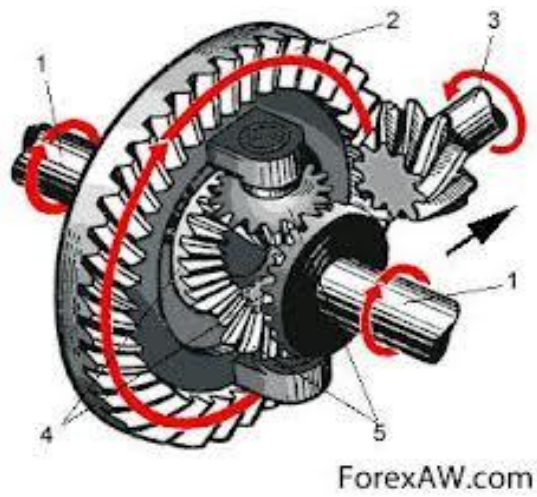
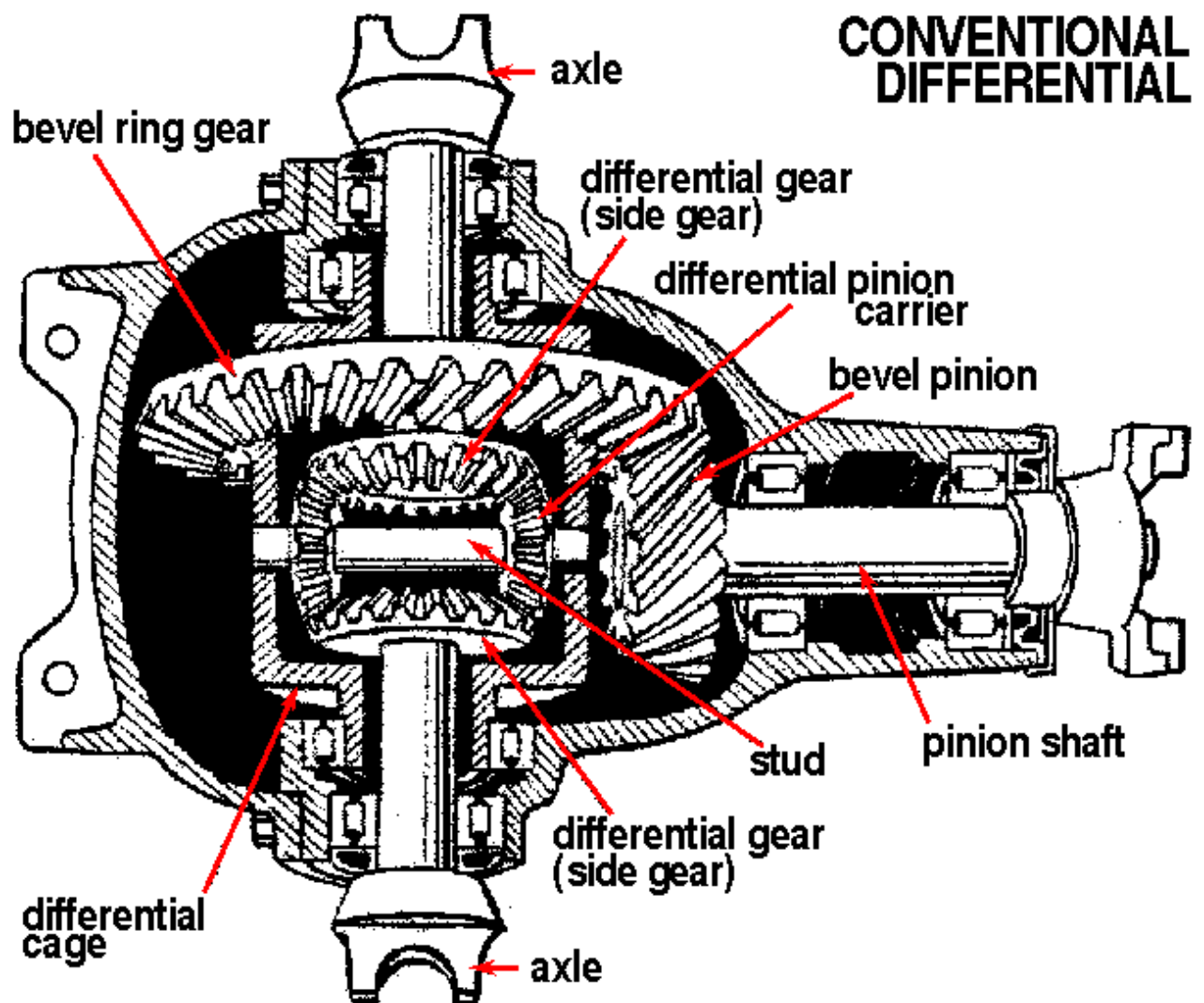
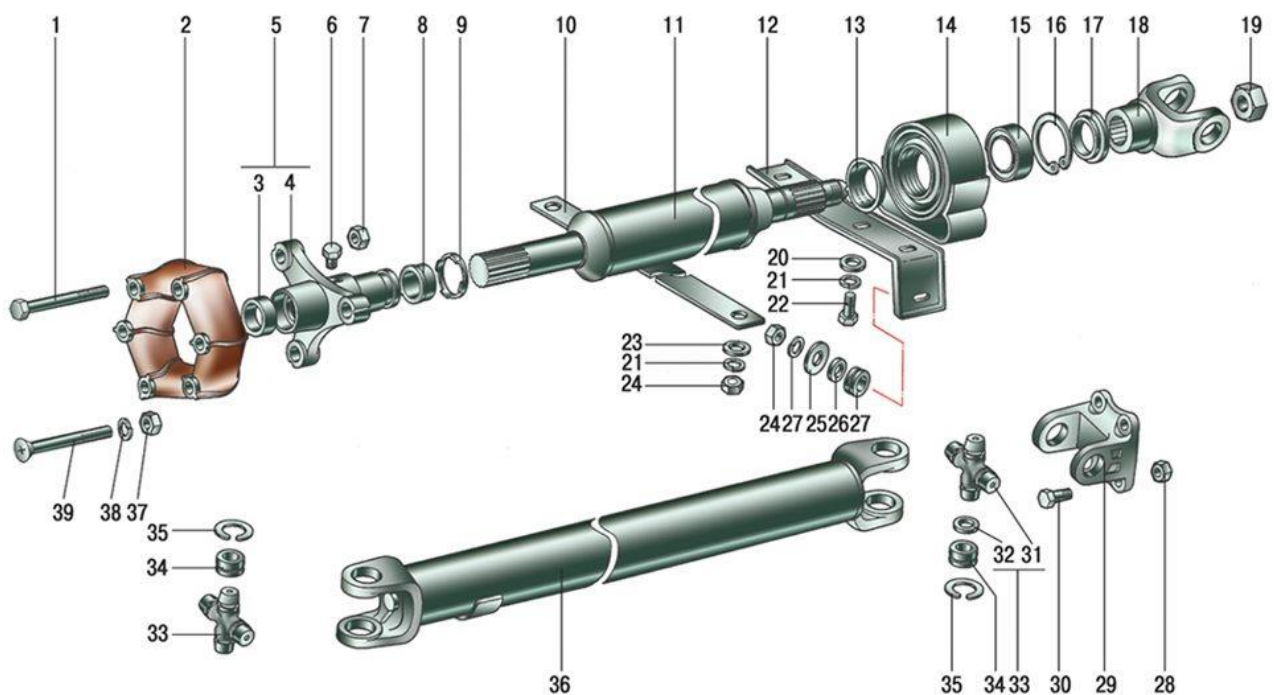
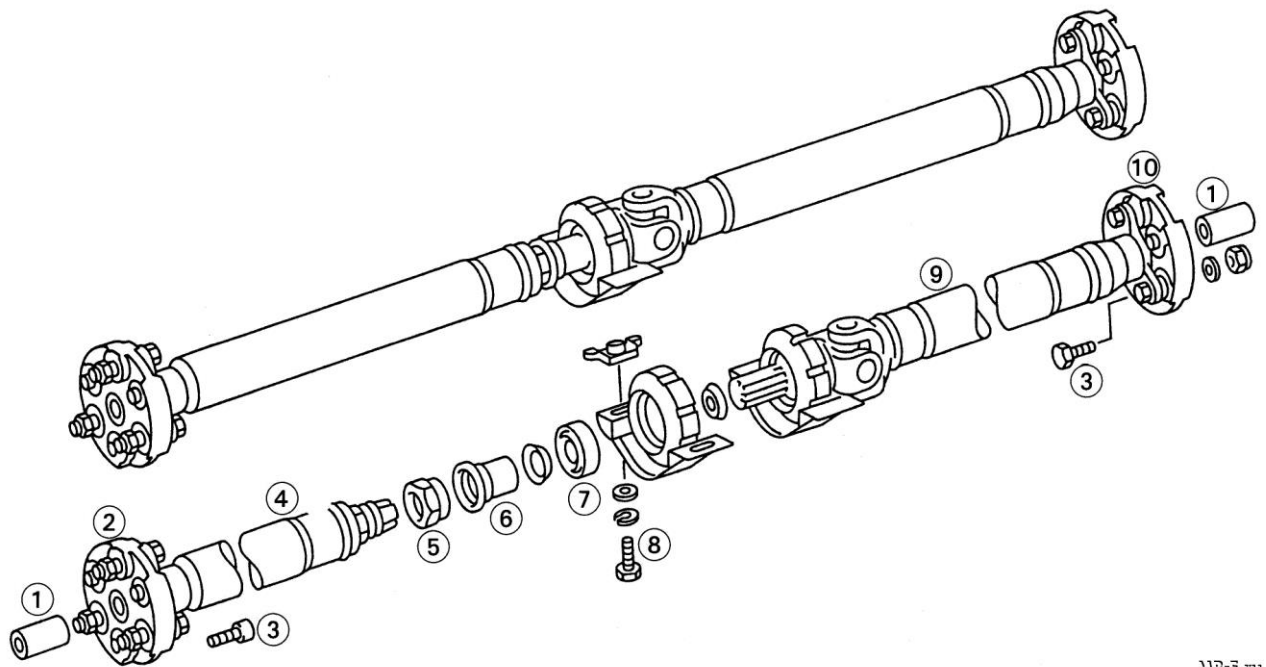


Рис. 140. Схема роботи диференціала.



Cardan Shaft





МБ-3.77

Steering System

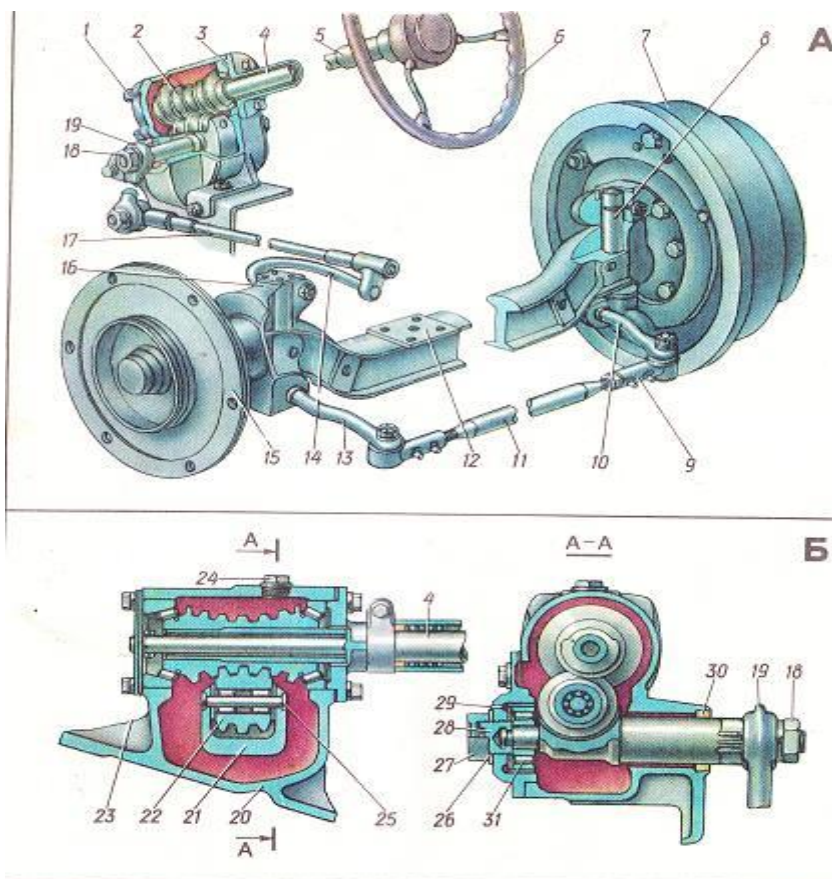
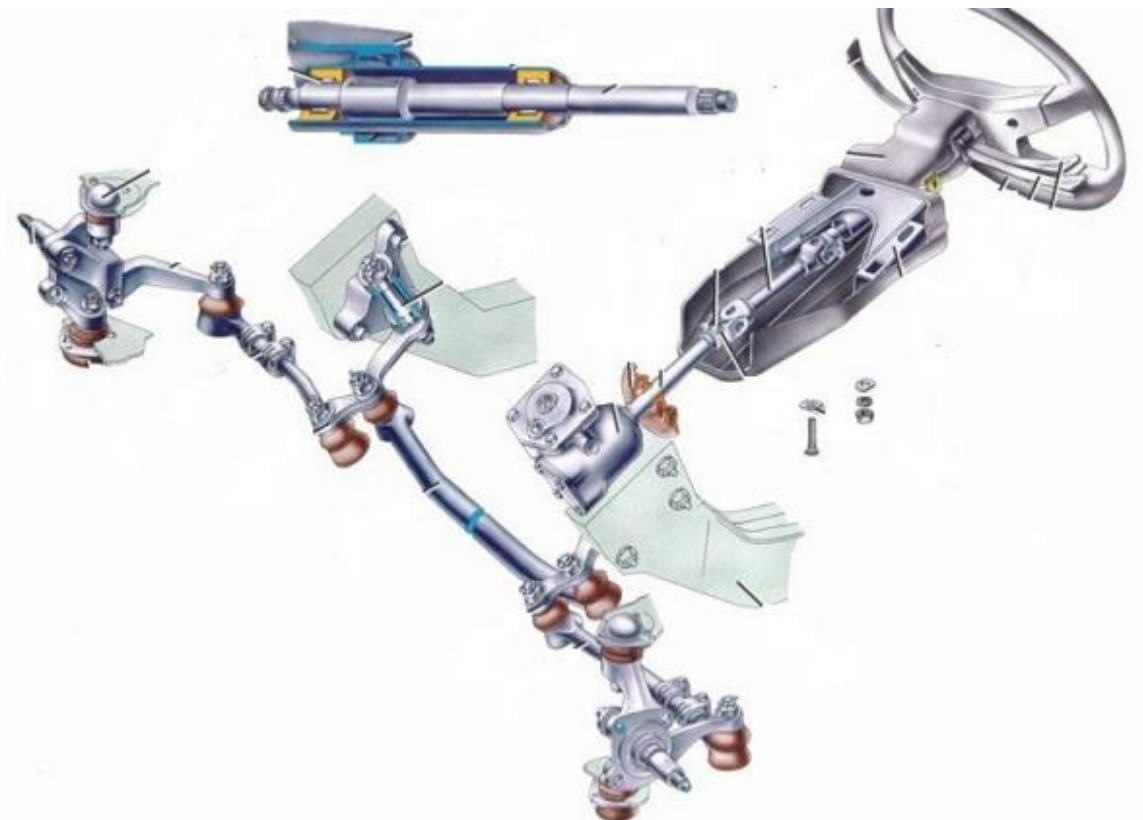


Рис. XVII. Рульове керування автомобіля ГАЗ-53А:

А — загальна будова; Б — рульовий механізм; 1 і 3 — кріпки картера рульового механізму; 2 — черв'як; 4 — рульовий вал; 5 — труба рульової колонки; 6 — рульове колесо; 7 — гальмівний барабан; 8 — шворні; 9 — наконечник поперечної рульової тяги; 10, 13 і 14 — поворотні важелі; 11 — поперечна рульова тяга; 12 — балка передньої осі; 15 — моточина колеса; 16 — поворотний цапфа; 17 — подовжня рульова тяга; 18 — гайка вала сошки; 19 — сошка; 20 — картер; 21 — вал сошки; 22 — ролик; 23 — регулювальні прокладки; 24 — пробка картера; 25 — вісь ролика; 26 — шайба регулювального гвинта; 27 — гайка регулювального гвинта; 28 — регулювальний гвинт; 29 — штифт бічної кришки; 30 — сальник; 31 — роликовий підшипник.



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«КПЕФК ЛНТУ», 2023. – 84 с.

Комп'ютерний набір:

Т.Вегера, О.Хилюк

Редактор:

за власною редакцією

Підп. до друку _____ 2023. Формат 60х84/16.Папір офс.
Гарн. Таймс.Ум. друк. арк. _____.Обл.-вид. арк._____.
Тираж _____ прим. Зам._____.

ВСП «Ковельський промислово-економічний фаховий коледж
Луцького національного технічного університету»
45000 м. Ковель, вул. Заводська, 23
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