МИНИСТЕРСТВО ОБРАЗОВАНИЯ РЕСПУБЛИКИ БЕЛАРУСЬ

Белорусский национальный технический университет

Кафедра английского языка №2

Электронный

учебно-методический комплекс

по учебной дисциплине

«ИНОСТРАННЫЙ ЯЗЫК (АНГЛИЙСКИЙ)»

для студентов I ступени получения высшего образования специальности

1-70 03 01 «Автомобильные дороги».

Минск ◊ БНТУ ◊ 2020

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Диск содержит данные об учебно-методическом комплексе по дисциплине «Иностранный язык (английский)», который предназначен для студентов очной формы получения высшего образования, а также преподавателей БНТУ кафедры английского языка №2. Может использоваться как для проведения аудиторных практических занятий, так и для самостоятельной работы студентов

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СОДЕРЖАНИЕ

ПОЯСНИТЕЛЬНАЯ ЗАПИСКА

Данный электронный учебно-методического комплекс (ЭУМК) предназначен для реализации образовательной программы по учебной дисциплине «Иностранный язык (английский)» для специальности 1-70 03 01 «Автомобильные дороги» на I ступени обучения.

Целью ЭУМК является формирование иноязычной коммуникативной компетенции будущего специалиста, позволяющей использовать иностранный язык как средство профессионального и межличностного общения в области информационных технологий. В процессе достижения главной цели решаются следующие задачи:

познавательные (знакомство с основными аспектами технической специальности посредством иностранного языка);

развивающие (совершенствование коммуникативных умений, формирование потребности к самостоятельной познавательной деятельности, систематизация знаний и умений);

практические (овладение иноязычным общением в единстве всех его компетенций, функций и форм, что осуществляется посредством взаимосвязанного обучения всем видам речевой деятельности в рамках определенного программой предметно-тематического содержания, а также овладения технологиями языкового самообразования).

Оформление и использование ЭУМК по учебной дисциплине осуществляется в соответствии с требованиями СТП СМК БНТУ 6.3–02–2014.

Особенностью структурирования и подачи учебного материала является сама структура комплекса, которая позволяет эффективно реализовывать процесс обучения при проведении практических занятий, а также ориентирует обучающегося на использование иностранного языка в качестве инструмента профессиональной деятельности: для перевода и реферирования профессионально-ориентированных и научных текстов, выступления с публичной речью, составления деловой документации.

Рекомендации по организации работы с ЭУМК. Данный электронно-методический комплекс предназначен как для аудиторных занятий, так и для самостоятельной работы студентов, обучающихся по специальности 1-70 03 01 «Автомобильные дороги».

ПЕРЕЧЕНЬ МАТЕРИАЛОВ

Структура ЭУМК включает следующие разделы: теоретический, практический, контроля знаний и вспомогательный.

Теоретический раздел ЭУМК включает в себя учебно-методическое пособие «Практическая грамматика английского языка» Колосовой Т.В., Крюковой Л.А., которое позволяет студентам технического вуза повторить грамматические явления языка и рассмотреть их на примерах из технической литературы, что повышает мотивацию изучения иностранного языка для специальных целей. Чёткая структура предлагаемого пособия помогает студентам систематизировать знания и, в случае необходимости, воспользоваться им на разных этапах обучения при самостоятельной работе.

Практический раздел ЭУМК включает в себя дидактический материал, представляющий собой разработки с дополнительными заданиями как для работы на практических занятиях при непосредственном контроле преподавателя, так и для самостоятельной работы студентов. Разнообразный характер упражнений позволяет варьировать лексическую и грамматическую наполняемость занятия в соответствии с практическими задачами, а также дает возможность выбора для соответствия определенному уровню владения иностранным языком. Предполагается, что данные наработки лягут в основу учебного пособия по дисциплине Иностранный язык (английский) для специальности 1-70 03 01 «Автомобильные дороги». Кроме того, дополнительно используются такие учебники и учебные пособия, как: «Английский язык для инженеров» (под общ. ред. Т.Ю. Поляковой), «Engineering Activities and the Environment» (Е.Е. Глуховская, Т.В Колосова), «Career Paths: Construction II - Roads & Highways» (V. Evans, J.Dooley, M.Chavez), «English Grammar in Use» (R. Murphy), «Technology 2» (E.H. Glendinning, A. Pohl); «Key words in Science and Technology» (B. Mascull); энциклопедии: «The World Book Encyclopedia», «McGraw-Hill Encyclopedia of Science and Technology», а также словари: Англо-русский терминологический словарь-справочник (Парменова Л.А., Муха О.Ю.); электронные словари ColorDict, Merriam-Webster Dictionary, Cambridge Dictionary of English и онлайн-словарь-справочник academic.ru.

В **разделе контроля знаний** ЭУМК представлены образцы лексико-грамматических тестов тематического и итогового контроля, а также предметно-тематическое содержание зачёта и экзамена.

Во **вспомогательный раздел** включены учебная программа БНТУ по дисциплине «Иностранный язык (английский)», включающая учебно-методическую карту дисциплины, и список рекомендуемой литературы.

ТЕОРЕТИЧЕСКИЙ РАЗДЕЛ

Теоретический раздел включает необходимый для изучения грамматический материал, который представлен в учебно-методическом пособии:

Колосова, Т. В. Практическая грамматика английского языка: учебно-методическое пособие для строительных специальностей БНТУ / Т.В. Колосова, Л.А. Крюкова. – Минск: БНТУ, 2005. – 107 с. http://rep.bntu.by/handle/data/30611.

ПРАКТИЧЕСКИЙ РАЗДЕЛ

Практический раздел включает методические разработки и упражнения по разделам грамматики, практики устной и письменной речи и технического перевода.

РАБОЧИЕ МАТЕРИАЛЫ

Составители:
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UNIT I. The History of Roads and Highways

Pre-reading tasks

1. Before you read the text, look at the words in the box and tick the ones you know. Consult the others in the dictionary.

to mean	ancient
to throw	route
solid	to carry
to drain	straight
ditch	flat
to protect	cobblestone
to manufacture	vehicle
to search	wagon
to investigate	to slope
to follow	condition
highway	pavement

2. Match the equivalents:

1. wheeled vehicle	a) грузовой автомобиль
2. urban area	b) происхождение
3. origin	c) твердое основание
4. truck	d) городская территория
5. clearing	e) сельская местность
6. rural area	f) колесное транспортное средство
7. solid base	g) участок земли, очищенный от деревьев и кустарника

Reading task

3. Read the text carefully and do the tasks that follow:

Road is a strip of land that provides routes for travel by automobiles and other wheeled vehicles. Roads usually connect urban areas with each other and rural areas with urban areas.

Roads and highways are vital lifelines. Farmers use them to ship their products to markets. Trucks can carry manufactured products from one area to another. Good roads carry millions of automobiles that travel on business and for pleasure.

Roads are so old that we are not sure of the origin of the word “road”. Most experts think it came from the Middle English word “rode” meaning “a mounted journey”. This may have come from the Old English “rad”, from the word “ridan”, meaning “to ride”.

In England, hundreds of years ago, certain main roads were higher than the surrounding ground. This was because earth was thrown from the side ditches towards the center. Because they were higher they were called highways. These roads were under protection of the king’s men and were opened to all travelers.

The first roads in the world probably followed trails and paths made by animals. People followed these trails to hunt for animals. People also made their own trails and paths in searching for water, food and fuel. Explorers followed these trails as they investigated new lands.

Early roads were built in the Near East soon after the wheel was invented. This was about 3000 B.C. As trade developed between villages, towns and cities, other paths or trade routes were made. One such early system of roads was the Old Silk Trade Route which ran over 6,000 miles (9,700 kilometers), connecting China with Rome and Europe. Merchants used this ancient route to carry Chinese silk across Turkistan, India and Persia.

The Egyptians, Carthaginians and Etruscans all built roads. But the first really great road builders were the Romans. They knew how to lay a solid base and how to make a pavement of flat stones. The Romans knew that the road must slope slightly from the center toward both sides to drain off water. The Roman road builders knew also that there must be ditches along the sides of the road to carry water away. Roman roads were built mainly to get soldiers from one part of the Empire to another. These roads ran in almost straight lines and passed over hills instead of cutting around them. The Romans built more than 50,000 miles (80,000 kilometers) of roads in there Empire and some of them are still in use.

From the 500’s to the 1800’s most roads in Europe were merely clearings in the forests. Cobblestone paving was used in some urban areas. There was little reason to built good roads, because most of the travel was on the horseback. The cleared way was sometimes quite wide so that robbers hiding in the woods could not leap out suddenly upon unsuspecting travelers. Later, when more wheeled vehicles, such as wagons, came into use, the roads of Europe still remained in poor condition.

Comprehension check

4. Answer the following questions.

1. What does this text deal with?
2. What do roads and highways serve for?
3. Did people use the paths made by animals in ancient times?
4. What really accelerated the building of good roads?
5. What was the most famous trade route?
6. Why do we consider the Romans the great road builders?
7. What purpose were Roman roads built for?

8. Asphalt paving was used in some urban areas, wasn't it?

Vocabulary practice

5. Fill in the correct word from the box:

hunting construction straight cobblestone ways ditches country

Roadmaking originated in the period of early human settlements. People chose the most convenient and the shortest _____of approach to their _____and fishing grounds, making footpaths. The first artificially constructed tracks were made in mountainous and forested _____.

Road _____ was extensively developed during the Roman Empire. Their roads were _____. Materials used in the construction of Roman roads were gravel, _____and hewn (тесаный) stone. _____ helped roads to drain, even when roads were not elevated much.

6. Give the English equivalents to the Russian words:

1. Early roads were built in the Near East after the (изобретения) of the (колеса). 2. The Romans knew that the road (должна слегка наклоняться) from the centre towards both sides. 3. The centre of the highways was higher than (окружающая земля, чтобы отводить воду) from the surface. 4. The road pavement was made of (плоских камней) with (прочным основанием). 5. The Roman roads were (прямые) with (канавами вдоль сторон дороги).

Language focus

7. Match the words with their synonyms:

a) to ship, car, to manufacture, trip, main, to connect, path, towards
b) journey, to produce, vehicle, to carry, to, chief, way, to join

8. Match the words with their antonyms:

a) narrow, to build, curved, top, soft
b) to ruin, wide, solid, bottom, straight

9. Form the verbs from the following nouns and translate them:

Concrete (бетон) – to concrete (бетонировать)
slope, hunt, design, load, place, form, shape

10. Form the adverbs from the following adjectives and translate them:

Main (главный) – mainly (главным образом)
slight, complete, sudden, mere, recent, probable

Speak on:

a) the appearance of the first roads in the world;
b) the Roman road builders;

UNIT II. The Master Road Builders

Pre-reading tasks

1. Before you read the text, check the meaning of these words. Use a dictionary if necessary.

demand	void
scarcity	to facilitate
to carry out	trench
thoroughly	impermeable
edgewise	to compact
suitable	surface
formation	course
cross-section	to remove
to elevate	layer

2. Match the equivalents:

1. improvement	a) подчёркивать
2. to pass	b) дюйм
3. impassable	c) непрерывное обслуживание
4. to support the load	d) усовершенствование
5. uniform thickness	e) относительно, сравнительно
6. inch	f) идти; проходить, проезжать
7. relatively	g) выдерживать нагрузку
8. to stress	h) одинаковой толщины
9. continuous maintenance	i) надлежащий дренаж
10. proper drainage	j) непроходимый

Reading task

3. Read the text carefully and do the tasks that follow:

Gradual technological improvements in the 17-th and 18-th centuries increased commercial travel, improved vehicles and the breeding of better horses. Rural roads became impassable in wet weather. These factors created an increasing demand for better roads.

Up to this time roads similar to the Roman roads were built. However, owing to a scarcity of a suitable material and the high cost of labour, the amount of stone material used was progressively reduced and the work was carried out less thoroughly. Research was carried out to find out more rational methods of using stone for pavement construction which would reduce both the amount of labour and the cost. And in the last half of the 18-th century the farthers of modern road building and road maintenance appeared in France and Britain.

Tresaquet. In France in 1764, Pierre Tresaquet, became an engineer of bridges and roads in Limoges. He developed an entirely new type of relatively light road surface, based on theory that the underlying natural formation should support the load.

His standard cross-section, 18 feet wide, consisted of an eight-inch-thick course of uniform stones laid edgewise on the natural formation and covered by a two-inch layer of broken stone. The second layer was topped with one-inch layer of smaller broken

stone. In order to maintain surface level Tresaquest's pavement was placed in an excavated trench — a technique that made drainage a difficult problem.

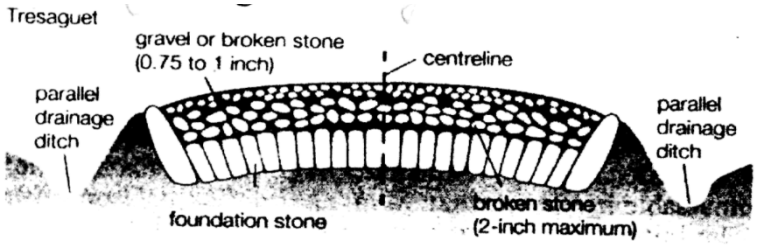


Figure 1

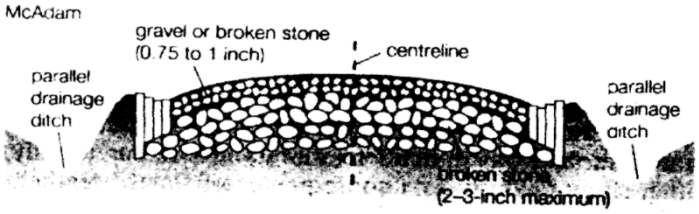


Figure 2

McAdam. The greatest advance came from John McAdam, born in 1756 in Scotland. He reached major heights in his road-building career after 1804 when he was appointed general surveyor for Bristol. The roads leading to Bristol were in poor condition. There he showed that traffic could be supported by a relatively thin layer of small, single-sized pieces of broken stone placed and compacted on a well-drained natural formation and covered by an impermeable surface of smaller stones.

Mc Adam is famous for the surface he developed for roads. This kind of surface, called macadam, is still used today. Mc Adam also stressed the importance of proper drainage to keep roads on a solid foundation. Drainage was essential to the success of Mc Adam's method and he required the pavement to be elevated above the surrounding surface. The structural layer of broken stone was eight inches thick and used stone of two or three inches maximum size laid in layers and compacted by traffic. The top layer was 2 inches thick, using three-quarter-inch stone to fill surface voids between the large stones. Continuous maintenance was essential.

Russian engineers were the first ones to construct granular surfacing laid on sand base which are now widely used in other countries. The use of a sand base permitted the cost of construction to be reduced and the removal of water from the subgrade to be facilitated. It helped to increase subgrade stability.

Comprehension check

4. Answer the following questions:

1. When did a period of intensive road-building begin in Europe?
2. Why was there a great demand for better roads?
3. What problems did the first engineers try to solve?
4. When did the fathers of modern road building appear?
5. What was the main idea of Tresaquet's method of road pavement construction?
6. What kind of surface did Mc Adam suggest?
7. What was essential in road pavement construction in Mc Adam's opinion?
8. What method of road pavement construction was proposed by Russian engineers?

5. Decide whether these statements are true or false? Correct the wrong ones.

1. Rural roads in the 17-th and 18-th centuries were passable in rainy weather.
2. There was enough suitable material to use for pavement construction.
3. Research was carried out to look for more rational methods of using stone for pavement construction.
4. Light road surface laid on natural formation was suggested by Pierre Tresaquet.
5. Tresaquet's pavement was elevated above the surrounding surface.
6. McAdam proposed new kind of surface, called cement, which is still used today.
7. The advantage of McAdam's method was that he placed the pavement in an excavated trench and provided proper drainage.
8. Granular surfacing laid on sand base which is now widely used in other countries was constructed by Russian engineers.

Language Focus

6. Match the following words with their synonyms.

A. permit, course, connect, elevate, vary, amount, similar, advance
B. link, raise, success, allow, alike, layer, quantity, change

7. Match the following words with their antonyms.

A. light, cheap, thin, above, entirely, advance, scarcity
B. under, failure, heavy, plenty, expensive, partly, thick

8. State the part of speech of the following words and translate them:

wide – widen – width – widely;
deep – deepen – depth – deeply;
high – heighten – height – highly;
short – shorten – shortly;
long – lengthen – length;
smooth – smoothen – smoothness.

9. Form the nouns from the following verbs using suffixes "-er", "-or" and translate them into Russian:

to make, to travel, to use, to design, to survey, to excavate, to manage, to govern, to investigate, to mix, to vibrate, to transport, to compact.

10. Give Russian equivalents to the following words:

1) owing to; 2) due to; 3) both…and; 4) because of; 5) in order to; 6) the number; 7) a number of; 8) the denser … the slower; 9) however; 10) either …or.

Summarizing

- **Make up a plan of the text**
- **Think and tell about:**
  - a) Tresaquet's method of road construction
  - b) the greatest advance of McAdam
  - c) the achievement of Russian engineers

UNIT III. Paving Materials

Pre-reading tasks 1

1. Translate the following words and memorize them:

failure	application
to force	crack resistance
tough	tyre
to crush	friction
stiff	impetus
strength	behaviour
recycled asphalt	to conduct

Reading task 1

2. Read the text carefully and do the tasks that follow:

Roads at the turn of the 20th century were largely inadequate for the demands about to be placed on them by the automobile and bicycle. As vehicle speeds increased rapidly, the available friction between road and tyre became critical for accelerating, braking and cornering. In addition, numerous pavement failures made it obvious that much stronger and tougher materials were required. The result was an ongoing search for a better pavement. Asphalt and concrete both offered promise.

Asphalt is a mixture of bitumen and stone, and concrete is a mixture of cement and stone. The first road use of asphalt occurred in 1824 when asphalt blocks were placed on the Champs-Elysees in Paris. The first successful concrete pavement was built in Inverness, Scotland, in 1865. Both asphalt and concrete required the availability of powerful stone-crushing, mixing and spreading equipment.

The impetus for the development of modern road asphalt came from the United States which had few deposits of natural bitumen to draw upon and where engineers were therefore forced to study the behaviour of this material. The first steps came in the 1860s with the work of Belgian immigrant Edward de Smedt at Columbia University in New York. De Smedt conducted his first tests in New Jersey in 1870 and by 1872 was producing the equivalent of modern road asphalt. The first applications were in Battery Park and on Fifth Avenue in New York City in 1872.

In 1887 de Smedt was followed as inspector of asphalts and cements by Clifford Richardson. Richardson basically developed two forms of asphalt: asphaltic concrete, which was strong and stiff and thus provided structural strength; and hot-rolled asphalt, which contained more bitumen and thus produced a far smoother and better surface for the car and bicycle.

Richardson published a standard textbook on asphalt paving in 1905, and the practice did not change greatly thereafter. The biggest change was in the machinery available to produce, place and finish the material rather than in the product itself. Toward the end of the century, there were major movements towards the use of recycled asphalt, chemical modifiers for improving bitumen properties and small fibres for improving crack resistance.

The first modern concrete roads were produced by Joseph Mitchell who conducted three successful trails in England and Scotland in 1865-66. Like asphalt technology, concrete road building was largely developed by the turn of the 20th century and was restricted more by the available machinery then by the material. For the following century the two materials remained in intense competition, both offering a similar product at a similar cost, and there was little evidence that one would far ahead of the other as they continued on their paths of gradual improvement. *(Picture: Machine laying asphalt concrete fed from a dump truck).*

- Champs-Elysées – главный бульвар в Париже (Елисейские поля).
- Battery Park Бэттери-парк Парк на берегу Нью-Йоркской гавани на южной оконечности Манхэттена. От парка начинается Бродвей.

Comprehension check 1

3. Answer the following questions:

1) The world entered the 20th century and roads didn't satisfy the demands of the automobile, didn't they? Why?
2) What kinds of materials were required for modern roads?
3) Why did the impetus for the development of modern road asphalt come from the United States?
4) What scientist produced the equivalent of modern road asphalt?
5) What kinds of asphalt did Clifford Richardson develop?
6) Who published standard textbook on asphalt paving?
7) Where were the first concrete roads built?
8) Why was concrete road building restricted?
9) Why did asphalt and concrete remain in intense competition for the following century?

4. Match the beginning with the ending:

1. Asphalt	a) was strong and stiff and provided structural strength.
2. Concrete	b) is a mixture of bitumen and stone.
3. Asphaltic concrete	c) is a mixture of cement and stone.
4. Hot-rolled asphalt	d) were restricted by available machinery.
5. Asphalt technology and concrete road building	e) contained more bitumen and produces concrete road building a far smoother and better surface for the car and bicycle.

Language Focus 1

5. Match the following words with their synonyms:

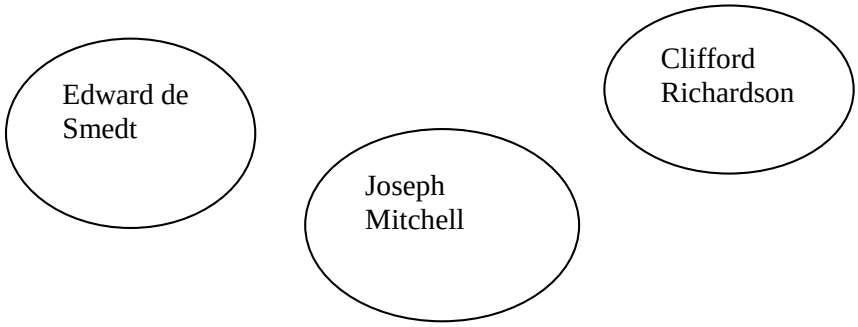
a) to accelerate, to occur, rapidly, to contain, to restrict, similar, to apply, to modify.
b) to take place, to change, to limit, slowly, to speed up, to involve, the same, to use.

6. Give the derivatives of the following words (adjectives, adverbs, nouns, verbs) and translate them:

to pave, conductivity, to mix, to require, possible, to improve, to change, stiff, to continue, to produce, to move, to complete, to add, available.

Speaking 1

7. Try to recollect the achievements of the following people whose names were mentioned in the text:



Writing Practice 1

8. Write a short paragraph summarizing the text.

Reading task 2

1. Before reading the text answer the following questions:
a) Do you know how asphalt is obtained?
b) In your opinion what are the processes used in the refining of asphalt?

2. Match the equivalents:

1. oil pool	a) примесь
2. crude oil	b) несущий слой
3. light fractions	c) водонепроницаемый
4. heavy residue	d) нефтяная залежь
5.) gravity	e) аэродром
6) deposit	f) заполнитель
7) refinery	g) универсальный
8) oil well	h) гидроизоляция
9) aggregate	i) плотность
10) waterproofing	j) тяжелый осадок
11) waterproof	k) сырая нефть
12) airfield	l) нефтеочистительный завод
13) base course	m) легкие частицы
14) impurity	n) залежь
15) versatile	o) нефтяная скважина

Reading task 2

3. Read the text carefully and do the tasks that follow:

Asphalt – an Ancient Constructional Material

Asphalt, the world's most versatile construction material today, is by no means new. It was used in many ways in ancient Mesopotamia, Syria and Egypt. The asphalt used by the ancients was a native material obtained from many of the oil pools where crude oil rose to the surface and the lighter fractions were evaporated by nature. The remaining heavy residue usually contained various amounts of water, soil and other impurities; but by slow and crude methods of distillation, fuel for lamps and bituminous products for mastics, waterproofing and paving were obtained.

The most extensive sources of native asphalt 4,000 to 5,000 years ago were located in Iraq. Several large deposits are known to have existed along the banks of the Euphrates River.

The Egyptians obtained native asphalts for waterproofing and building from the Dead Sea and from a source near the River Jordan in Lebanon.

Asphaltic construction materials are a component of crude oil taken from the hundreds of thousands of oil wells throughout the world today. The amount of asphalt that a crude oil may contain is quite variable, depending upon the gravity of the crude. The lower the gravity of the crude oil the higher is the asphalt content.

The crude oil is transported by pipelines, tank cars or barges to the refineries where it is separated into its various components by a continuous-flow refining process.

In the refining of asphalt, two different processes are used: steam and vacuum distillation method and solvent extraction method. Another refining method used to obtain a higher percentage of motor fuel is the "cracking" process, which by intense heat and high pressures brings about a chemical change producing a bituminous type of material not widely used for paving.

The basic principles of soil-asphalt stabilization, as applied to highway and airfield construction, are methods of designing and mixing local soil or aggregate with asphaltic material to form a stable and waterproof base course. Properly constructed soil-asphalt base courses resist deformation through the cementing action of the asphalt which binds the soil particles together. The thin coating of asphalt around the soil particles also provides a high degree of waterproofing which is further aid to resistance to deformation.

Comprehension check

4. Answer the following questions:

1. How was native asphalt obtained in ancient times?
2. Where were large sources of native asphalt found?
3. What was asphalt used for?
4. What does the amount of asphalt in a crude oil depend on?
5. How is the crude oil transported to the refineries?
6. What processes are used in the refining of asphalt?
7. What is done to form a stable waterproofed base course?

Language focus

5. Build derivatives from the words below and translate them:

To vary – adj.;	to resist – n.;	to stabilize – n.;
to continue – adj.;	to crack – n.;	to coat – n.;
to extract – n.;	to refine – n.;	to form – n.;
stable – n.;	proper – adv.	

6. Match the following words with their synonyms:

a) to contain, to obtain, amount, to remain, to bind, course, to separate, way, to apply, fraction, to aid.

b) quantity, to get, to involve, method, to connect, to divide, layer, to help, to stay, particle, to use.

7. Put the correct forms of the words into the sentences:

Nature works its wonders

Sir Waller Raleigh _____ on the island of Trinidad in 1595 and stayed there long enough to obtain a _____ ofasphalt. The asphalt he used was a native asphalt _____ from an asphalt lake a short distance from the shore of the Gulf of Paria and was similar to that _____ by the ancienls.	to land to supply to take to use
Hundreds of thousands of tons of asphalt have been ____ from the Trinidad lake without any sign of loss. As the material removed, pressure deep in the earth _____ more of the heavy residue to the surface, where nature continues its _____ process.	to remove to force to refine
The natural asphalt _____ from the lake _____ many impurities and foreign matter such as water, fine sand and vegetation. To produce a _____ paving material, these impurities have to be _____; therefore a refining process is necessary.	to remove to contain to suit to remove

8. Translate from Russian into English:

1. Асфальт является природным материалом, получаемым из нефтяных скважин.

2. Сырую нефть транспортируют на нефтеочистительные заводы, где её разделяют на различные составные элементы.

3. Количество асфальта в сырой нефти зависит от её плотности.

4. Чем выше плотность сырой нефти, тем выше содержание асфальта.

5. При очистке асфальта используется два метода: метод паровой и вакуумной дистилляции, а также метод экстракции селективным растворителем.

6.Укрепление грунта или заполнителя асфальтом широко используется при строительстве дорог и аэродромов.

7. Тонкое покрытие асфальтом вокруг частиц грунта обеспечивает высокую степень водонепроницаемости основания дорожной одежды.

9. Read the text and choose the right statement:

Some interesting facts

One of man's oldest building materials is finding its way into a lot of new places these days. Concrete, first discovered by the Romans, is now more widely used in construction than all other materials together.

The magic ingredient that makes concrete possible is cement, about which, according to one expert, more has been learnt in the past three decades than in the preceding 2,000 years. Concrete is a synthetic stone which can be formed while soft into practically any shape the builder wants. Portland cement mixed with water is the paste that binds sand, gravel, clinker (шлак) into an artificial rock that becomes harder as the years pass. Portland cement does not come from a place of that name; it was called Portland because Joseph Aspdin, the English builder who invented the first dependable, scientifically made cement about 1824, thought it resembled (напоминать) the rock excavated on the Isle of Portland on the Dorset Coast.

Portland cement is called …

1. after the name of the person invented it;
2. after the name of the place it had been formed;
3. after the name of the island where the mineral it is similar to was excavated.

UNIT IV. The Road. General Information

Pre-reading tasks

1. Translate the following words and memorize them:

structure	subsoil
to withstand	content
subgrade	excessive
moisture	disintegration
load	site
distribution	complete (adj.)
stability	maintenance
to vary	to subject
to cause	earthwork

2. Match the equivalents:

1. engineering structure	a. распределение влаги
2. road subgrade	b. инженерное сооружение
3. moisture distribution	c. дробление каменных материалов
4. gravel quarrying	d. грунтовое основание дороги
5. subsoil moisture content	e. эксплуатационные качества дорожной одежды
6. pavement performance	f. содержание влаги в подстилающем слое
7. engineering solution	g. вводить в эксплуатацию
8. put into service	h. инженер, ответственный за
9. repair shops	i. плотность движения
10. utmost importance	j. вписывать в ландшафт
11. traffic density	k. первостепенная важность
12. fit into landscape	l. выдерживать нагрузки
13. withstand loads	m. ремонтные мастерские
14. stone crushing	n. разработка гравийного карьера
15. engineer in charge of	o. техническое решение

Reading task

3. Read the text carefully and do the tasks that follow:

Modern highways are complex engineering structures. They are intended for high-speed motor traffic. The road pavement must continuously provide good riding qualities and be capable of withstanding the dynamic loads influenced by passage of vehicles. Pavements and road subgrades are subject to the influence of many natural factors such as heating by the sun, freezing, thawing, moistening by rain, etc. Complex physical processes develop in the subgrade caused by variations in moisture distribution and an increase in subsoil moisture content. An excessive moisture content quickly causes the subsoil to lose its strength and may lead to disintegration of the road foundation. The many and varied factors of pavement performance have to be taken

into account by the designer and constructor who have to provide for the maximum stability of the subgrade and for the maximum strength of the pavement.

Roads are built in the most varied natural conditions - in broad plains and hills, sandy deserts and in mountains. In all these diverse and complex conditions the road engineer has to be able to find correct engineering and economic solutions. Because of this, when solving construction problems related to road he has to make use of natural and historical sciences, i.e. geology, climatology, hydraulics, hydrology, etc. He must be able to design highways so as to ensure comfort and safety of transportation. *(Picture: A highway paved with concrete).*

The road-building operations become complicated because of the extensive length of the construction site – often tens and hundreds of kilometers. The task of the road engineer is to mechanize and technically develop the road-building operations and to provide for the most efficient and complete mechanization of the entire construction process. This is true to such operations as earthworks, sand and gravel quarrying, stone crushing and cement-concrete surfacing.

Finally, when the highway is put into service, its maintenance and the provision for uninterrupted traffic become of the utmost importance of the national economy. The engineer in charge of the highway operation must ensure the maintenance of the road quality under all traffic and weather conditions.

With the growth of traffic density a demand for greater amenities will come. It will be necessary to provide the national road system with hotels and restaurants, service stations and repair shops, where drivers and passengers may rest and vehicles be serviced and repaired. Attention should be given to such questions as fitting roads into the landscape in plan and in profile, planting trees, so as to improve their aesthetic value.

Comprehension check

3. Answer the following questions:

1. What is a highway?
2. What are modern highways intended for?
3. What is the main function of the road pavement?
4. What factors are pavements and road subgrades subject to?
5. Why do complex physical processes develop in the subgrade?
6. What can an excessive moisture content lead to?
7. What kinds of sciences must the road engineer know to ensure comfort and safety of transportation?
8. What do you know about the conditions in which road engineers have to build different kinds of roads?
9. In what way it is possible to make road-building operations easier?
10. What conveniences must the national road system be provided with?

Vocabulary practice

6. Choose the right translation of the word:

1. **subsoil** a) почва b) гравий c) подстилающий слой грунта
2. **to withstand** a) различать b) выдержать c) обеспечить
3. **distribution** a) распределение b) расширение c) удаление
4. **content** a) ослабление b) уклон c) содержание
5. **surfacing** a) покрытие b) замерзание c) увлажнение
6. **disintegration** a) осушение b) расслоение c) преодоление
7. **excessive** a) чрезмерный b) полный c) разнообразный
8. **to crush** a) поднимать b) уничтожать c) дробить
9. **to cause** a) определять b) вызывать c) требовать
10. **stability** a) изменение b) влияние c) устойчивость

Language focus

5. Read the following words paying attention to the stress and translate them:

transport (n) – to transport;
increase (n) – to increase;
export (n) – to export.
subject (n) – to subject;
import (n) – to import;
concrete (n) – to concrete

6. Complete the table. Try to remember what the following words mean:

Verb	Noun
1. to construct	…
2. …	load
3. to heat	…
4. …	passage
5. to influence	…
6. …	distribution
7. to design	…
8. …	maintenance
9. to vary	…
10. …	provision
11. to solve	…
12. …	moisture
13. to provide	…

7. Give the initial forms of the words and translate them:

continuously, varied, qualities, withstanding, sandy, necessity, uninterrupted, excessive, safely.

8. Match the words with their synonyms:

a) to ensure, to vary, solution, operation, diverse, complete, amenities, to take into account.

b) decision, to pay attention to, work, various, conveniences, total, to change, to guarantee.

9. Fill in the correct prepositions:

to intend …; to be capable …; to subject …; to take … account; to give attention …; because …; to provide … .

10. Translate the following sentences into English:

1. Современные дороги предназначены для высокоскоростного автомобильного транспорта.
2. Покрытие дороги должно обеспечивать хорошее качество езды и выдерживать динамические нагрузки.
3. Покрытия и дорожные основания подвержены влиянию многих природных факторов, таких как нагревание солнцем, замерзание, таяние, увлажнение и т.д.
4. Сложные физические процессы, вызванные изменением в распределении влаги, развиваются в грунтовом основании.
5. Чрезмерное содержание влаги в грунтовом основании может привести к его разложению.
6. Проектировщик и строитель должны обеспечивать максимальную устойчивость грунтового основания и максимальную прочность покрытия.
7. Задача инженера-дорожника заключается также в том, чтобы обеспечить механизацию таких процессов как земляные работы, разработка песчаных и гравийных карьеров, дробление камня и цементно-бетонных покрытий.

Speak on:

a) the road pavement of modern highways;
b) the role of a road engineer in the construction of modern highways.

UNIT V. Highway Network Planning

Pre-reading tasks

1. The following unit is devoted to planning, so what do you think?

1) What is the purpose of planning?
2) Is it important to use a plan before doing something?
3) What's the job of highway planners?

2. Translate the following words and memorize them:

heavy traffic	culvert
to draw up	to fulfill
curve	grade
sharpness	right-of-way
steepness	shoulder
slope	excavation
boundary	to locate
drawing	haulage

3. Match the English words with their Russian equivalents:

1. long-range needs	a) узнать заранее
2. public hearings	b) котлован, выемка грунта
3. to identify	c) прогнозировать
4. environmental impact statement	d) чернозем, перегной
5. excavation	e) долговременные нужды
6. to discover in advance	f) прилегающий, смежный
7. sidewalk	g) заключение о воздействии на окружающую среду
8. humus	h) особенность
9. to predict	i) тротуар
10. adjacent	j) обозначать
11. feature	k) общественные слушания

Reading task

4. Read the text carefully and do the tasks that follow:

In planning a highway network or a route, highway planners must learn:
(1) where people live, (4) where goods are produced,
(2) where they want to go, (5) what markets the goods are sent to,
(3) how they get there, (6) how the goods reach their final users.

Traffic counts tell how many and what kinds of vehicles travel on a road, and when traffic is the heaviest. From these and other facts about the past and present, planners

try to predict future growth in population and industry, changes in land use, and how such growth and change will affect highway needs.

Public participation in road planning is essential. In the U.S. highway planners hold public hearings on most major highway projects. These meetings enable citizens to present their views before a project begins.

Before highway construction begins, planners must also prepare an environmental impact statement. The purpose of such a statement is to discover in advance all the possible good and bad effects that a new highway may have on the public and on the environment.

Highway engineers draw up standards for various kinds of roads, highways, and bridges. These standards govern the thickness and kind of foundation and surfacing for different kinds of traffic; the number of lanes needed; the sharpness of curves; and the steepness of hills.

In planning a new road or rebuilding an existing one, maps must be drawn if they are not already available. Aerial photography is widely used today for this work. These maps show the location of other roads, railroads, towns, farms, houses, and other buildings. They also show such natural features as rivers, lakes, forests, hills and the slope of the land. The types of soil may also be identified.

Using these maps, engineers locate new highways and make detailed drawings called plans. The plans show the exact boundaries of the right-of-way. This is land needed for road pavement, shoulders, ditches, and side slopes. The plans also show the exact location, grades, and curves of the pavement, and the location of bridges and culverts.

So highway planners study everything from the long-range needs of a country to a particular section of a single route. This planning determines what the highway needs of the region are and how these needs can best be fulfilled and paid for.

Comprehension check

5. Decide whether these statements are true or false:

1. There is no need for highway planners to know where people live, where they want to go, where goods are produced and sent to.
2. In planning a new highway planners try to predict future growth in population and industry.
3. In the USA before the project begins people meet and discuss their ideas about future highways.
4. Maps showing the location of other roads, towns, houses and other buildings are usually drawn in planning a new road or rebuilding an existing one.
5. There are no special standards for various kinds of roads, highways, and bridges, which govern the thickness, kind of foundation, surfacing, the number of lanes and other peculiarities.
6. A plan is a drawing that shows exact boundaries of the right-of-way and also the exact location, grades, and curves of the pavement, and the location of bridges and culverts.
7. The aim of planning is to find the best way of highway needs fulfillment.

Vocabulary practice

6. Choose the right translation of the word:

1. **formation** a) создание b) земляное полотно c) учреждение
2. **impermeable** a) недоступный b) непроницаемый c) устойчивый
3. **compact** a) поднимать b) уменьшать c) уплотнять
4. **slope** a) наклон b) подъем c) спуск
5. **suitable** a) тщательный b) внимательный c) подходящий
6. **tough** a) слабый b) прямой c) жесткий
7. **solid** a) солидный b) устойчивый c) твердый
8. **crush** a) копать b) дробить c) облегчать
9. **complete** a) проводить b) завершать c) исследовать
10. **thoroughly** a) тщательно b) первоначально c) успешно

7. Fill in the correct word from the box:

benefits; distance; traffic; drawings; populations; route; highways; volumes; available;

1) _____ are designed for the haulage of goods and passengers with a minimum of effort and at low cost.
2) Traffic between two centers is approximately proportional to their _____ and inversely proportional to the _____ between them.
3) Consideration in planning is also given to the effect of new _____ on existing streets, roads, and parking lots.
4) The economic, social, and environmental _____ and costs of the roads are discussed with relevant official and community organizations until an acceptable specific _____ is determined.
5) Computer models are then used to estimate future traffic _____ on each proposed route.
6. Aerial photography is widely used today to draw maps if they are not _____.
7. All construction work is performed in accordance with working _____.

8. Match the terms with their definitions:

Ditch, slope, shoulder, right-of-way, bridge, vehicle, culvert

1. Any means in or by which someone travels or something is carried.
2. A long, narrow excavation made in the ground by digging, as for draining or irrigating land.
3. A structure that spans and provides a passage over a road, railway, river, or some other obstacle.
4. Ground which has a natural inclination, as the side of the hill.
5. A portion of the right-of-way which is wide for safe emergency stopping and sloped for proper drainage.

6. A drain or channel crossing under a road, sidewalk, etc.

7. The zone which is marked for laying the road, excavating the soil for filling the embankments, for building ancillary structures and for green plantings.

Language Focus

9. Arrange the synonyms in pairs:

needs, fulfill, permit, exact, govern, determine, locate, ditch, allow, demands, direct, carry out, trench, accurate, decide, place.

10. Form nouns from the following verbs and translate them:

To plan, to travel, to predict, to grow, to participate, to meet, to discover, to exist, to locate, to draw, to pave, to determine.

11. Translate the following sentences into English:

1. Инженеры-дорожники составляют стандарты (нормы) для различных видов дорог, магистралей и мостов.

2. При планировании новой дороги следует чертить карты.

3. Карты показывают местоположение рек, озер, лесов, холмов, других дорог, железных дорог и домов.

4.Используя эти карты, инженеры выполняют детальные чертежи, называемые планами.

5. При планировании магистрали следует знать, где люди живут и куда они хотят ездить.

6. Участие общества в планировании дорог в США является весьма важным.

Speak on:

12. Speak about planning of roads and highways. Use the following expressions as introductions:

It is known that … It should be noted that …
It is essential to note that … It is a well-known fact that...

UNIT VI. Organization of Survey Work

Pre-reading tasks

1. Translate the following words and memorize them:

survey (surveying)	data
estimate	quarry
to execute	to utilize
to adopt	available
accuracy	gradient

2. Match English and Russian equivalents.

1. survey work	a. климатологическая информация
2. economic surveys	b. приблизительная смета
3. engineering surveys	c. изыскательские работы
4. approximate estimate	d. технические изыскания
5. cartographical information	e. быть ответственным за
6. climatological information	f. картографическая информация
7. to be in charge of	g. экономические изыскания

Reading task

3. Read the text carefully and do the tasks that follow:

Economic and engineering surveys are carried out mainly by special road designing and surveying organizations. The field work is executed by a special survey party that collects the required materials and performs the necessary surveying work. In the process of surveying appropriate data must be obtained for making an approximate estimate of the quantities and cost of the work and also for establishing the required road-building materials both from local and from outside sources, and whether their quantity is sufficient for construction of the road or bridge. *(Picture: Surveyor at work with a leveling instrument).*

The time rates for carrying out the survey and designing work are established with a view to the type of survey and the nature of the relief of the area, as well as the climatic and other local conditions influencing the efficiency of work of the party. The head of the survey party is in charge of all works and carries full responsibility for the accuracy of the survey field work, and also for the thoroughness and quality of all the data collected.

During surveys special attention should be focused on the study of local natural conditions and in particular on the carrying out of geological and soil investigations.

The survey party usually includes a geological engineer, who is in charge of all operations concerned with geological and soil investigations, and with the location of quarries for road-building materials.

The designing and surveying departments check the quality of the survey party's work with the aid of special inspectors.

The season of the year does not limit the survey operations at present. Surveys are carried out all the year round with the exception of the northern regions of Siberia and Far East. However, surveying operations in winter encounter considerable difficulties, which lead to an increase in cost.

When studying climatological information it is necessary to establish the general climatic conditions of the area where the road is to be laid (average monthly temperature over the year, average monthly intensity of snowfall and rainfall for a year). All these items must be substantiated by means of information obtained from local meteorological stations and from highway authorities. These data are utilized in finalizing decisions relating to design.

On the basis of the available cartographical information the location of road is selected. The location of the road is studied on large-scale maps, which are termed topographical maps. Relief and detailed regional situation are indicated on them. The alternative locations of the route are considered, whether to lead the road around or through intermediary towns and cities, to cross large water courses or along a valley, etc.

Simultaneously with map route location the main technical standards for designing the road should be established. The class of the road, the type and width of the carriageway and the overall width, maximum gradient and minimum radius of curves, etc., are included in such technical standards. The class of road and technical standards adopted must be in accordance with the potential development of traffic over a period of not less than 10 years.

Comprehension check

4. Answer the following questions.

1. Is it necessary to carry out survey work of the land before the construction of a road?
2. Who usually performs an examination of the shape, size and position of a piece of land?
3. What data are usually obtained in the process of surveying by a special survey party?
4. What should special attention be focused on during surveys?
5. Does the season of the year limit the survey operations?
6. What does climatological information include?
7. What is usually indicated on topographical maps?
8. What do technical standards comprise?

Vocabulary practice

5. Choose the right translation of the word:

1. **elevate** a) включать b) смещать c) поднимать
2. **demand** a) требование b) бедствие c) нагрузка

3. **utilize** a) побуждать b) нагнетать c) использовать, применять
4. **route** a) резина b) трасса, маршрут c) выступ
5. **maintain** a) сопротивляться b) усиливать c) содержать, обслуживать, ремонтировать
6. **urban** a) городской b) доступный c) заметный
7. **towards** a) вперед b) к, по направлению c) вниз
8. **available** a) соответствующий b) благоприятный c) имеющийся в распоряжении
9. **resistance** a) сопротивление b) прочность c) мощение
10. **aggregate** a) агрегат b) заполнитель (бетона) c) множество

6. Match the words with their definitions:

Survey, curve, accuracy, investigation, climate, data, condition

1. A continuous bending line that has no straight parts.
2. The long-term prevalent weather conditions of an area, determined by latitude, position relative to oceans or continents, altitude, etc.
3. A particular state of being or existence; situation with respect to circumstances.
4. A single piece of information; fact.
5. To plot a detailed map of (an area of land) by measuring or calculating distances and height.
6. A careful search or examination in order to discover facts.
7. The degree of agreement between a measured or computed value of a physical quantity and the standard or accepted value for that quantity.

<u>Language Focus</u>

7. Find synonyms to the following words in the text:

To help, to fulfill, to use, to point out, to involve, care, research, to call, to accept, to pay attention to.

8. Define the part of speech of the following words:

mainly, appropriate, approximate, responsibility, thoroughness, include, exception, encounter, indicate, intermediary, simultaneously, curve, surveyor, situate, relief, focus, accuracy, available.			
Verb	Noun	Adjective	Adverb

9. Translate the following groups of words into Russian:

a) a number; the number of accidents; a number of advantages; in magazine number one; motor-car number.

b) to take interest; to take into account; it takes me an hour to get to the University; to take part in; to take place.

c) to develop road-building industry; to develop the necessary properties; to develop a new type of machinery; the development of the economy; the development of mechanism.

10. Choose the appropriate preposition:

1. Preliminary survey was carried out (with, by, of) means (in, upon, of) aerial photography.
2. (On, in, for) order to protect the surface from heat and cold it was covered with special substance.
3. Both the bridge (of, to, and) the tunnel will be finished in time.
4. Owing (at, to, of) the new system of regulations the number of accidents went down.
5. The access to the bridge was difficult due (at, to, of) the great amount of snow which had fallen during the last week.
6. Because (for, to, of) the cracks on the road surface they had to close this section of the road for transport.
7. Good lighting helps cut accidents for both vehicles (for, and, to) pedestrians.

Summarizing.

11. Write a short summary of the text. You may use the following clichés:

The text deals with…
The author describes (stresses, points out)…
Special attention is paid to…
The author comes to the conclusion that…

UNIT VII. Right-of-Way and Road Cross-Section

Pre-reading tasks

1. Translate the following words and memorize them:

to mark	to reinforce
separate	strip
snowdrift	ancillary
borrow pit	volume
to allocate	to stack
to terminate	aggregate
center line	carriageway

2. Match the equivalents.

1. cross section	a) ось дороги
2. to fill the embankment	b) делать пригодным
3. green plantings	c) поперечный профиль
4. excavation of borrow pit	d) вертикальная плоскость
5. section	e) отсыпать насыпь
6. to render suitable	f) упор (дорожного покрытия) у краев
7. vertical plane	g) выемка кювет резерва
8. centre line	h) сечение (разрез)
9. lateral support	i) временные сооружения
10. temporary structures	j) зеленые насаждения

Reading task

3. Read the text carefully and do the tasks that follow:

The zone which is marked for laying the road, excavating the soil for filling the embankments, for building ancillary structures and for green plantings is called the road zone, or right–of–way. The higher the technical class of the road, the wider is the right–of–way for its construction.

Within the limits of inhabited places or agricultural lands used for especially valuable crops, the width of the road zone should be reduced to a minimum, and includes only the width strictly necessary for the road.

In separate cases, for example for building offices, for excavation of quarries for road–building materials, for planting fruit trees as protection against snowdrifts, excavation of borrow pits near the route, certain additional areas may be allocated. However, after the termination of construction works, the land which was appropriated for temporary structures, for the excavation of borrow pits and quarries, has to be leveled, and rendered suitable for further use in agriculture.

The section of a road by a vertical plane at right angels to the road centre line is called a cross–section. The road surface strip within the limits of which motor vehicles run is called a carriageway or roadway. Usually it is reinforced by means of natural or

artificial stone aggregates (concrete) which form the pavements. The strips of ground adjacent to the carriageway are called the road shoulders. The shoulders render lateral support to the pavement, which is made of solid materials within the limits of the carriageway. Shoulders are used for temporary parking of vehicles, as well as for road machinery during the road overhaul or for stacking road repair materials.

Comprehension check

3. Answer the following questions:

1. What information does this text carry?
2. What is the right-of-way?
3. In what cases is the width of the right–of–way made wider?
4. When is it necessary to reduce the width of the right–of–way to a minimum?
5. What should be done with the land appropriated for temporary structures after the termination of construction works?
6. What is the cross–section of a road?
7. What is a carriageway?
8. What is used to reinforce the carriageway?
9. What are shoulders?
10. What can you say about the function of shoulders?

4. Complete the sentences using the text:

1. Right–of–way is … .
2. Certain additional areas may be allocated in separate cases, for example … .
3. The workers have to render suitable for further use in agriculture the land which … .
4. Motor vehicles run within … .
5. Natural or artificial stone aggregates are used for … .
6. Lateral support to the pavement is provided by … .
7. You can park your vehicle … .

Language Focus

5. Arrange the synonyms in pairs:

To terminate, to protect, within, overhaul, ancillary, to allocate, to defend, to finish, in, to reserve, to reinforce, auxiliary, repair, to strengthen.

6. Give the derivatives of the following words (adjectives, adverbs, nouns, verbs) and translate them:

To protect, to excavate, to level, to suit, wide, to value, to reduce, strict, to separate.

7. Fill in the correct prepositions:

over	for	since	in	from	by	to	of	to

1. If the car is well maintained it will not need any repair **…** several years.
2. Cement has many advantages **…** traditional materials for it can be easily laid, compacted and shaped.
3. Considerable attention must be given to the reconstruction of roads … order … make them suitable for high–speed motor traffic.
4. …. excavators are heavy and slow–moving machines they are carried …site…site … special transporters.
5. Salt spreading on roads reduce the number … traffic accidents.

8. Fill in the blanks using the words below and translate the text:

Water, embankment, soil, utilization, quantity, near, level

ROADBED

In order to lay the carriageway at the required _____ above the ground surface a formation or roadbed is constructed in the form of embankments or cuttings with side ditches for drainage and diversion of _____. The formation includes also borrow pits – shallow excavations from which the _____ was used for filling the embankments, and spoil banks, which are heaps of excessive soil, parallel to the road , remaining after excavation of cuttings.

If the embankment is low soil for its construction can be taken from the widen side ditches. When the _____ is high the soil has to be taken from cuttings adjacent to the road or from shallow excavations made near the road and called borrow pits. When the embankments are high and require a great _____ of soil, the borrow pits are usually excavated away from the embankment. In any case the borrow pits should be excavated as _____as possible to the road because by reducing the length of haul of the soil from the borrow pit to the embankment one reduces the cost of the earthworks and improves the _____ of road machinery.

Note:

roadbed	земляное полотно
shallow excavation	неглубокая выработка
spoil bank	кавальер (вал)
cutting	выемка
haul	перевозка

9. Put the words in the right order to make up sentences.

1. should, A borrow pit, to the road construction site, near reasonable distance, be located.
2. regular slopes, are, The sides, given, of the embankment.
3. local materials, by using, The strength, should be developed, cheap, road pavements, of.

4. compaction, an instrument, in the pavement, is, for obtaining, A roller.

5. the road, When, to be in a cutting, is situated, is said, below the land surface, the road surface.

10. Translate from Russian into English:

1. В пределах населенных пунктов и пригородных сельскохозяйственных земель полосу отвода обычно уменьшают до минимума. Она включает в себя только ширину строго необходимую для дороги.

2.Чем выше категория дороги, тем шире полосы отвода для ее строительства.

3. Кювет резервы – это неглубокие выемки (excavations), из которых грунт используют для того, чтобы отсыпать насыпи.

4. Землю необходимо выровнять после окончания строительных работ и сделать ее пригодной для дальнейшего использования.

5. Обочины используют для временной парковки транспортных средств, для складывания дорожно-строительных материалов и для ремонта машин.

Summarizing

11. Write a short summary of the text. You may use the following clichés:

The text is devoted to …
… are discussed.
It is spoken in detail …
Much attention is given to …
The author comes to the conclusion that …

UNIT VIII. Pavement

Pre-reading tasks

1. Before you read the article, check the meaning of these words and phrases and memorize them.

exploration	to solidify
durability	film
to shrink	to resist
to swell	joint
supplement	crack
flexible	to enhance
rigid	fine
to glue	to cast
to cool	additive

2. Match the equivalents:

A. 1. flexible pavement	a) тщательно укатывать
2. to maintain workability	b) бетоноукладчик
3. paving machine	c) жёсткость при изгибе
4. to roll thoroughly	d) сохранять способность подвергаться обработке
5. tyre friction	e) битумная плёнка
6. light reflectance	f) износоустойчивые камни
7. bituminous film	g) трение шины
8. to spray coating	h) отражение света
9. wear resistant stones	i) напылять покрытие
10. flexural stiffness	j) нежёсткая дорожная одежда

B. 1. rigid pavement	a) стальная арматура
2. portland cement concrete	b) жёсткая дорожная одежда
3. a poor natural formation	c) бетон на портландцементе
4. steel reinforcement	d) слабое земляное полотно
5. tensile strength	e) поперечные швы
6. fine cracking	f) прочность на растяжение
7. transverse joints	g) мелкое растрескивание
8. longitudinal joints	h) нестандартный материал
9. substandard material	i) продольные швы

Reading task

3. Read the text carefully and do the tasks that follow:

Road traffic is carried by the pavement which in engineering terms is a horizontal structure supported by in situ natural material. In order to design this structure subsurface explorations are conducted. The engineering properties of the local rock and soil such as strength, stiffness, durability, susceptibility to moisture, and propensity to shrink and swell over time are established. These properties are determined either by field tests or by empirical estimates based on the soil type or by laboratory

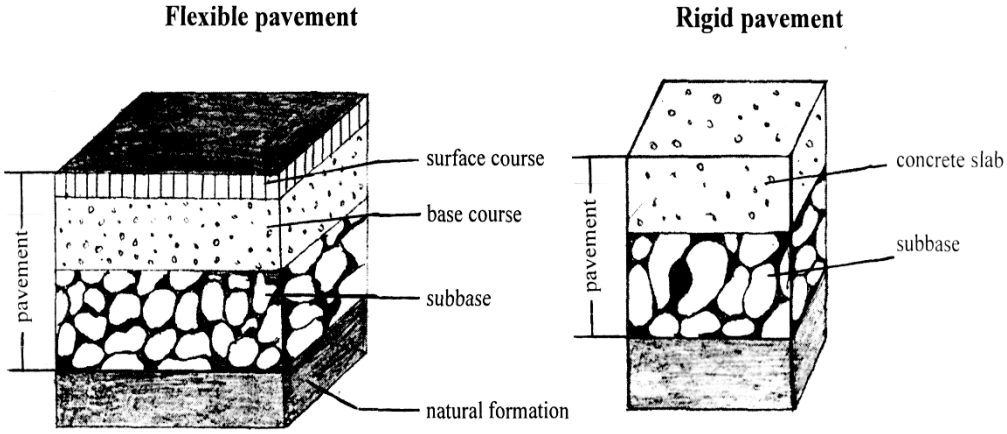
measurements. The material is tested in its weakest expected condition, usually at its highest probable moisture content. Soils unsuitable for the final pavement are identified for removal, the maximum slopes of embankments and cuttings are established, the degree of compaction to be achieved during construction is determined and drainage needs are specified.

In a typical rural pavement, the base course provides the required supplement to the strength, stiffness and durability of the natural formation. Its thickness ranges from 4 inches (10 centimeters) for very light traffic and a good natural formation to more than 40 inches (100 centimeters) for heavy traffic and a poor natural formation. The subbase is a protective layer and temporary working platform sometimes placed between the base course and the natural formation.

Pavements are called either flexible or rigid, according to their relative flexural stiffness.

Flexible pavements have base courses of broken stone pieces either compacted into place in the style of McAdam or glued together with bitumen to form asphalt. In order to maintain workability, the stones are usually less than 1.5 inches in size and often less than 1 inch. Initially the bitumen must be heated to temperatures of 300°-400° F (150°-200° C) in order to make it fluid enough to mix with the stone. At the road site a paving machine places the hot mix in layers about twice the thickness of the stone size. The layers are then thoroughly rolled before the mix cools and solidifies.

The surface layer of a flexible pavement protects the underlying base course from traffic and water while also providing tyre friction, generating minimal noise in urban areas, and giving suitable light reflectance for night-time driving. Such surfaces are provided either by a bituminous film coated with stone or by a thin asphalt layer. Bituminous surfacing with stone is relatively cheap, effective and impermeable and lasts for about 10 years. Its main disadvantage is its high noise generation. Maintenance usually involves a further spray coating with bitumen. Asphalt surfacing is used with higher traffic volumes or in urban areas. It commonly contains smaller and more wear-resistant stones than the base course and employs relatively more bitumen. Asphalt surfacing is better resist horizontal forces and produces less noise.



Surface dressing	поверхностный слой износа
Surface course	верхний слои дорожной одежды
Base course	несущий слой
Concrete slab	бетонная плита
Subbase	подстилающий слой
Formation level	уровень грунта; нулевая отметка
Natural formation	земляное полотно

Rigid pavements are made of portland cement concrete. The concrete slab ranges in thickness from 6 to 14 inches. It is laid by a paving machine, often on a supporting layer that prevents pumping water and natural formation material to the surface through joints and cracks. Concrete shrinks as it hardens, and this shrinkage is resisted by friction from underlying layer, causing cracks to appear in concrete. Cracking is usually controlled by adding steel reinforcement in order to enhance the tensile strength of the pavement and ensure that any cracking is fine and uniformly distributed. Transverse joints are sometimes also used for this purpose. Longitudinal joints are used when the whole carriageway cannot be cast in one pass of the paving machine.

In places where the local natural material is substandard for use as a base course, it can be “stabilized” with portland cement, pozzolana or bitumen. The strength and stiffness of the mix are increased by the surface reactivity of the additive which also reduces its susceptibility to water. Special machines distribute the stabilizer into the upper 8 to 20 inches of soil.

In deciding whether to use a flexible or rigid pavement, engineers take into account service life period, riding characteristics, ease and cost of repair, and the effect of climatic conditions. Often there is little to choose between rigid and flexible pavements.

Comprehension check

4. Answer the following questions:

1. What does this text discuss?
2. What is the pavement?
3. Why is it necessary to conduct subsurface explorations to design the pavement?
4. How are different properties of the local rock and soil determined?
5. What is the function of the base course?
6. Does the thickness of the base course range in a typical rural pavement?
7. Where is the subbase situated?
8. What kinds of pavements are described in the text?
9. What kinds of surfacings of a flexible pavement are used?
10. What are the advantages of bituminous surfacing?
11. Where is asphalt surfacing used?
12. What material is used for rigid pavements?
13. What property does concrete possess when it hardens?
14. What is usually done to control cracking?
15. What is necessary to take into account when making the final choice of pavement structure?

Vocabulary practice

5. Choose the right translation of the word:

1. **to create** a) соединять b) создавать c) дополнять
2. **to spray** a) напылять b) отражать c) укатывать
3. **to enable** a) требовать b) давать возможность c) допускать
4. **embankment** a) насыпь b) прочность c) пленка

5. **treatment** a) отражение b) обработка c) распределение
6. **durability** a) упругость b) долговечность c) гибкость
7. **solidify** a) защищать b) обеспечивать c) затвердевать, застывать
8. **additive** a) добавка b) обочина c) плотность
9. **stabilize** a) распределять b) включать c) укреплять (грунт)
10. **reinforcement** a) наклон b) арматура c) износ

6. Fill in the blanks using the words below and translate the sentences:

flexible, pavement, highway, rigid, cracking, resistance, properties, gravel, site

1. The substance _____ to be determined are of great importance for our research.
2. The _____ has storage for up to 50,000 tonnes of material.
3. The road _____ must be of adequate rigidity, uniformity and resistance to wear.
4. The asphalt concrete surfacing is _____ and should, therefore, be laid over a solid stone base.
5. Broken-stone surfacings have a low _____ to wear under automobile traffic.
6. The pavement is the most expensive part of a _____.
7. The _____ road is the cheapest form of road and the simplest from the construction point of view.
8. Two classifications of pavement have been developed: flexible and _____.
9. Rigid pavement, made of Portland cement concrete, generally has greater strength but is susceptible to _____.

Language focus

7. Arrange the words according to their part of speech:

typically, removal, solidify, supplement, durability, temporary, place, thoroughly, reflect, suitable, moisten, resist, relatively, coating, shrink, cast, prevent, reinforcement, distribute, joint, harden, workability, flexible, protective, cause, stabilizer, additive.

verb	noun	adjective	adverb

8. Translate the following words paying attention to the prefixes and suffixes:

impermeable, unsuitable, disadvantage, motionless, unprotected, untested, useless, invisible, irregular, inaccurate, disappear.

9. Form nouns from the following words:

to resist, stiff, to add, durable, to shrink, susceptible, to distribute, to stabilize, to supply.

10. Match the words with their synonyms:

a) to conduct, to range, to glue, commonly, to involve, to ensure, to stabilize, to enhance, to solidify, to identify, to protect.

b) to connect, to vary, to carry out, to contain, to specify, usually, to reinforce, to defend, to guarantee, to enlarge, to harden.

11. Match the words with their antonyms:

a) to heat, to expand, to repair, to appear, to enhance.

b) to damage, to cool, to contract, to reduce, to disappear.

12. Translate from Russian into English:

1. Дорожная одежда – это горизонтальная конструкция, поддерживаемая естественным материалом.
2. Для того чтобы спроектировать горизонтальную конструкцию, необходимо определить строительные свойства грунта.
3. Такие свойства горной породы и грунта как прочность, жёсткость, долговечность и чувствительность к влаге определяют различными путями.
4. Дорожная одежда – это многослойная (multilayer) конструкция, состоящая из нескольких слоёв: поверхностного слоя, основания дорожной одежды, подстилающего слоя и земляного полотна.
5. Существует 2 типа дорожной одежды: нежёсткая и жёсткая дорожная одежда.
6. Выбирая тип покрытия, инженер должен принимать во внимание многие факторы.

Speaking

13. Speak about:

a) flexible pavement
b) rigid pavement

UNIT IX. Pavement Structural Layers

Pre-reading tasks

1. Translate the following words and memorize them:

stress	binder
roadbed	smoothness
to induce	roughness
to attenuate	porous
surfacing	subbase
abrasion	subgrade
to employ	to saturate
wear	to distribute

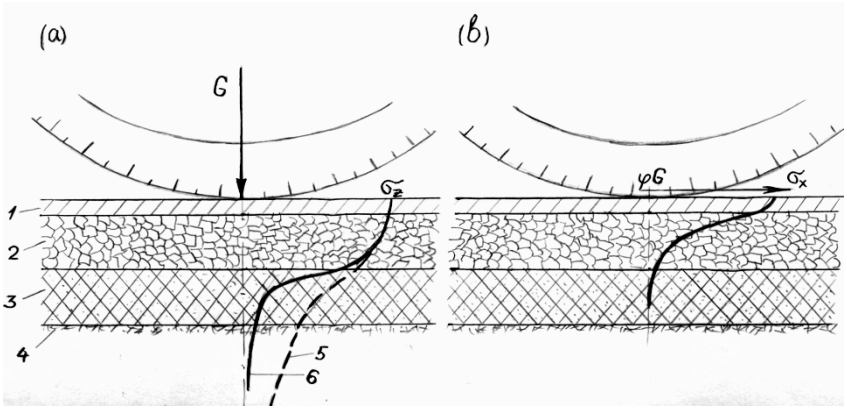
2. Match the English words with their Russian equivalents:

1. pavement structural layers	a) водонепроницаемый
2. semi-rigid structure	b) илистый грунт
3. base course	c) несущая способность
4. wearing course	d) конструкционные слои дорожной одежды
5. impervious to water	e) глинистый грунт
6. protective (sealing) coat	f) полужесткая конструкция
7. polished surfacing	g) морозозащитный слой
8. pavement base	h) несущий слой
9. weak bed soil	i) суглинистый грунт
10. silty soil	j) слабый грунт земляного полотна (основание)
11. winter moisture accumulation	k) скользкое покрытие
12. frost resistance	l) многослойная конструкция
13. loamy soil	m) защитный слой
14. bearing strength	n) основание дорожной одежды
15. clayey soil	o) слой износа
16. anti-frost heave course	p) морозостойкость
17. multilayer structure	q) зимнее влагонакопление

Reading task

3. Read the text carefully and do the tasks that follow:

To ensure all-year-round operation of traffic on a road independent of weather conditions, the carriageway is covered with a pavement which is a rigid or semi-rigid structure laid on the surface of the roadbed and resisting traffic stresses and climatic factors.



Traffic stress diagram for a multilayer pavement:
a) diagram of vertical stresses; b) diagram of horizontal stresses;
1 – wearing course; 2 – base course; 3 – subbase; 4 – subgrade;
5 – homogeneous soil; 6 - pavement

The stresses induced in the pavement by motor vehicle wheels attenuate with the depth. This enables the pavement to be designed in the form of a *multilayer structure*, employing materials whose strengths vary for each layer and are determined in accordance with the magnitude of the acting forces. The pavement consists of following layers:

1. *Surfacing* is the upper, and most rigid, layer of the pavement. It is comparatively thin, but resists well the abrasion and the impacts caused by the wheels, and also the effect of weather conditions. Usually, the surfacing is the most expensive part of the pavement and, therefore, is laid to the minimum admissible thickness. The surfacing provides the required road service qualities (surface smoothness, high coefficient of adhesion). Surfacing usually comprises two coats or courses - *the base course*, on which depend the basic qualities of the surfacing, and *a wearing course*, which is not regarded in calculations and which is periodically renewed as it wears out. When the surfacings are made of weak materials, which are subject to appreciable wear, a special wearing course made of strong stone material treated with organic binders is necessary, which may be periodically renewed in the course of road operation.

If the surfacing is not sufficiently impervious to water and may be destroyed during freezing or drying out in hot arid weather conditions, it is covered with a thin *protective or sealing coat* by surface treatment with a binder and a filling of fine sand. Surface treatment is also used for increasing the roughness of polished surfacings.

2. Below the surfacing base coat is the *pavement base*, a strong bearing layer of stony material or stone with a binder. This layer is designed to distribute the individual wheel-loads over the roadbed or sub-base.

The pavement base is not subject to the direct action of automobile wheels. Therefore, materials of less strength than those used for the surfacing or the wearing course can be employed in its construction.

When the base is protected from the action of surface water - in the case of an impervious surfacing - it may become saturated by water drawn upwards from the roadbed during winter frost penetration. For this reason, in the northern regions materials used for base construction have to satisfy certain requirements concerning frost resistance.

3. *The sub-base* is a layer of earth or stone materials, resistant to moisture, inserted when necessary between the pavement base and the roadbed to reduce the required thickness of the pavement base. The sub-base is made of gravel, slag, soil treated with binding agents, sand, etc.

On sections where the roadbed comprises silty, loamy and clayey soils, inside which winter moisture accumulation may occur, a sub-base of porous materials is introduced. This consists of a sand or gravel layer which drains away excess water from the upper layers of the roadbed, drains the pavement structure and increases the bearing strength of the roadbed. It is termed a *drainage or anti-frost heave course*.

If the roadbed is composed of stable, impervious sand, sandy loam or gravel soils, a sub-base is not necessary.

4. *The subgrade* comprises the thoroughly compacted upper layers of the roadbed, upon which are laid the layers of the pavement. The subgrade receives all the distributed pressure of traffic loads and, therefore, is a very important element of the pavement structure. The stability of road pavements can be ensured only on a heterogeneous, well compacted roadbed with adequate drainage. The increase of roadbed soil resistance to external loads, its drainage and the uniformity of water conditions are the best means for ensuring pavement stability and reducing its cost. No increase in the thickness of the pavement base can guarantee the strength of a pavement laid on a weak bed soil.

Comprehension check

4. Answer the following questions:

1. Is the pavement a multilayer structure?
2. What do you know about stresses in each layer?
3. Do the strengths of materials for each layer of the pavement vary?
4. What are the main layers of the pavement?
5. How many courses does the surfacing have? Characterize them.
6. What course of the surfacing is often renewed?
7. When is the surfacing covered by a sealing coat?
8. What is the function of the pavement base?
9. Why is the pavement base of less strength than surfacing?
10. How can the pavement base be saturated by water?
11. What materials are used for the sub-base?
12. Why is the sub-base course termed a drainage or anti-frost heave course?
13. What layer receives all the distributed pressure of traffic loads?
14. Subgrade is the thoroughly compacted upper layer of the roadbed, isn't it?

5. Complete the following sentences:

1. The pavement structural layers are …
2. Surfacing is the most expensive part of the pavement and it is laid to the minimum …
3. Surfacing provides the required road serving qualities such as …
4. The pavement base is designed to distribute …

5. The pavement base can be saturated by water drawn upwards from the roadbed during…
6. The sub-base is made of …
7. The sub-base is termed …
8. The subgrade receives all the distributed pressure of …

Vocabulary practice

6. Fill in the blanks using the words below and translate the sentences:

renewed, multilayer, stresses, loads, roughness, roadbed, porous

1. The pavement is designed in the form of _____ structure.
2. The _____ induced in the pavement attenuate with the depth.
3. A wearing course is periodically _____ as it wears out.
4. Surface treatment is used for increasing the _____ of polished surfacing.
5. The pavement base is a strong bearing layer of stony materials which distributes the wheel _____ over the sub-base.
6. _____materials are introduced in the sub-base which drains away excess water.
7. The subgrade comprises the thoroughly compacted upper layers of the _____.

Language focus

7. Match the words with their synonyms:

a). operation, to induce, to determine, rigid, impact, to comprise, to protect, section, to satisfy the requirements, agent, to term, thoroughly, to occur, to regard, to employ.

b). tough, substance, to decide, work, to consider, to cause, to meet the requirements, to use, to defend, stretch, to involve, carefully, influence, to take place, to call.

8. Match the words with their antonyms:

a). upwards, external, roughness, heterogeneous, reduce, fine.

b). internal, increase, smoothness, coarse, homogeneous, downwards.

9. Form nouns from the following words:

to treat-…..; rough-…..; to penetrate-…..; to resist-…..; to drain-…..; to compact-…..; to distribute-…..; smooth-…..; stable-……

10. Fill in the correct prepositions:

1. to consist … sth (something); 2. to subject … sth; 3. … accordance … sth; 4. to treat … sth; 5. to depend … sth; 6. … addition; 7. … the same time; 8. to be designed … sth.

11. Fill in the blanks with English equivalents:

1. The surfacing provides (гладкость поверхности и высокий коэффициент сцепления). 2. (Слой износа) is not taken into account in calculations. 3. The surfacing which is made of weak materials (обрабатывается) with organic (вяжущими). 4. To make the surfacing (водонепроницаемым) it is covered with a thin (защитным слоем). 5. (Основание дорожной одежды) is designed (чтобы распределить нагрузку колёс) over the sub-base. 6. The pavement base (может быть насыщено) by water drawn upwards from the roadbed. 7. (Подстилающий слой устойчив к влаге), it is designed of (пористых материалов). 8. The sub-base is also termed (дренажный или морозозащитный слой). It is done from (гравия, шлака или грунта) treated with binders. 9. (Грунтовое основание) comprises thoroughly compacted upper layers of the roadbed. It receives all (нагрузки транспорта) and therefore is considered to be a very important element of pavement structure.

12. Translate from Russian into English.

1. Дорожная одежда является одним из важнейших и дорогостоящих элементов автомобильной дороги. Её стоимость составляет 50-60% от общей стоимости дороги.

2. Дорожная одежда – многослойная конструкция, состоящая из нескольких конструктивных слоёв, уложенных на тщательно спланированном и уплотнённом земляном полотне.

3. Дорожная одежда должна отвечать определённым требованиям. Она должна быть прочной, шероховатой и ровной, обеспечивающей высокий коэффициент сцеплениюю.

4. Слои дорожной одежды проектируются с применением материалов различной прочности в соответствии с величиной действующих напряжений.

5. Местные материалы широко используются чтобы уменьшить стоимость строительства и сократить срок строительства.

Speaking

13. Comment on the pavement and its structural layers:

a). the surfacing
b). the pavement base
c). the sub-base
d). the subgrade

Writing

15. Write the summary to the text in English.

UNIT X. Constriction

Pre-reading tasks

1. Translate the following words and memorize them:

to blast	seal	settling
removal	to spread	to strip
alignment	marking	to stockpile

2. Match the equivalents:

1. continuous right-of-way	a) до некоторой степени
2. bearing ratio	b) непрерывная (сплошная) полоса отвода
3. in-situ	c) как только
4. motorized grader	d) защитное покрытие
5. to some extent	e) показатель плотности грунта
6. once	f) напоминать выпуклость
7. to import	g) начинать
8. commence	h) световозвращающий отражатель
9. seal	i) слегка выступать
10. retroreflector	j) ограждение (установленное на раздел. полосе или на обочине)
11. to feature camber	k) на месте
12. to protrude slightly	l) вносить, вводить
13. crash barrier	m) автогрейдер

Reading task

3. Read the text carefully and do the tasks that follow:

Road construction requires the creation of a continuous right-of-way, overcoming geographic obstacles and grades low enough to permit vehicle travel. Removal of earth and rock by digging or blasting, construction of embankments, bridges and tunnels, and removal of vegetation (this may involve deforestation) are often needed. A variety of road building equipment is employed in road building.

Once these activities are completed, construction of the pavement can begin.

Firstly the longitudinal and vertical alignment of the road is set out by a surveyor. The alignment of the road will be marked with control pegs. The pegs will have level markings as a control mechanism to ensure the road is constructed according to design levels.

Construction of the road commences with the stripping of the topsoil, within the road reserve. The topsoil is usually stockpiled nearby for the construction of embankments along the road. The in-situ ground will be removed, using a heavy motorised grader to a level specified by the civil engineer. This is considered as the roadbed level. It will be compacted using a heavy vibratory road roller. Once the roadbed has been compacted

to the required density (as will be specified by the engineer), the pavement layers can now be imported.

The first layer to be imported is the selected subgrade. This is usually a gravel type material. Once placed the material is leveled off by a grader. It will be compacted to a required density, using a road roller.

The next layer to be imported is the sub-base. The subbase material is of a higher quality than the selected sub-grade. It is usually a gravel type material with a high bearing ratio. While the material is worked by a grader, it is mixed with water to aid compaction. Once the subbase layer has been compacted to its required density, the importation of the final layer can commence.

The final layer of a road is the base course consisting of gravel or crushed stone. The base course will be leveled of and compacted. Sometimes (usually for roads that will experience heavy loads) portland cement will be added to it, to ensure adequate strength of this layer. On top of the base course is placed a surface course which typically consists of asphalt concrete or a seal consisting of a mixture similar sized small stones, bitumen and portland cement. This surface course strengthens the pavement structure by spreading out the vehicle loads applied to the subgrade. It also provides a smooth and high-friction surface for vehicles to drive on. *(Picture: Asphalt layer and roller).*

Two important factors in road construction are ensuring adequate compaction of the pavement layers and ensuring quality control over the use of materials in the pavement layers.

Each layer should be compacted such that the density of the layer is relatively close the maximum dry density of that specific material. For road construction the density required is usually greater than 95% of the materials maximum dry density. This limits the possibility of the pavement layers from settling and therefore preventing any undulations and holes in the road surface.

Modern roads, and indeed many ancient ones, such as those built by the Romans, feature camber. This is designed to allow water to drain away from the road to its edges. Modern roads that carry motor traffic also employ camber in curves to aid traffic stability by allowing them to "bank into" the bend to some extent.

On the side of the road there may be retroreflectors on pegs, rocks or crash barriers, white toward the direction of the traffic on that side of the road, and red toward the other direction. In the road surface there may be cat's eyes: retroreflectors that protrude slightly, but which can be driven over without damage.

Road signs are often also made retroreflective. For greater visibility of road signs at daytime, sometimes fluorescence is applied to get very bright colors.

Comprehension check

4. Answer the following questions:

1. What does road construction require?
2. Who sets out the longitudinal & vertical alignment of the road?
3. What road building equipment is used during road construction?

4. What is the difference between the materials used in the subgrade & in the subbase?
5. What is the purpose of mixing the materials of the sub-base with water?
6. What does the final layer consist of?
7. Asphalt concrete or a seal is used in a surface course, isn't it?
8. Can you name the important factors in road construction?
9. What does the low density of each layer lead to?
10. What is camber designed for?
11. Are there any special devices on the side of the road? What is their purpose?
12. What is added to road signs to make them brighter at daytime?

5. Decide whether these statements are true or false:

1. Removal of earth and rock by digging or blasting, building embankments, bridges and tunnels are often needed when the road is constructed.
2. The longitudinal and vertical alignment of the road is set out by road planners.
3. The removed topsoil is usually stockpiled nearby for rehabilitation of newly constructed embankments along the road.
4. A heavy motorized grader is used to remove the in-situ ground.
5. The first pavement layer to be imported is the selected sub-base.
6. The sub-based material is usually a gravel type material which is worked by a grader and mixed with water to aid compaction.
7. The base course is the final layer of a road.
8. The density of each layer shouldn't be close the maximum dry density of the specific material to prevent any undulations and holes in the road surface.
9. Modern roads feature camber.
10. Road signs are not retroreflective.

<u>Vocabulary practice</u>

6. Choose the right translation of the word:

1.	**уклон**	a) level b) shoulder c) grade
2.	**взрывать**	a) to blast b) to penetrate c) to compact
3.	**удаление**	a) development b) removal c) reduction
4.	**колышек**	a) mark b) peg c) barrier
5.	**складировать**	a) to keep b) to remove c) to stockpile
6.	**плотность**	a) density b) location c) quality
7.	**грунтовое основание**	a) subsoil b) pavement base c) subgrade
8.	**слой износа**	a) surface course b) wearing course c) base course
9.	**распространение**	a) digging b) blasting c) spreading
10.	**оседание**	a) overcoming b) settling c) alignment

7. Match the words with their definitions:

1. right-of-way	a) is a mixture of bitumen and stone
2. asphalt	b) movements of people and vehicles along roads and streets

3. pavement	c) is a mixture of cement and stone
4. traffic	d) central part of the road used by wheeled traffic
5. subbase	e) the land needed for road pavement, shoulders, ditches, side slopes
6. carriageway	f) is a rigid or semi-rigid upper layer of the surface of the road
7. concrete	g) is a thoroughly compacted upper layer of the roadbed
8. gravel	h) a self-propelled wheeled machine with a steel blade used to level roads, hills and cuts
9. road	i) to put flat stones, bricks, etc. on a path, a road, etc.
10. motor grader	j) specially prepared way between places for the use of pedestrians, riders, vehicles
11. to pave	k) small stones with coarse sand
12. subgrade	l) is a layer resistant to moisture, which is made of gravel, slag, soil treated with binders

8. Choose the right verb:

1. When constructing a road builders should *carry away* | *exclude* | *overcome* | *overtake* different obstacles.
2. Builders sometimes *compact* | *add* | *place* | *level* Portland cement to the base course to ensure adequate strength of this layer.
3. The surface course spreads out the vehicle loads and at the same time *strengthens* | *involves* | *cuts* | *compacts* the pavement structure.
4. A borrow pit (source for obtaining fill, gravel, and rock) and a water source should be *divided* | *located* | *used* | *indicated* near or in reasonable distance to the road construction site.
5. Old road surfaces, fences, and buildings may need to be *blasted* | *removed* | *allocated* | *erased* before construction can begin.

Language Focus

9. Match the words with their synonyms:

a) to commence, to employ, to strip, to permit, to introduce, to aid, to select, bend, to specify.

b) to remove, to import, turn, to choose, to begin, to determine, to apply, to help, to allow.

10. Arrange the words according to the parts of speech:

Noun	Verb	Adjective

Variety, creative, import, selection, remove, select, creation, vary, importation, survey, selective, continue, create, removable, continuous, surveyor, various, strengthen, removal, strength, spread, reflect.

Speak on:

11. Speak about road construction stages, using the following clichés:

First, the author discusses … .
Attention is drawn to the fact that … .
Further it should be noted that … .
A detailed description of … is given.
The author emphasizes the fact that … .
The final part of the article reports on … .

UNIT XI. Maintenance

Pre-reading tasks

1. Translate the following words and memorize them:

pothole	edge
trash	snow fence
to deteriorate	snowdrift
to patch	snowplow
to schedule	sealing

2. Match the English words with their Russian equivalents:

1. traffic facilities	a) бульдозер с прямым отвалом
2. drain clearing	b) ремонт выбоин (ямочный)
3. emergency maintenance	c) разрушенные участки
4. pothole patching	d) по крайней мере
5. to scatter salt	e) накапливать
6. major failure	f) очистка дренажных канав
7. routine maintenance	g) серьёзное разрушение
8. worn spots	h) разбрасывать соль
9. straight-blade dozer	i) текущий ремонт
10. at least	j) транспортные сооружения
11. to pile up	k) срочный текущий ремонт

Reading task

3. Read the text carefully and do the tasks that follow:

The life of a road structure depends on the quality of its maintenance and minor renovation. Maintenance keeps the roadway safe, provides good driving conditions, and prolongs the life of the pavement, thus reducing the road investment. Maintenance consists of activities concerned with the condition of the pavement, shoulders, drainage, traffic facilities, and right-of-way. It includes the prompt sealing of cracks and filling of potholes to prevent water entering through the surface, the removal of trash thrown on the wayside by the traveling public, and the care of pavement markings, signs, and signals. In rigorous winter climates, substantial effort is required to remove snow and ice from the pavement, to scatter salt for snow and ice removal, and to spread sand for better traction.

In many countries an increasing share of road budgets is being allocated to rehabilitation and maintenance of existing roads, rather than new road construction.

Routine maintenance refers to activities such as grading, grass cutting, drain clearing, pothole patching, and shoulder repairs, which are performed at least yearly if not more frequently. *Periodic maintenance* activities are typically scheduled over periods of several years and include resurfacing and bridge repairs. *Rehabilitation* involves more substantial intervention to strengthen a road, repair structural defects, and restore the

road to its initial condition, often after it has deteriorated to an "unmaintainable" standard. Rehabilitation sometimes also includes changes or improvements to previous characteristics, for instance, by widening, making small alignment changes, or providing footpaths.

Other maintenance activities include *seasonal* maintenance, such as snow clearing and flood repairs, *emergency* maintenance to restore roads after major failures, and the *regular* maintenance of road signs.

Repairing damage and resurfacing. Gravel and other similar type roads have to be smoothed quite often. Surfaces and edges of bituminous materials are repaired by patching with new material where worn spots develop from travel or because of weak spots in the ground underneath. Every 10 or 15 years many roads with bituminous surfaces are resurfaced completely.

Workers repair concrete pavements by digging out broken sections and putting in new concrete. They often repair cracks by filling them with asphalt. Many older concrete pavements must be resurfaced completely.

Deteriorated pavements can be reconstructed in several ways:

- the surface can be treated to improve its characteristics;
- the existing course can be overlaid;
- the damaged layers can be removed and replaced;
- the existing wearing course can be remixed with additional materials.

Clearing ice and snow. Most roads and highways must serve the year around. So they must be kept free from snow and ice in winter. In some places, snow fences are put up. These are thin pickets wired together and placed parallel to the road, on the side from which the storm winds usually blow, and about 50 to 100 feet (15 to 30 meters) from the road. Snowdrifts then do not pile up on the road.

V-shaped or straight-blade dozers clear the roads when it snows. In deep drifts, special snowplows are needed.

Often roads and highways that are slippery from ice and snow must have salt, chemicals, sand, or cinder spread on them to keep them passable.

Comprehension check

4. Answer the following questions:

1. What does the life of the road structure depend on?
2. What does maintenance include?
3. It is better to maintain and rehabilitate existing roads than construct new ones, isn’t it?
4. What types of maintenance are there?
5. What are the ways of reconstruction of deteriorated pavements?
6. What means of protection from snow do you know?
7. What kinds of machines are used to protect roads from snowdrifts?
8. Do most of roads and highways meet the requirements of modern traffic?

Vocabulary practice

5. Choose the right translation of the word:

1. **to prevent** a) насыщать b) предотвращать c) сохранять
2. **binder** a) покрытие b) маршрут c) вяжущее вещество
3. **to spread** a) улучшать b) распределять c) обрабатывать
4. **to reduce** a) регулировать b) уменьшать c) насыпать
5. **to penetrate** a) проникать b) размещать c) противостоять
6. **alignment** a) конструкция b) трасса c) устойчивость
7. **to deteriorate** a) удалять b) ухудшать c) улучшать

6. Match the words in A with an appropriate ending in B:

A		B
1.Routing maintenance	involves	a) resurfacing and bridge repairs scheduled over periods of several years.
2.Periodic maintenance		b) restoration of the road to its initial condition and sometimes widening, making small alignment changes or providing footpaths.
3. Rehabilitation		c) grading, grass cutting, drain clearing, pothole and shoulder repairs which are carried frequently.
4.Seasonal maintenance		d) restoring roads after major failures and repairing of road signs.
5.Emergency maintenance		e) snow clearing and flood repairs.

7. Fill in the blanks using the words below and translate the sentences:

to suit, slippery, to clear, conditions, caused, bends

Driving in bad weather _____ creates extra difficulties. An early indication of likely weather conditions allows motorists to change their driving _____ those conditions. Statistics also show that such early warnings (предупреждения) have saved lives, particularly at dangerous _____. For example, in Finland where most travel is by road, and where one in four accidents are _____ by speeding on icy roads warning of coming snow or ice is essential. This allows road workers _____snow and prevent _____ surfaces, thus preventing many accidents.

Language focus

8. Read and translate the following words paying attention to the prefix “re-”:

resurface, reconstruct, restore, replace, remove, remix.

9. Form nouns from the following verbs and translate them:

to care - . . .;	to improve - . . .;	to repair - . . .;
to treat - . . .;	to wire - . . .;	to deteriorate - . . .;
to attach - . . .;	to align - . . .;	to strengthen - . . .;
to protect - . . ,	to remove - . . ,	to smooth - . . . ..

10. Match the words with their synonyms:

a) to continue, shoulder, to spread, to plan, to connect, damage, traction.
b) failure, wayside, to prolong, adhesion, to schedule, to scatter, to wire.

11. Match the words with their antonyms:

a) to improve, to destroy, to narrow, restoration, final, under.
b) initial, to rehabilitate, failure, above, to widen, to deteriorate.

Speaking

12. Speak on:

1. The significance of maintenance for the life of a road.
2. The main types of maintenance activities.
3. Ways of repairing damage and resurfacing.
4. Maintenance activities in winter.

UNIT XII. Road Junctions and Intersections

Pre-reading tasks 1

1. Translate the following words and memorize them:

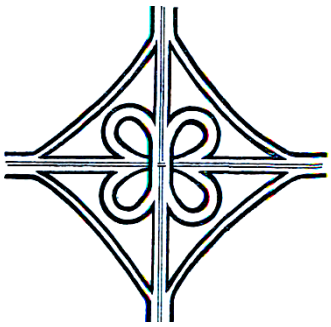
junction	collision	flyover
intersection	pedestrian	to weave

2. Match the equivalents:

1. overpass	a) затор (в движении транспорта)
2. to drop speed	b) сквозной проезд
3. underpass	c) пересечение в форме клеверного листа
4. segregation	d) площадь кругового движения
5. safeguards	e) снижать скорость
6. clover-leaf junction	f) сближение, схождение в одной точке
7. roundabout	g) путепровод под дорогой, подземный переход
8. convergence	h) разделение потоков движения
9. congestion	i) путепровод над дорогой; эстакада
10. through route	j) меры безопасности

Reading task 1

3. Read the text carefully and do the tasks that follow:



A road junction, as the term is generally used, is the point at which one road meets another; an intersection is the point at which two or more roads cross each other. Both junctions and intersections are, of course, the worst danger spots in a road system.

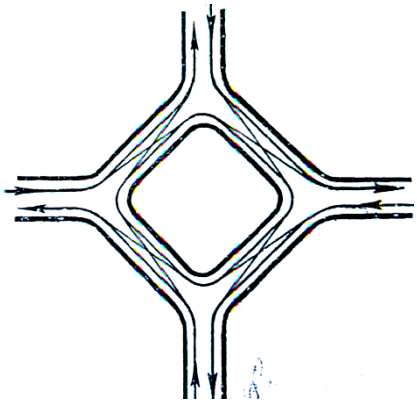
The problems of reducing danger at these points are those of cost and space. If junctions and intersections are such that all classes of traffic meet each other at the same level, there is a danger of collision, not only between cars of the same class but between those of different classes. Almost complete segregation of different classes can be achieved, and the need for users of the same class to cross traffic streams, the most dangerous process of all, can be avoided.

The perfect example of complete segregation of different classes of traffic and of the avoidance of crossing traffic streams is the clover-leaf junction, at which no collision can occur between vehicles if the drivers of those leaving the junction can manage to avoid those already on the road which they are approaching - which is a difficult thing.

All forms of road junction can be classified into three groups: *multi-level junctions, roundabouts and flyover-junctions*.

a) **Multi-level junctions.** The clover-leaf, the most typical of these, has already been mentioned. There is need for multilevel intersections where three conditions are fulfilled:

1. only a small percentage of the traffic must turn to left or right, and;
2. the major volume of traffic is travelling on a fast through route;
3. the volume of traffic would otherwise be sufficient to justify the provision of a roundabout.



b) **Roundabouts.** Unlike multi-level intersections, roundabouts do not enable traffic to cross without dropping speed but pedestrians and cyclists cannot be segregated unless costly over- or under-passes are constructed.

The success of a roundabout depends greatly upon the ease with which vehicles using it can "weave" or pass from one traffic lane to another. The greater the length of the road in which the weaving can be carried out and the smaller the angle of approach of converging streams of traffic, the more easily can weaving be performed. The angle should not be greater than 30 degrees. The greater the diameter of the island, the smaller the angle of convergence.

c) **Flyover-junctions.** These have been developed chiefly at places where there are no pedestrians (and cyclists are few, if any). These "flyovers", which enable high speeds to be maintained, are extremely expensive, costing about ten times as much as a roundabout, so it is much better to have ten roundabouts at ten dangerous junctions than a single flyover at a single junction.

Comprehension check

4. Answer the following questions:

1. What are the most dangerous spots in a road system?
2. What problems are connected with the problems of reducing danger of these points?
3. How can complete segregation of different classes of traffic be achieved?
4. What types of road junctions do you know?
5. What does the success of a junction depend on?
6. What can you say about the angle of approach of converging streams of traffic?
7. Where have flyover-junctions been developed?

5. Choose the best variant to complete the sentences:

1. *There is a danger of collision between vehicles of the same class and those of different classes if...*

a) ...there is no need for drivers to cross traffic streams;
b) ...there is a clover-leaf junction;
c) ...all classes of traffic meet at the same level at intersections.

2. *Multi-level intersections are adopted when...*

a) ...only a small percentage of traffic travels on a through road;
b) ...the traffic must cross the street necessarily dropping speed;

c) ...the major volume of traffic is travelling on a fast through route without dropping speed when passing the junctions.

3. *A roundabout is considered successful if...*

a) ...the angle of approach of converging streams of traffic is very large; b) ...the vehicles using it can easily reach different exits as directly as possible passing smoothly from one traffic lane to another at a small angle of convergence;

c) ...the road for the vehicles to pass from one traffic lane to another is too short.

4. *Flyover junctions are not very widely used as...*

a) ...they do not enable high speeds to be maintained;

b) ...they cost ten times as much as a roundabout and are designed for roads where pedestrians and cyclists are excluded;

c) ...they are manageable only on roads which accommodate pedestrians and pedal cyclists.

Vocabulary practice

6. Choose the right translation of the word in bold:

1. **perfect** example a) совершенный b) идеальный c) законченный
2. **to pass** from one lane to another a) передавать b)проезжать c) обгонять; двигаться; переходить
3. **to maintain** high speeds a) обслуживать b)ремонтировать c) сохранять
4. ten **times as much as** a roundabout a) время, раз b) сколько c) так же много, как, столько же, больше
5. to be of great **value** a) математическая величина b) ценность, значение c) стоимость

Follow up activity

7. Read the text in 2 minutes and answer the question:

How can the problem of safety be solved?

Roads appeared in the far-off times and were first in the form of pedestrian tracks. Then, as civilization progressed, they became routes along which horse-drawn traffic and finally vehicles moved.

Roads have always had a dual function: as traffic routes and as a means of approach to dwellings and other buildings. But since the growth of transport these functions have been seriously in conflict with each other. Today this conflict is extremely great and leads to great danger.

Any town so planned that its citizens are killed in great numbers is an ill-planned town. The layout of all newly developed areas must be made dependent on the safety factor. Pedestrians and fast motor traffic will never and can never mix - they must be isolated.

Pre-reading task 2

8. Match the equivalents:

1. pedestrian subway	a) одностороннее движение
2. urban	b) переулок
3. flow	c) обочина; бордюрный камень
4. directional control	d) двустороннее движение
5. peak hours	e) контроль за направлением движения
6. signposting	f) гужевой транспорт
7. carrying capacity	g) встречный поток движения
8. one-way traffic	h) часы пик
9. opposing traffic	i) городской
10. kerb	k) система знаков и указателей
11. side street	l) пропускная способность дороги
12. two-way traffic	m) пешеходный тоннель
13. horse-drawn vehicles	n) поток

Reading task 2

9. Read the text carefully and do the tasks that follow:

Traffic Control

1) It is obvious that in existing urban areas much of the congestion is due to narrow streets and junctions which are incapable of taking peak-hour traffic. The solutions to this problem are costly. They include adequate roundabouts and street widening, and the segregation of traffic by means of flyover roads, underpasses, bridges, and pedestrian subways.

(2) Much of the congestion in urban areas is due to traffic which has no business in the area but is only passing through. There is a tendency for drivers to keep to the well-lit shopping streets. If they can be made to use less important streets and those not occupied by shops, then conditions are improved not only for the through traffic but also for the local traffic.

(3) Signposting is, of course, a directional control and a very effective one. In fact it is important for all signs and symbols used on the roads to be seen, well in advance, by drivers approaching at normal speed. Directional control cannot increase the capacity of the highway system but it can avoid local congestion.

(4) One-way traffic is a special kind of directional control which is very effective in maintaining the traffic flow in congested areas.

(5) A major cause of congestion in towns is the interruption to the free flow of traffic by cross traffic at junctions. But if the need for traffic streams to cross each other can be avoided then the movement of vehicles will be much easier. This easier movement of traffic can often be achieved by making traffic move in one direction only along certain streets and by prohibiting incoming vehicles from side streets from crossing the main stream. The streets may be either one-way or two-way according to local conditions of traffic or width of carriageway, and traffic at the junctions can be guided

by constructing suitably-shaped islands. Besides one-way traffic can also be introduced where the carriageway width is inadequate for two opposing lines of traffic.

(6) The disadvantages of a one-way traffic system are that it increases the distance travelled by some vehicles, that it makes it more difficult for strangers to find their way about. The true aim of a one-way system is to eliminate cross traffic, and under conditions of continuous flow on crossing streets the introduction of a properly designed one-way scheme can double the carrying capacity of the highways.

(7) The two main objections to street intersections are that they are a cause of accidents and that they interrupt the flow of traffic. The best thing to do with intersections is to get rid of them. If that is not possible they may be improved and made safer but they will always remain a source of danger and delay.

(8) Many accidents are caused because traffic streams of different types, or traffic streams travelling in different directions, are using the same carriageway, and these accidents can be avoided either by reservations between traffic lanes, or by vertical (or "grade") separation.

(9) In many cities in America and in Europe segregation of traffic is achieved by means of flyovers or underpasses; at some junctions there are even three different levels. Each has its advantages and disadvantages according to the circumstances. Flyover structures are not always aesthetically pleasing while an underpass may be more expensive to construct. The separation of fast and slow traffic from the heavier and faster traffic is most desirable not only in the interests of freedom of traffic movement, but also of safety. This ideal is not easy to achieve. *(Picture: 1.9 km long Flyover at Khilgaon Rail & Road Intersection in Dhaka City, Bangladesh).*

(10) Urban traffic control will be of benefit to the general public in the district concerned and will result in greater comfort for road users of all classes, as well as bringing economic advantages to the community as a whole.

Comprehension check

10. Group the following sentences according to the topics:

A. The problems created by motor traffic growth.
B. Ways of solving the traffic congestion problem.
C. Advantages of a one-way traffic scheme.

1. A great intensity of traffic makes it necessary to lower the average speed of vehicles. 2. The problem of avoiding traffic congestion is one of the most important. 3. Under conditions of continuous flow on intersecting streets a properly designed one-way scheme can double the carrying capacity of the highways. 4. The extraordinary growth of motor traffic has created traffic difficulties demanding new designs and planning. 5. Roundabouts, streetwidening and the segregation of traffic by means of flyover roads, pedestrian subways, underpasses are possible solutions of the congestion problem though they are costly and demand space. 6. A special kind of directional control—one-way traffic—obviates the necessity for traffic streams to cut across each other. 7. Narrow streets and junctions are incapable of taking peak-hour traffic. 8.

Directing the traffic stream to less important streets may improve both the through and local traffic. 9. With the carriageway width inadequate for two opposing lines of traffic a one-way scheme is advantageous though it increases the distance travelled by vehicles.

11. Match the sentences with the paragraphs of the text. Put them in order according to the text:

1. The importance of signs in the control of direction choice.
2. The advantage of having one-way streets.
3. Segregation of different types of traffic is an ideal not easy to achieve.
4. The necessity of introducing grade separation.
5. The roads where congestion in town takes place.
6. The danger of having street intersections.
7. Drivers themselves may bring about congestion.
8. The disadvantages of one-way traffic.

Speaking

12. Speak about traffic control using the following clichés:

This text deals with …
The author pays great attention to the …
Advantages and disadvantages of the … are discussed.

UNIT XIII. Roads: Environmental Aspect

Pre-reading tasks

1. Translate the following words and memorize them:

jam	advertisement
crash	wealth
to avoid	to crowd
curse	to injure
accident	to implement

Reading task 1

2. Read the text carefully and do the tasks that follow:

The M25, the motorway around London, opened in 1986. Today people call it the biggest car park in Europe. Every morning on the radio we hear about jams, and road repairs, and crashes, and which parts of the M25to avoid. One day soon we will hear. 'There is a traffic jam all the way round the M25 in both directions. If you are driving to work, we advise you to go back home.

Winston Churchill described the car as the curse of the twentieth century. This will probably be true of the next century, too. It can be very funny to compare advertisements for cars with the reality of driving them. Cars are symbols of freedom, wealth, and masculinity. But when you are stuck in a traffic jam, all cars are just little metal boxes to sit in.

Cities and towns all over the world have a huge problem, and no government really knows what to do. For once it is not a matter of technology which is stopping us. If we want to build two-level roads, we can do it. If we want trains which can travel at hundreds of miles an hour, we can build them.

The people who believe in roads say that cars represent a personal choice to travel when and where you want to. But on trains and buses - public transport - you have to travel when the timetable says you can. These people think that if you build more roads, the traffic will move more quickly, but research, shows that if there are more roads, there will be more cars to fill them.

By 2010, the number of cars on our roads will double. Environmentalists are saying that we should put more money into public transport. Cars often carry just one person. If the public transport system works, more people will use it. If trains carry more people the roads won't be so crowded, and car: pollute the air more than trains.

One characteristic of the people of the twentieth century is that we are a race on the move. But it is just possible that soon we won't be able to move another inch, and well have to stay exactly where we are!

5000 people a year are killed on British roads, and 40000 are injured. For children road accidents are a major cause of death.	By 2025, just to park all the cars in Britain will need an area larger than London.

Comprehension Check

3. Say if the following statements are true or false:

1. You can park your car on the M25.
2. There is often a traffic jam all the way round the M25.
3. Winston Churchill thought cars were an awful invention.
4. Advertisements for cars don't show the reality of driving.
5. We do not have the technology to find a solution to the traffic problem.
6. Some people think that the traffic will move more quickly if there are more roads.
7. Environmentalists think that public transport should be more expensive.

4. Answer the following questions:

Did the article mention any of the advantages and disadvantages of cars and trains?
What are the reasons for building more roads?
What are the reasons for improving the public transport system?

5. What do you think?

1. What is the traffic situation like in your town?
a) Is there a good public transport system? Is it cheap?
b) Do you have to pay to use the motorways?
c)Do people drive well?
2. Tell each other about a time you were in a traffic jam.

Language Focus

6. Insert antonyms:

a. Public transport in Hong Kong is cheap but in London it is ….

b. Paris has the Metro railway below ground and a large bus system ….

c. People should … and finish work at different time to reduce peak hour traffic jams.

d. City administration tries to encourage people to use … transport, not private cars in the city center.

e. The cost of buying a car can be increased while the cost of public transport should be ….

Vocabulary practice

7. Fill in the missing words from the list:

average	source	solve
transportation	study	routes
atmosphere	car	number
advantage increase	public transport per	reduction

The private … has dramatically improved the comfort, speed and individual freedom of movement. The car brought people closer to places of work, … and entertainment.

However, the use of private cars can also be a … of many most serious problems today. The car is a disadvantage as well as an … . It pollutes the …, may be involved in dangerous accidents, and by its great quantity blocks roads. In New York City, 2,5 million cars move in and out of the city each day. The average speed is sometimes 8,1 miles … hour. But New Yorkers continue to drive, just as people in London where the … speed in certain particularly overcrowded … is only 2 miles per hour. Most people believe that the car a necessary part of life in today's world. Car owner usually do not consider other methods of public … such as bus, train or bicycle.

The only way to … these problems is to reduce the use of private cars. How can we do it? We may … the quality and availability of public transport. Cars could not be permitted in certain parts of the city, thus making people walk and use …. The cost of buying and running a car can be increased with a corresponding … in the price of public transport. The reduced … of cars on the roads means less pollution.

8. Choose the right variant.

a. The only means of arrival / access to the station is through a dark subway.
b. When her car broke down, she had to catch / to take a taxi.
c. The two buses collided (столкнулись), but luckily none was injured / wounded.
d. There are road works in the center streets and long delays / interval are expected.
e. Only a mechanic could realize/understand the true amount / extent of the damage of the car.
f. While turning a corner at high speed my car hit / crashed a lamp post.

Reading task 2

9. Read the text carefully and do the tasks that follow:

WALKING AND CYCLING

The ease with which people can get to work, shops and other services is an important part of our daily life. Trends over recent years indicate that people have been making longer and longer journeys, principally by private car, to reach these facilities. There is a conflict between lifestyle built around more frequent journeys made quickly and conveniently by car and people's desire for less pollution, less noise and less congestion which harm our environment. We can improve matters in two main ways: by locating shops and leisure facilities in town and suburban centres; and by enabling journeys to be made by modes other than car such as transport, cycling and walking.

The Institute of Transport economics (Norway) has collected information on walking and cycling in Norway and abroad. The information comprises the extend of walking and cycling, risk and traffic safety for pedestrians and cyclists and the environmental gains that would be achieved if car traffic were replaced by walking and cycling.

In Norway, considerably more than 60% of trips of two kilometers are made by car. Replacing some of these trips by walking or cycling should therefore be possible. Public transport is only relevant as a means for trips longer than three to five kilometers long.

People living in areas with developed public transport system walk and cycle more than the population in the rest of the country. This indicates that walking and cycling are much a supplement to public transport as an alternative.

Improving the Conditions

People experience improved health as the main benefit of walking. The most positive aspects of cycling are that it is fun and it is convenient. Other benefits of cycling are getting fresh air and that it is simple, inexpensive.

The most important drawbacks of walking and cycling are that it is inconvenient i.e. it takes too long and there is a limit to the distanced. Other important disadvantages are that it is impossible to carry large and heavy objects and that the infrastructure is unsatisfactory i.e. that the network for pedestrian and bicycle paths is insufficiently developed, it is difficult to cross streets, etc.

In order to implement measures to improve the situation for pedestrians and cyclists, it is reasonable to start from to the infrastructure. Developing the network of pedestrian and cycle paths, widening pavements, improving opportunities for crossing roads and streets, building subways and crossings for pedestrians and cyclists and providing a smoother road surface are measures requested by many for easier walking and cycling.

Increasing Safety

In total number of accidents may increase if trips are transferred from car to bicycle. In order to achieve the goal of increased walking and cycling and to ensure that such travel takes place in the safest possible way, safety measures targeted at pedestrians and cyclists need to be implemented.

Traffic regulation measures such as traffic signals and fences also contribute to reducing the number of pedestrian accidents.

A Better Environment and Better Health

Walking and cycling improve physical fitness and reduce morbidity* and morbidity*.

Pedestrians and cyclists are more exposed to pollution than people in cars. Currently, pedestrians and cyclists contribute to limiting pollution but emissions of air pollutants will be reduced if more people walk and cycle.

Notes:

morbidity – болезненность morbidity - смертность

<u>Comprehension Check</u>

10. Answer the following questions which will help you to make a summary of the text:

1. What does this text deal with?
2. Why do scientists think about such means of movement as walking and cycling?
3. What country is spoken about in this text?
4. Are cars widely used for trips of two kilometers in Norway to get to work, shops and other services?
5. What are the main problems created by cars?
6. Is it possible to replace trips for short distances by walking and cycling?
7. What are the main benefits of a) walking, b) cycling?

8. What safety measures can be implemented to improve the situation for pedestrians and cyclists?

9. In what way is walking and cycling connected with the health of people?

Follow up activities

11. Read the text below and decide which answer A, B, C or D best fits each space. There is an example at the beginning (O).

Example: 0 A tired B irritated C fed D angry

ON YOUR BIKE!

If you are getting ...tired... (0) wasting time looking for parking space, my…….(1) to you is to consider the bicycle as an alternative ..... (2) of transport. Cycling is probably the cheapest and healthiest way of getting..... (3) in our congested city centres. ..... (4) it is convenient and environmentally desirable, it can be an unattractive ..... (5) on a cold wintry morning. It is much easier to ..... (6) onto a nice warm bus or jump into your car, ... (7) the sight of cyclists as they weave their way in and out of the traffic may fill you with ..... (8) as you sit waiting in yet..... (9) traffic jam. In spite of the ..... (10) that worsening pollution is getting many people ..... (11), causing more and more health problems, and ..... (12) it is fashionable to express one's ..... (13) of the environmentally safe bicycle, it is hard to ..... (14) the danger cyclists face in sharing the road with cars. ..... (15) cycling is not as risky as it looks at first sight, there are more and more accidents involving cyclists.

1 A advice	B warning	C plan	D solution
2 A method	B way	C means	D instrument
3 A on	B through	C over	D about
4 A Despite	B In spite	C Although	D Even as
5 A choice	B advice	C propose	D transport
6 A enter	B be	C travel	D get
7 A even	B however	C though	D and
8 A approval	B envy	C angry	D criticism
9 A other	B more	C another	D longer
10 A truth	B reality	C fact	D event
11 A round	B down	C over	D together
12 A while	B despite	C as	D in spite of
13 A favour	B agreement	C belief	D approval
14 A refuse	B criticize	C deny	D think
15 A Even though	B However	C Whereas	D Although

SUPPLEMENTARY READING

MAIN TYPES OF PAVEMENT

To permit automobile traffic to travel along a road at any time of the year at high speeds and with economic fuel consumption, the road pavement must be of an adequate rigidity, uniformity and resistance to wear. These requirements can be satisfied by means of various combinations of pavement structural layers consisting of different road-building materials. The pavement service qualities, i.e., permissible speed and traffic comfort, are determined mainly by the nature of the surfacings, which can be divided into the following basic structural types, given in consecutive order of their development.

Cement concrete and asphalt surfacings. These surfacings are of high rigidity and high resistance to loading.

The stone aggregate is thoroughly graded, so that the interstices between large particles are filled with smaller chips, and the material as a whole has a minimum porosity (maximum density). Cohesion is provided by the use of cement and organic binders.

In contrast to asphalt surfacing, cement concrete surfacing has a very considerable inherent strength and temperature stability. These surfacings usually consist of separate concrete slabs, measuring 3- 4 m by 6 - 7 m. The slabs are separated from each other by joints which are necessary to allow for changes in length owing to temperature fluctuations. These are expansion joints which contract when the slab length increases, and contraction joints which expand when the slabs shrink. Inserted into the joints are steel bars called dowels which provide for the possibility of small changes in slab length but which transmit vertical loads from one slab to the other, and, to a lesser degree, flexural movements.

Apart from sand, stone dust (mineral powder) is introduced into the asphalt concrete, which enters into physical and chemical reactions with the organic binding agents, resulting in the surfacing becoming more resistant to temperature change.

The asphalt concrete surfacing is flexible and should, therefore, be laid over a solid stone base (flexible pavement).

Bituminous macadam - broken stone and gravel surfacing treated with organic binders. Owing to the adhesive properties of the binders, this surfacing is highly resistant to the destructive action of traffic. Such a pavement is impervious to water.

The differences in the methods of binder introduction in the process of construction create the fundamental structural characteristics of the surfacings obtained.

A. Mixing on the road site or in special plants provides for good coating of the chippings by the binder. The amount of binder used is less with this method then when using the method of impregnation. The mixing method together with the proper selection of stone material grades makes possible the provision of stronger surfacings.

The positive mixing makes possible the use of chippings graded in such a way as to form a solid matrix, the density of which approaches the optimum value.

B. Impregnation is the introduction of the binder into the surfacing by means of pressure-spraying over the surface of a lightly compacted layer of uniform chippings.

After the penetration of all the bitumen into the interstices of the aggregate, the surface of the pavement is covered with fine chippings and compacted by rolling. The

stability of surfacing of the impregnation is ensured mainly by the wedging action of the chippings, which takes place during the rolling process. Among the shortcomings of this process is the comparatively high consumption of binder per unit area.

C. *Broken-stone surfacings* and bases made of uniform size chippings (macadam). The strength of broken-stone surfacings is provided by the wedging action which takes place during rolling. The major factor determining the stability pf the surfacing is the friction developed between chippings, also the cementing action of the stone powder formed by abrasion of the chippings during rolling. The abrasion of the edges and the crushing of the stone, in addition to the penetration of mud deposited on the surface during use of the road give rise to the appearance of sandy, silty and clayey particles within interstices and hence to the loss of cohesion by the surfacing especially during wet seasons.

Broken-stone surfacings have a low resistance to wear under automobile traffic, since the tangential, stresses of pneumatic tyres destroy the efficiency of packing. Consequently, such pavements are used as an independent type of surfacing only when the traffic intensity is low. More often they are used to provide the road with a base laid beneath a surfacing treated with organic binders.

Surfacings of natural gravel or artificially graded gravel mixtures.

The strength of the material is provided by grading as closely as possible to the optimum mixture, keeping the interstices between big particles filled with finer ones so that the material, as a whole, has the minimum porosity. Cohesion is achieved by introducing fine mud and clay particles into the mixture. In humid seasons of the year the strength *of* the surfacing may be reduced owing to the decrease of cohesion.

The gravel road is the cheapest form of road and the simplest from the construction point of view. It has high strength and stability when does not contain am overlarge quantity of fine fractions, which make the mixture plastic in wet conditions. Pavements of local weak materials and of industrial waste products are constructed in a manner similar to the gravel type roads.

Types of pavements. Depending on the riding quality road pavements are classified as high-quality, intermediate and inferior. When classifying road pavements the decisive factors are the permissible traffic speed and the rate of strain accumulation in them.

Bases beneath heavy-duty surfacings must maintain the required strength throughout the year, without showing any decrease during the wet season.

Bases under the high-quality surfacings may be made of the following types, depending on the required strength of the pavement and the availability of local building materials: broken stone, gravel, blast-furnace slag, cinder and other local industrial waste materials, of the soil used for roadbed treated with binders, i.e. bitumen, cement or lime.

The intermediate and inferior types of pavements are laid directly on the: bed soil, with the exception of broken-stone pavements, which should be laid on a base of soil treated with binders, or of slag or other local materials.

PAN AMERICAN HIGHWAY

Pan American Highway is a system of highways that extends from the United States-Mexican border to southern Chile. It also connects the east and west coasts of

South America, and links the capitals of 17 Latin-American countries. The 29325-mile (47,516-kilometer) system benefits Latin America's economy. It provides a route for raw materials and agricultural products through much of Latin America. The Pan American Highway is sometimes described as running through the western United States and Canada up into Alaska. But neither country has officially named any highway as part of the Pan American Highway system.

Route. The Pan American Highway has four major U.S. terminals: Nogales, Ariz.; and Eagle Pass, El Paso, and Laredo, Tex. It crosses Mexico, Guatemala, El Salvador, Honduras, Nicaragua, and Costa Rica, and into Panama. The Darien Gap, a stretch of about 90 miles (140 kilometers) of jungle, blocks the highway at Yaviza, Panama. Motorists usually ship their cars from either Cristobal or Balboa, Panama, to Colombia or Venezuela. South of the gap the highway follows the western coastline of South America to Puerto Montt Chile.

At Santiago, Chile, about 660 miles (1,060 kilometers) north of Puerto Montt, a major branch of the highway cuts eastward across the Andes Mountains to Buenos Aires, Argentina. From Buenos Aires, it follows the east coast of South America north to Rio de Janeiro, Brazil, then turns inland to Brasilia, the capital of Brazil. Other branches of the highway lead to the capitals of Bolivia (La Paz and Sucre), Paraguay (Asuncion), and Venezuela (Caracas).

Development. The idea to link North and South America dates from the late 1800's, when people talked of building a Pan American railway. But it was not until 1923, at the Fifth International Conference of American States, that a highway was seriously considered. This conference led to the First Pan American Highway Congress at Buenos Aires in 1925.

Organization of the system started in the late 1920’s. By 1940, over 60 per cent of the highway between the United States and Panama had been completed. By the early 1950’s, most of the project was open to travel in South America. An important link in the system opened in 1962, when the Thatcher Ferry Bridge was completed over the Panama Canal at Balboa. The bridge is 1 mile (1.6 kilometers) long and is one of the world's longest steel arch bridges.

Each South American country has financed the building of the highways within its own borders. In 1930, the United States began giving financial support to speed the building of the Pan American Highway between Panama and Texas. This section is also called the Inter-American Highway. The United States has contributed two-thirds of the cost of building this part of the highway. Only Mexico has not used United States financial aid in building the system.

The Pan American Highway Congress, sponsored by the Organization of American States (OAS), meets every four years to discuss the development and progress of the highway system. The congress has headquarters in the General Secretariat of the OAS, Washington, D.C

KINDS OF ROADS AND HIGHWAYS (in America)

There are about 3,900,000 miles (6,200,000 kilometers) of surfaced and unsurfaced streets, roads, and highways in the United States. Canada has about 550,000 miles (885,000 kilometers) of surfaced and unsurfaced roads.

Local and secondary roads make up about 80 per cent of the roads in the United States. *Local roads* carry traffic within a local area. *Secondary roads* link small communities and connect local roads to main highways leading to more distant places. Most local and secondary roads are built and maintained by local governments.

Primary highways. The most important roads generally are those that carry the greatest number of automobiles, trucks, and buses. These main roads, called *primary highways*, connect the larger communities. Most are constructed and cared for by state governments.

The federal government helps the states pay the cost of building and improving primary and secondary roads and streets. The routes are selected by states.

Some highways with four or more traffic lanes are divided in the center with a strip of land, called a *median strip*. This separates lanes of traffic going in opposite directions and helps prevent collisions.

Another important factor in safety and smooth traffic flow is the principle of *controlled access*. On fully controlled access highways a vehicle can enter or leave a main highway only at certain locations called *interchanges.* These interchanges are usually located at main crossroads. *Grade separations* are often used to separate crossing streams of traffic. In a grade separation one of the intersecting highways crosses over the other on a bridge. The two are connected by sloping, curved roadways called *ramps.*

With controlled access, no driveways from homes or commercial establishments connect directly with the main highway. Minor roads and streets run over or under the road without connecting to it. Minor roads may also dead-end at the highway or connect with a service road that runs parallel to the highway.

Freeways are main highways with full access control and grade-separated interchanges. Those with four or more lanes are divided by a median strip. Freeways in congested parts of big cities are often *elevated* (built above surface streets) or *depressed* (built below surface streets). The term *freeway* refers only to the free flow of traffic. Motorists may have to pay a toll to travel on these roads.

Expressways are similar to freeways but sometimes have only partial access control. *Parkways* are roads resembling freeways. But they are built in parklike surroundings with attractive landscaping and scenery. Most parkways are limited to passenger cars.

Bypasses are built to take motorists around cities. Motorists traveling some distance often do not want to drive through small towns or centers of large cities that lie on their routes. Those traveling from one part of a city to another also usually prefer to avoid downtown traffic. The bypass helps these motorists avoid city traffic, and reduces traffic congestion for those who want to drive into town.

Bypasses today are usually built as freeways, sometimes with service roads on one or both sides to serve local traffic.

Intersections are crossings of one road by another. Most intersections are at the same level, so that vehicles going east or west have to take turns crossing with vehicles going north and south. Sometimes roads intersect at odd angles and it is especially difficult to make a safe crossing. At such places the engineer may put *islands* in the paved area to keep traffic in the proper paths. When two freeways intersect, more complex interchanges are sometimes needed.

FLOATING ROAD MAKES FLOODED AREAS PASSABLE

When the Netherlands' major rivers-the Ijssel, the Rhine, and the Meuse-overtop their banks, the flood-waters sometimes block roadways, causing access problems for local residents. Similar problems result when one of the country's many bridges is closed for repair. In search of an innovative solution, the Directorate-General for Public Works and Water Management recently held a design competition to solicit ideas for a floating road.

The winning team developed a system of aluminum modules, each 5.5 m wide, 3.5 m long, and 1.5 m high, that can be linked together to form a floating road for either temporary or permanent use. The team recently built and tested a prototype on a tributary of the Mouse in the Netherlands near Hedel.

While various types of floating bridges that can be rapidly assembled have been designed for military applications, driving on these structures is typically "so uncomfortable that they are useless" for civilians, says Jan Brouwer. The goal of the Dutch project, in contrast, was to create a floating road on which motorists could drive as safely and comfortably as on a normal road, at speeds of up to 80 km/h.

The modules are stiff, lightweight aluminum boxes that are partially filled with polystyrene to keep them afloat. The bottom of the structure is porous, allowing water to enter the modules and fill the spaces beneath and between the polystyrene blocks. This design imparts stability to the structure, says Frans Soetens, a structural engineer for TNO Building and Construction Research. The road is further stabilized by aluminum breakwaters on each side.

The modules are designed to be transported easily by truck. Once at the site, they are placed in the water and linked by stainless steel clamps. Some of the modules, which are spaced at regular intervals, are equipped with rings that project from the sides. Steel piles are driven through these rings to anchor the structure to the riverbed. The distance between the piles and the depth to which they are driven depend on local conditions. Constructing a road some 50 m long in this manner would typically take as little as two days, says Martin Cornelissen, the project designer for the DHV Group.

The 70 m long prototype, installed earlier this year, includes more than a dozen floating modules and two transitional structures, each 10m long, which form ramps on each bank of the river. It was tested for both a 2,000 kg private car and an emergency vehicle weighing 7,500 kg. Waves were also generated in the water to test the roads stability. The tests were successful, and the structure has now been approved for public use.

SILENCE IS GOLDEN

Today's sound barriers are visually attractive and environmentally friendly

Many studies have shown that where vehicle noise is significant the construction of traffic noise harriers (sound walls) has been the most effective mechanism to curb vehicle noise for residents living next to high density roadways.

Noise barriers can be designed in one of two ways, to blend into the environment, or to make a dominant visual statement. Both can work well in different situations. A barrier can be blended into an area by using light and transparent materials. This allows

natural light to pass through, and in many cases reduces the perceived height of the barrier.

In other situations a well designed barrier with strength of form and a firm, distinctive silhouette may help to strengthen the area. Earlier noise barriers are often ‘unsightly’. Today, they are well designed and blend well with the background.

As noise barriers arc often viewed at speed, heir appearance needs to be simple, because small decorations are likely to blur and appear cluttered when viewed at speed. However, it must also be taken into account that local residents will also have to view these barriers everyday,often for extended periods of time. *(Picture: The sound tube in Melbourne, Australia, designed to reduce roadway noise without detracting from the area's aesthetics).*

Excessive detailing of the barrier can increase the dominance of the barrier. Some experts believe it is generally more desirable to use colour, texture and landscaping in the overall design to help the barrier reflect the character of its surroundings.

The colour of noise barriers is an important aesthetic element. Generally colours are either chosen to help the barrier blend in to the environment, or to create a pleasing visual effect. Plantings at the base of noise barriers can improve the aesthetics of the barrier, as well as giving it a more natural feel.

The angle of noise barriers also affects their aesthetics. A barrier with a vertical profile can make people feel confined. Angling the wall can reduce this effect. However, deciding which way to angle the wall can also be difficult. Angling it away from the road gives drivers an increased feeling of space, but may make an increased feeling of confinement for those on the other side and visa-versa.

Noise barriers often appear incongruous or characterless; this is often a result, of poor design related to cost reduction. Although their main function should be to control traffic noise, the visual effect should not damage the surrounding areas.

To prevent noise from becoming a burden and haying detrimental consequences, Degussa AG's Business Unit Rohm Plexiglas has for many years been developing transparent noise control products and systems that are ideal both from an economical and ecological point of view. Examples can be found the world over. Today, transparent noise barriers made from Plexiglas Soundstop belong to the streetscape in many European countries, but also in Hong Kong, Japan and Australia.

Soundstop can be installed both flat and in the form of barrel vaults. By reflecting sound at the barrier made of Soundstop, the volume of noise in the area behind it is considerably reduced. Being transparent, the material offers a clear view from both sides.

The light-transmitting sheets also make an important contribution to road safety. Since they cast no harsh shadows on the road surface, drivers have no need to adjust to a constant change in lighting conditions, and remain in visual contact with their surroundings.

The weather resistance of Plexiglas means that the high light transmission and all other properties remain practically unchanged for many years.

Soundstop is offered in seven standard colours. Special colours can be developed on request. Moreover, the simple and inexpensive processing options it offers, such as

thermoforming, cutting to size and drilling or surface treatment, leave virtually unlimited scope for individual designs.

The barrier can be installed using a simple post and foundation design. Weighing only 34 kg per m^2 no heavy lifting equipment is needed to install. It is available in heights up to 8.5m and in virtually any colour.

ROADS OF BELARUS

Belarus is fifteenth among countries with developed network of motorways by density of public roads per one square kilometer and twelfth by their length per one thousand of inhabitant

BACKGROUND

More than four centuries ago the first documents(statuses) for the state regulation of public roads and traffic rules were introduced in Belarus. In XVIII-XIX the Belarusian roads reached the European level. During the Soviet times a large-scale road construction ensured the creation of optimum network of motorways. Presently, having 207,600 square kilometres of territory and 10.5 million inhabitants, Belarus accounts for 53,500 kilometres of public roads. More than 67% of them are concrete or asphaltic concrete, 1,830 km of roads have four or more traffic lanes. The core of Belarusian motorway network is republican highways 16,382 km long.

The main government document that sets out economic, legal and administrative principles of governing the country's system of motorways is the 1994 Law on Motorways. The Committee for Motorways under the Belarusian Transport Ministry oversees the branch that is financed from the state budget road fund.

TRANSEUROPEAN HIGHWAYS

The geographical situation of Belarus has predetermined its role of a transit state. The main Belarusian highway Minsk-Moscow was built before the World War II. In 70s the highway was extended to Brest within the project of large-scale construction timed to 1980 Moscow Olympics.

After the break-up of the Soviet Union, the Belarusian motorways became an essential part of the European transportation network. At the present, the major Belarusian highway is Ml (E30 by European classification). It links West Europe countries with Russia, crossing Poland and Belarus (606 km). In 1994 the country started the project of Ml modernization, funded with loans of European financial organizations. By 1998 reconstruction of the first stretch of the highway 234 km long was completed. Upgrading and improvement other parts are in progress.

Ml highway makes also a part of the Crete Corridor 11 that is considered by the European Union a priority transportation route due to the significance of East-West transport flows through it.

Another important Belarusian highway is M8 that is a part of the Crete Corridor IX and links Russia with Ukraine through Belarusian cities of Vitebsk and Gomel. The highway is 456 km long.

The 468 km highway Gomel-Vilnius-Klaipeda plays an important role in the Crete Corridor IXB, linking Russia and Ukraine with the Baltic states.

MANAGEMENT

Belarus' road maintenance system had been finally shaped in 1998. State-run companies (called “Avtodor”) distribute government orders among companies of different ownership thus making it possible to use the allocated funds efficiently and exercise control over fulfillment of road maintenance contracts. Magistralavtodor oversees maintenance of M highways which are 4,200 km long. Local motorways are run by six Regional Associations which are subordinated to local governments. The road branch of the country employs more than35.000 people.

GRAMMAR FOCUS

1. State the function of the verb “to be” in the following sentences and translate them:

1. The structural layer is eight inches thick. 2. They are building a new ring road round the city. 3. The ring road around the city is to be as long as 150 km. 4. In the Old World all wheels were solid discs. Finally, the wheel was covered with iron and then with rubber. 5. These machines were to make construction quicker and cheaper. 6. The engineer was working at his design for some months. 7. All these materials are to be transported to the site from afar. 8. Granular base was to be compacted by the rollers.

2. State the function of the verb “to do” in the following sentences and translate them:

1. We’ll do our best to improve the road quality. 2. They didn’t know how to give the road a pavement of flat stones, but the Romans did. 3. Motorists don’t have to pay a toll to travel on these roads. 4. Did Richardson publish a standard textbook on asphalt paving in 1905? 5. This type of asphalt did play an important part in road construction. 6. Do these methods help you to improve the road pavement? 7. The Egyptians obtained native asphalts from the Dead Sea, didn’t they? 8. They began to do their best much earlier than we did.

3. State the function of the verb “to have” in the following sentences and translate them:

1. He is a very skilled engineer and we have high opinion of his work. 2. We have to mechanize all building operations to make the road in time. 3. During the construction of the bridge across the river specialists had to solve many technical problems. 4. You will have to take measures to prevent spring waters from penetrating the subgrade. 5. This type of cement has changed the concrete properties. 6. The new ceramic engine has been developed in Japan. 7. They had to stop and rest every quarter of an hour as path was very steep. 8. They will have to consider the conditions of this locality.

4. Remember the function of “it”. Read and translate the following sentences:

1. It is necessary to develop the principles of road design and construction. 2. It is essential that the machinery must be serviced regularly. 3. It is to be noted that the Belarusian enterprises produce modern road-building equipment. 4. It is with the help of our specialists that a lot of roads have been constructed in Asia and Africa. 5. It was May when they received the new equipment. 6. It is said that the experiments are going on successfully. 7. It were Russian engineers who suggested granular surfacing. It was laid on a sand base. In fact it was the cheapest way of road construction.

5. Define the function of <u>one (ones)</u> and translate these sentences:

1. One can say that geographical position of Belarus itself has determined its social and cultural peculiarities for many years. 2. One may work in the laboratory only observing certain rules. 3. One should know how to cross the street. 4. In planning a new road or rebuilding an existing one maps must be drawn. 5. These methods are different from the ones used before. 6. Scientists are developing new processes and improving old ones to produce metals that will meet present day requirements.

6. Pay attention to the words "only", "the only", "some", "the same" and translate the following phrases:

a). the only method of solving the problem; coal is not only a source of heat; the only example known; the work was finished only yesterday; the only means of access to the station.

b). some new methods of work; the same properties; some rules; the same traffic intensity; some local materials; the same equipment; polluted in some extent.

7. Choose the right preposition and translate the sentences:

1. The equipment may be used only (owing to, in case of, due to) emergency. 2. They could not get there in time (in order to, owing to, instead of) a severe storm. 3. Interest in transport problems has extended far (among, beyond, between) the specialists. 4. This bus makes regular trips (out of among, between) the city centre and the suburb. 5. The research centre was situated high in mountains some three kilometers (below, under, above) sea-level. 6. All the workers decided to stay and wait for the results (since, till, as long as) the end of test. 7. They had to stop and rest every quarter of an hour (as, because of, but) the mountain path was very steep.

8. Give the appropriate degrees of comparison of the following adjectives and adverbs:

1. light	…….	……
2. ……..	less	……
3. ……..	…….	the most difficult
4. ……..	worse	……
5. ……..	……..	the best
6. expensive	……..	……
7. ……	denser	……
8. ……	……..	the most
9. ……	farther (further)	……
10.attractive	……	……

9. Translate the following sentences, paying attention to the suffix "-er":

1. The denser the ground, the slower is the process of moisture transfer. 2. The higher the average speed of the traffic, the wider will be the traffic lane required. 3. The more experiments scientists make, the greater is their knowledge of the properties of this material. 4. The higher the degree of soil compaction, the slower is the penetration

of capillary water. 5. The greater the number of vehicles in the stream, the more severe will be requirements to the road.

10. Translate the following sentences paying attention to the modal verbs:

1. A crane can raise a weight of several tons. 2. Crossing the street cars and trucks should slow down speed. 3. They might use the new equipment for the experiment. 4. The equipment is to be supplied by a Japanese firm. 5. These machines were to make construction quicker and cheaper. 6. During the construction of the bridge across the river specialists have to solve many technical problems. 7. They had to remove a thick layer of sand before they started the construction. 8. You will have to take measures to prevent spring waters from penetrating into the subgrade. 9. A driver must be able to see a pavement ahead in order to stop or turn aside. 10. The drivers are allowed to park their cars in this place. 11. He had to pay a fine for speeding. 12. The properties of this metal will have to be tested with special machines.

11. Choose the correct modal verb:

1. The wheel _____ be changed if you don't want to get into an accident.
a) have to b) should c) can
2. Environmental factors _____ always be considered.
a) may b) must c) have to
3. The road _____ be reconstructed last year.
a) have to b) was to c) is to
4. Our car had broken down and we _____ walk to the station.
a) were to b) must c) had to
5. Somebody _____ to help them.
a) may b) must c) will have

12. Define the part of speech of the underlined words and translate these sentences:

a) 1. A car causes air pollution. 2. Some mistakes in calculations have been the main cause of failure of the bridge. 3. Both of these failures are almost entirely caused by traffic. 4. The continuous use of highways causes loud traffic noise creating a problem for people who live near highways. 5. These accidents are caused by speeding on icy road.

b) 1. They have read an interesting article on the subject of their investigation. 2. Aluminium loses its strength when it is subjected to a high temperature. 3. The results of their experiments are subjected to criticism. 4. The pavement is subjected to the direct action of traffic loads and of natural factors.

13. Define the part of speech of the underlined words and translate these sentences:

a) 1. Minor roads run parallel to the highways. 2. Transport running on tracks has been widely used in the cities of the 19-th century. 3. Escalator runs at full speed when

carrying passengers but when empty it runs at half speed. 4. The compressor is designed to run at comparatively low speeds. 5. Great difficulties had to be overcome during the construction of the road. It runs through the taiga, huge marshes and rivers.

b) 1. Motor transport is the most efficient form of transportation over comparatively short distances. 2. In countries with a planned economy all means of transport form a single transportation system. 3. Different kinds of earth and soil are mixed together to form a pavement.

c) 1. Different metals have to be produced in different ways. 2. Cycling is another pleasant way of seeing the British countryside. 3. The roads must be maintained on a proper way. 4. The cleared way was quite wide in the forest to use new machines.

14. Find the verb in the Passive Voice:

1.	a) will need	b) is needed	c) has needed
2.	a) was employed	b) has employed	c) employs
3.	a) mixed	b) was mixing	c) will be mixed
4.	a) is removing	b) must be removed	c) had removed
5.	a) has been used	b) used	c) uses
6.	a) leveled	b) is being leveled	c) will level

15. Translate the following sentences paying attention to the predicates in the Passive Voice with prepositions:

1. This material was much spoken of. 2. The design of the road was much worked at. 3. The engineers' measurements and their calculations can be relied on. 4. The experimental model will be followed by mass production of these mechanisms. 5. The new model of the device will be worked at in the plant laboratory. 6. The construction of the new tunnel was paid great attention to. 7. This document is much spoken about. 8. The specialists were sent for some days ago. 9. Beautiful bridges are looked at with great pleasure. 10. The original design of the bridge was referred to in some journals.

16. Write these sentences in another way (like in the example):

They built concrete pavement in 1865. ---- Concrete pavement was built in 1865 .

1. People pay great attention to ecological problem lately.
2. Lorries transport sand to the site.
3. People use this road very often.
4. The workers maintained the road in a proper way.
5. The scientists produced a new substance after many years of hard work.
6. The workers smooth, pave and prepare roads to allow easy travel.
7. People expect considerable noise health effects from road systems.

17. Choose the best variant:

1. This expressway ____ next year.

a) is completed b) was completed c) will have been completed d) will be completed

2. Local road-building materials _____ be employed to reduce the cost of construction.

a) were b) is c) must d) able

3. A lot of new roads _____ this year.

a) will build b) have built c) have been built

4. New roads _____ in our city every year.

a) was built b) have been built c) has been built d) are built

5. A great number of roads _____ in Belarus since the war.

a) are designed b) has designed c) has been designed d) designed

18. Use the correct tense-forms of the verbs in brackets:

If tomorrow you _____ (drive) down Spencer Road you _____ (get) a shock. Suddenly the speed limit changes from 35 to 60. But take it easy! At this point of the road miles _____ (change) into kilometres.

Without warning, the city street department recently _____ (replace) its road signs to metric units. Officials said that the Federal Highway Administration _____ (announce) beforehand that all road signs _____ (become) metric within one month. Many drivers _____ (ask) about their reaction to it and they _____ (object) to it strongly. And they _____ (support) by over 170 members of the Congress. The innovation _____ (discuss) in the Congress several times before the majority of its members _____ (agree) to it. Frankly speaking, when I _____ (drive) along Spencer Road last night I _____ (not / puzzle) by the change that much.

19. Define the functions of the Participle and translate these sentences:

1. Working in the laboratory he deals with different new materials. 2. The approach roads have been designed to provide free flow for traffic approaching and leaving the bridge. 3. While designing a tunnel there are many factors to be taken into consideration. 4. The bridge was constructed while maintaining traffic on the existing road underneath. 5. Having become popular, suspension bridges were built in different places of Great Britain. 6. Having investigated the static and dynamic behaviour of the system, the scientists approved it. 7. Having been given the site, they examined it thoroughly. 8. Having been built nine centuries ago, the bridge has been reconstructed several times. 9. Being obtained in the laboratory the new substance showed valuable properties. 10. The problem being discussed at the scientific conference is of great importance for industry. 11. The professor told us about the experiments being carried out in the laboratory. 12. When excavating the ground the workers found some very hard rock thus discovering naturally formed concrete. 13. If protected by a special coating this material becomes waterproof.

20. Point out the sentences with the Participle as:

a) an Attribute b) an Adverbial modifier c) Absolute Participial Construction

1. The engine tested showed that it needed no further improvement.
2. While driving a car one should be very attentive.
3. Some new devices having been obtained, the researcher could make more complex experiments.
4. A new electronic instrument will calculate how far a car can drive on the fuel left in the tank.
5. Having been repaired, the engine began operating better.
6. Inspecting the motor, the engineer made some valuable remarks.
7. Having done a number of operations, the machine stopped automatically.
8. The cars at that time were very small, the engine being placed under the seat.

21. Choose the best variant of translation for the underlined Participles:

1. The topsoil is stockpiled for rehabilitation of newly constructed embankment.
a) строящие b) построив c) построенной

2. It will be compacted using heavy vibratory road roller.
a) использующие b) используя c) использовав
3. The in-situ ground will be removed to a level specified by the engineer.
a) определили b) определяя c) определенного
4. The final layer of a road is the base course consisting of gravel or crushed stone.
a) состоявший b) состоящий c) который состоял
5. Having placed a surface course the builders strengthened the pavement structure.
a) разместив b) размещая c) размещенный
6. Being leveled of by a grader a gravel type material will be compacted to required density.
a) выравнивая b) при выравнивании c) будучи выровненным

22. Read and translate the following sentences paying attention to the words with the ending "-ed":

1. The machine used showed good results. 2. The methods introduced received general recognition. 3. The equipment tested required some improvement. 4. The substance investigated showed interesting results. 5. The discovery mentioned remained unknown to most scientists for a long time. 6. The methods applied increased the production of motor cars. 7. The properties described required further investigation. 8. The phenomenon discovered attracted the scientists' attention. 9. The results obtained showed that there was a mistake.

23. Choose the right variant of the Participle:

1. (Building, having built) new roads we make our life more comfortable. 2. The road (being repaired, repairing) will be much wider. 3. (Crossing, having crossed) the

street, cars and trucks should slow down. 4. (Having built, having been built) nine centuries ago, the bridge has been reconstructed several times. 5. (Being finished, having finished) the experiment, he printed the results. 6. (Broken, having broken) by the wind the tree was lying, on the road. 7. Roads (connecting, having connected) large, industrial centres are very important. 8. (Having lived, while living) in London many years he knew the city well.

24. Choose the right translation of the words given in the brackets:

a). 1. The test (выполнен) by a group of students. 2. The group of students (выполняющая) the test is in the laboratory. 3. The test (выполненный) is very complex.

is performing; performing; performed; is performed

b). 1. The engineer (проводит) the investigation. 2. The investigation (проводимое) by the engineer is important. 3. The engineer (проводящий) the investigation works is in our laboratory.

carrying out; is carrying out; carried out; is carried out

c). 1. (Определяя) the properties of the soil the scientist made lots of experiments. 2. The properties of the soil (определены) accurately enough. 3. When (были определены) all the properties of the soil it was recommended for the construction.

are determined; determined; determining; are determining

25. Define the Absolute Participle Construction in the following sentences and translate them:

1. All the problems having been solved, they stopped the discussion. 2. Maps for building a road are made by planners, a separate plan being drawn for each individual section. 3. The road conditions being unchanged, the automobile can travel at a constant speed. 4. A variety of road building equipment is employed in road building, a bulldozer being the most widely used. 5. The experiment having been finished, they started new investigations. 6. The term “speed” means the rate of motion, the term “velocity” meaning the speed in a definite direction. 7. Cars with internal combustion engines having appeared, the automobile industry began developing rapidly. 8. The population of the city increasing, much attention must be paid to highway construction.

26. Translate the following sentences paying attention to the function of the Gerund:

1. Building a road tunnel through a mountain takes much time. 2. A new system of removing snow and ice from the city streets by using heat has been tested in Moscow. 3. In planning the bridges considerable attention was paid to their appearance. 4. We must avoid placing concrete on frozen subgrade. 5. The British and French government signed an agreement to built a tunnel and digging began. 6. Heating may change the properties of the substance. 7. It is not possible to start a construction job without levelling the site. 8. The scientists considered different ways of solving the problem. 9.

Cracking is usually controlled by adding steel reinforcement. 10. Good lighting helps cut accidents for both vehicles and pedestrians.

27. Choose the sentences that have the Gerund:

1. Porous asphalt reduces noise by absorbing some of the noise emitted by vehicles.
2. In the late 18th century, European engineers began designing roads that included lighter surfaces.
3. The thin coating of asphalt around the soil particles provides a high degree of waterproofing.
4. An engineer testing the pavement resistance found sufficient drawbacks.
5. When constructing a road a lot of earthworks should be done.
6. Being provided with batteries an electric car can develop a speed of 50 miles an hour.
7. Several methods of testing soil stability are used.
8. Improving the properties of the material required much time.

28. Define the part of the speech of the underlined words (Participle or Gerund) and translate the sentences:

1. Reconstructing this road will require much time and money. 2. Reconstructing this road they met with many difficulties. 3. Working at o construction site they used different types of machines. 4. Working at a construction site helps to understand all stages of road building. 5. Scientists devote much attention to the problem of changing the climate. 6. Changing the climate, science makes nature serve man. 6. Melting is a physical process. We cleared the road from melting snow. Melting ice, we get water. 7. Speeding causes accidents, so many countries have speed limits.

29. Translate into Russian and define the function of the Infinitive:

1. It is essential to collect and study information about the area where the road is to be laid. 2. To use more glass in a modern motor vehicle means improvement of visibility. 3. The aim of individual road sections. 4. The chief engineer allowed the new engine to be tested. 5. This method of construction is said to have some advantages. 6. Nothing could make him turn the computer off. 7. Plastics are supposed to be used instead of metals in many cases. 8. The road surface to be repaired was destroyed many years ago by heavy vehicles. 9. Some degree of elevation of the road was made in order to ensure drainage. 10. The authorities wanted speed to be limited within the city centre. 11. This machine enables many operations to be carried out easily. 12. Modern discoveries allow science and engineering to be developed rapidly. 13. The use of this machine permits levelling of the roadbed to speed up. 14. The are likely to be familiar with this phenomenon. 15. This experiment seems to give good results.

30. Read and translate the sentences with the Complex Subject:

1. This bridge is said to have been built two hundred years ago. 2. Rubber is known to have been brought from America. 3. They were reported to have completed the

construction of the road last month. 4. Speeding is found to be one of the factors increasing accidents on the road. 5. Proper alignment of the road is supposed to contribute to safe driving. 6. The journey was expected to be brief and pleasant. 7. They seem to be studying the materials to be of great interest. 9. The cooling system proposed by the designers proved to be inefficient. 10. The road to be built in this district is likely to meet all modern requirements. 11. The discovery of a laser is sure to be of great value. 12. This scientist is certain to make a great discovery.

31. Translate into English using the Complex Subject:

1. Известно, что этот тип вяжущего является очень чувствительным (sensitive) к погодным условиям. 2. Говорят, что несколько мостов будет построено по всей длине дороги. 3. Полагают, что стоимость строительства будет уменьшена путём использования местных материалов. 4. Применение этого материала, вероятно, даст лучшие результаты. 5. Улица, оказалась более привлекательной после ремонта. 6. Этот вопрос вряд ли будет рассматриваться на конференции. 7. Дорога, несомненно, будет расширена после реконструкции. 8. Новый метод, кажется, является эффективным.

32. Read and translate the sentences with the Complex Object:

a) 1. We expected the designers to simplify the design of the structure. 2. Nowadays drivers want the road signs to be visible, understandable and uniform. 3. Everybody wanted the construction of the pavement to be completed in time. 4. I know him to have been working at this project for a long time. 5. We supposed them to finished earthworks.

b) 1. These methods enable full investigation of local materials to be carried out. 2. Modern mechanized methods employed for earthworks permit a stable roadbed to be built. 3. This plan enables the reconstruction of be built. 4. This plan enables the reconstruction of both primary and secondary roads to be completed. 5. This width of lanes and shoulders allows the carriageway width to be determined.

c) 1. Heat causes most materials extend. 2. The rain made us return home. 3. They could make him change his decision. 4. Air pollution causes scientists find different ways from its harmful effect. 5. This method of construction is said to have some advantages. 6. Nothing could make him turn the computer off.

РАЗДЕЛ КОНТРОЛЯ ЗНАНИЙ
ОБРАЗЦЫ ТЕСТОВ ДЛЯ ИТОГОВОГО КОНТРОЛЯ

Final Test (1st Term)

PART 1

1. Skim the text "Pavement"

Pavement is the wearing surface of a road, street, or sidewalk. Parts of Babylon and Troy are believed to have been paved; Roman roads were noted for their durable stone **paving**. Cobblestones were common from late medieval times into the 19th cent.

A pavement known as macadam road, introduced in England in the 19th cent., is still used today; it consists basically of compacted layers of small stones cemented into a hard **surface** by means of stone dust and water (water-bound macadam). However, the main pavement surfaces in use today are bituminous/asphalt coverings and concrete.

Desirable qualities in pavements include durability, smoothness, quietness, ease of cleaning, and a nonslippery surface. The requirements conflict to a degree, so no one material is ideal in all respects. The **foundation** of a pavement must be crowned, or slightly arched, for rapid shedding of water; it must be strong enough to withstand heavy dynamic loads, but capable of responding to temperature changes. In the bituminous macadam pavement, the foundation is macadam, upon which a bituminous material that penetrates at least 2 in (5 cm) into the foundation is poured, forming an impervious **binder**.

In the bituminous-mixed macadam pavement, a mixture of crushed rock, ground glass and other additives, and bituminous binder is spread over a macadam foundation and rolled into a compact mass. The two other pavement types use a concrete road slab as a foundation. In the sheet asphalt pavement, a binder course and a wearing course are laid over a concrete foundation.

The binder course, whose function is to prevent creepage of the upper course, is composed of broken stone and asphalt cement. The wearing surface is a mixture of **fine** sand, filler, and asphalt. By far the most common type of pavement for heavy use is rigid concrete.

The first concrete pavement was laid in Bellefontaine, Ohio, in 1894. A modern highway will have a 6 in (15 cm) base of concrete, on top of which 3 in (7.5 cm) of steel-reinforced concrete will be laid. Pavements that must withstand only pedestrian traffic may use brick or wood-blocks, set in a 1 in. (2.5 cm) bedding of sand, cement mortar, or mastic.

2. Decide whether the following statements are true or false according to the text.

1. The first paved roads are believed to appear in ancient Rome.
2. Macadam roads were widely used only in England in the 19th century.
3. The foundation of a pavement must be slightly arched for rapid responding to temperature changes.
4. In the bituminous macadam pavement, a bituminous material forms an waterproof binder.
5. Rigid concrete is the most common type of pavement used for heavy traffic.

3. Choose the contextual meaning.

1. **paving**	a) брусчатка	b) отмостка	c) булыжник
2. **surface**	a) плоскость	b) поверхность	c) площадь
3. binder	a) вяжущее	b) переплет	c) связка
4. course	a) курс	b) трасса	c) слой
5. fine	a) хороший	b) тонкий	c) мелкий

IV. Which sentence meant exactly the tame?

1. A mixture of crushed rock, ground glass and other additives, and bituminous binder is spread over a macadam foundation and rolled into a compact mass.

a) Смесь щебня, толченого стекла и других добавок, а также битумного связующего выкладывают на щебеночное основание и скатывают в компактную массу.

b) Смесь щебня, толченого стекла и других добавок, и битумное связующее вещество распределяется по щебёночному основанию и укатывается в плотную массу.

c) Смесь щебня, притертого стекла и других добавок, и битумное связующее вещество распределили по щебёночному основанию и укатали в плотную массу.

2. In the sheet asphalt pavement, a binder course and a wearing course are laid over a concrete foundation.

a) В листовом асфальтобетонном покрытии поверх бетонного фундамента укладывается связующий слой и износостойкий слой.

b) В асфальтовом дорожном покрытии бетонное основание укладывается на связующий слой и слой износа.

c) В асфальтовом дорожном покрытии на бетонное основание укладываются связующий слой и слой износа.

3. Brick or wood-blocks may be used for pavements that must withstand only pedestrian traffic.

a) Кирпичные или деревянные блоки могут использоваться для тротуаров, которые должны выдерживать только пешеходное движение

b) Клинкерный кирпич и деревянные колоды также используются для тротуаров, которые должны выдерживать только пешеходное движение.

c) Для тротуаров, предназначенных только для пешеходного движения, разрешается использовать клинкерный кирпич и деревянные блоки.

Part 2

V. Grammar: choose the correct variant.

Telford, originally a stonemason, came up with a system of road building which required digging a trench, installing a foundation of heavy rock, and then surfacing 1) ____ a 6-inch layer of gravel. During construction, the center of the road 2) ___, producing a crown that allowed water to drain off. In the course of his career, Telford 3) ___ over 1,000 roads, 1,200 bridges, and numerous other structures. Although his system was faster and 4) ___ expensive that the Romans' method, it 5) ___ still costly and required frequent resurfacing with gravel.

1) A. with	B. at	C. in
2) A. is raised	B. raised	C. was raised
3) A. builds	B. built	C. was built
4) A. little	B less	C. the least
5) A is	B. was	C will be

VI. Give the missing forms of the words below.

Verb	Noun	Adjective
1) to stiffen		
2)	compactor	
3)	requirement	
4) to add		
5)		movable

Part 3

VII. Fill in the blanks using the words from the list below.

a) placed; c) top; e) three-layer;b) rocks; d) bottom;

Although he was blind, John Metcalfe was able to design and build firm, 1) ____ roads. First he 2) ___ large stones on the 3) ___ layer, then he took the materials excavated from the roadbed such as smaller 4) ____ and earth and used them for the middle layer, and finally he spread a layer of gravel on 5) ____.

Part 4

8 Read the text and choose the best summary.

Pavement design is the process of selecting pavement layer types and thicknesses in order to withstand expected traffic loads in a cost-effective manner. Each pavement layer usually consists of mineral aggregates such as natural river or pit sand, natural gravel, and crushed rock. For rigid pavements, Portland cement is mixed with water and aggregates to produce a viscous concrete mix that is poured into prepared forms and vibrated.

There are generally three types of pavements specified for pavement design. Gravel pavement is the simplest type of pavement and is often designed for lightly traveled roads. Flexible pavement is a multilayered structure that includes a subbase, a base, and an asphaltic wearing course. Rigid pavement consists of a plain or steel-reinforced Portland cement concrete slab laid on a prepared crushed-stone base course.

A. The main points under discussion are the definition of pavement design and layer types and thickness selecting as well as the descriptions of different pavement types.
B. The definition of pavement design is given in the text. The main materials for pavement are touched upon. The classification of pavements is presented.
C. The text is devoted to the pavement design process and its peculiarities. The structural features of different pavement types are discussed.

9. Put the jumbled sentences in the right order.

A. Standards of highway engineering are continuously being improved.
B. It involves the design, construction and maintenance of highway systems.
C. Highway engineering is an engineering discipline branching from civil engineering.
D. So highway engineers must take into account future traffic flows, design of highway intersections, geometric alignment and design, highway pavement materials and design, structural design of pavement thickness, and pavement maintenance.

Final Test (2nd Term)

PART 1

1. Skim the text "Highway Planning and Survey".

The construction of new roads, road reconstruction and general maintenance of existing ones, of roadside buildings and other road structures are carried out according to approved projects and **estimates.** The construction of roads and structures is not permissible without these documents.

The road project shows the horizontal and vertical location of the road, the **design** and dimensions of the road bed, carriageways, bridges, culverts, dwellings, etc. required for the normal operation of the road.

The road construction estimate defines the quality of materials required, manpower, equipment, transportation and the cost of the separate elements, as well as that of entire road.

To prepare the data required for planning, it is necessary to carry extensive survey work in a series of successive stages. During the first stages of the survey work the general economic aspects are studied, so as to determine the technical and economic basis of the project and its importance for national economy.

Comprehensive economic surveys provide data for planning road construction and designing road networks in any given territory (district, region or republic). On the basis of the survey data it is decided what form the road network shall take, what roads are to be constructed and in what sequence. The economic survey also takes into account the character of **freight** and passenger traffic, as well as the distribution of productive forces and inhabited localities.

Engineering surveys are carried out simultaneously with economic ones in order to establish the horizontal and vertical road location, also the size, type and designs of highway structures and the **extend** and cost of work.

Before work on the road is started surveys are carried out **to finalize** the project in detail. Supplementary survey work may be executed at the time of building the road so as to improve the original project.

Aerial survey is especially suitable where roads are to be laid in mountain terrain where routing becomes extremely difficult. When surveys are to be made in swamp or forest regions one may, by means of aerial photographs, determine the limits, type of the swamp, also the approximate depth of swamps and the nature, density and height of forests.

2. Decide whether the following statements are true or false according to the text.

1. In planning a new road or rebuilding an existing one it is necessary to carry out extensive survey work.
2. The construction of roads and structures is permissible without projects and estimates.
3. The main function of the road project is to show the design and dimensions of the roadbed bridges, carriageways, culverts, dwellings, etc.
4. The road construction estimate isn't paid attention to.
5. Air survey is used only to study a locality with complicated relief.

3. Choose the contextual meaning.

1. estimate	a) смета	b) определение	c) оценивать
2. design	a) проект	b) конструкция	c) разработка
3. freight	a) груз	b) грузовой	c) фрахт
4. extend	a) степень	b) продолжительность	c) расширять
5. to finalize	a) урегулировать	b) завершать	c) согласовывать

4. Which sentence means exactly the same?

1. The road construction estimate defines the quality of materials required, manpower, equipment, transportation and the cost of the separate elements as well as that of the entire road.

a) Смета на строительство дороги определяет качество требуемых материалов, рабочей силы, оборудования, транспортировки и стоимость отдельных материалов так же хорошо, как и стоимость всей дороги.

b) Смета на строительство дороги определяет качество требуемых материалов, рабочей силы, оборудования, транспортировки и стоимость отдельных элементов, а также стоимость всей дороги.

c) Смета на строительство дороги определяет качество требуемых материалов, рабочей силы, оборудования, транспортировки и отдельных элементов всей дороги.

2. On the basis of the survey data it is decided what form the road network shall take, what roads are to be constructed and in what sequence.

a) На основе даты изысканий решается, какую форму приобретёт сеть дорог, какие дороги должны быть построены и в какой последовательности.

b) На основе данных изысканий решается, какую форму приобретёт сеть дорог, какие дороги должны быть построены и в какой последовательности.

c) На основе данных изысканий решается, какую форму приобретёт сеть дорог, какие дороги будут построены и в какой последовательности.

3. Engineering surveys are carried out simultaneously with economic ones in order to establish the horizontal and vertical road location.

a) Технические изыскания проводятся вместе с одними экономическими изысканиями, чтобы определить вертикальное и горизонтальное расположение дороги.

b) Технические изыскания проводятся одновременно с экономическими, чтобы установить вертикальное и горизонтальное расположение дороги.

c) Технические изыскания проводят в одно время с экономическими расчетами в порядке, необходимом для установления горизонтального и вертикального положения дороги.

PART 2

5. Grammar Recognition (miscellaneous). Choose the correct variant.

During survey great attention should be focused on the study of local natural conditions, and in particular on the (-1-) of geological and soil investigations. Soils brought to the laboratory (-2-) to the tests required by the design method. It is important to obtain a complete working knowledge (-3-) that area surrounding a job site. In many areas this survey reveals local material which (-4-) as base and pavement aggregates. Many highway departments have men who spend (-5-) of their time carrying out such explorations.

1. a) having carried out	b) carrying out	c) being carried out
2. a) are subjected	b) is subjected	c) subjected
3. a) from	b) of	c) with
4. a) will serve	b) serves	c) is serving
5. a) many	b) the most	c) more

PART 3

6. Match the terms with their definition.

a) profile; b) trench; c) survey; d) traffic intensity; e) shoulders; f) traffic stream;

1. An examination of the shape, size and position of a piece of land to prepare the data required for planning.
2. The strips of ground adjacent to the carriageway.
3. Vehicle travelling in the same direction with different speeds and carrying various loads.
4. The total number of vehicle passing through any section of a road in unit time (day, hour).
5. The section of a road made by a vertical plane along its centerline.
6. A long narrow excavation made in the ground by digging as for draining or irrigating land.

7. Fill in the blanks using the words from the list. There are some extra words you do not need to use.

a) suitable; b) approach; c) to maintain; d) shaped; e) cutting; f) advantage; g) valuable;

1)____ roads are requested (требовать) to serve sea, river and canal transport and airports. When laying out a highway it is essential 2) _____ administrative, cultural and economic communications between various parts of the country. Considerable attention must be given to the reconstruction of roads in order to make them 3) ____ for modern high-speed motor traffic. When planning the earthworks one should try to use earth

excavation from 4) ____ . Cement is known to have a number of advantages over traditional materials for it can be easily laid, compacted and 5) ____.

8. Read the text and choose the best summary.

Economic and engineering surveys are carried out mainly by special road designing and surveying organizations. The field work, including the preparation of the main project documents, is executed by a special survey party that collects the required materials and performs the necessary surveying work (geodesic survey, hydrometric observations, drilling operations, etc.). Upon their return, the members of the survey party, with the assistance of other employees of the department draw up the project documents. The composition of the working party may alter considerably depending on the class of road, its length, the natural conditions of the district being surveyed. The head of the survey party is in charge of all works and carries full responsibility for the accuracy of the survey field work.

1. The text is devoted to different survey types such as economic and engineering surveys.
The people in charge of different fields of work are mentioned and their responsibilities are described.
2. The text deals with organization of economic and engineering surveys. The functions of a survey party are explained, its composition is described, the main factors influencing this composition are listed.
3. The importance of different types of surveys is emphasized in this text. The definitions of each types are given and the main documents preparation is paid attention to.

9. Put the jumbled sentences in the right order.

A. Photographs taken from airplanes in flight have been used for map-making since World War II.
B. Aerial photographs may be taken with the camera either pointing vertically downwards or at any angle.
C. When surveying and planning highways, aerial photography may be employed with advantage.
D. The advantages of aerial survey are the speed with which work is accomplished and the wealth (изобилие) of details.

EXAMINATION TEST

I. Skim the text

In American English, pavement is the durable surfacing of roads and walkways. In British English, pavement usually means a footpath next to a road, the same as sidewalk in American English.

The most common modem paving methods are asphalt and concrete. In the past, brick was **extensively** used, as was metalling. Today, permeable paving methods are beginning to be used more for low-impact roadways and walkways.

Metal or metalling has had two distinct usages in road paving Metalling originally referred to the process of creating a carefully-engineered gravel roadway Road metal later became the name of stone **chippings** mixed with tar to form the road surfacing material tarmac. A road of such material is called a "metalled road" in British usage, and is still a common modem usage Tire word “metal” is derived from the Latin “metallum”, which means both "mine" and "quarry”, hence the road-building terminology.

Asphalt (specifically, asphalt concrete) paving has been widely used since 1920-1930, though in ancient times asphalt was already used for road-building. The viscous nature of the asphalt binder allows asphalt concrete to sustain significant plastic deformation, although fatigue from repeated loading over time is the most common failure mechanism. The actual material used in paving is termed HMA (Hot Mix Asphalt), and it is usually applied using a free floating screed Advantages of asphalt roadways include relatively low noise, relatively low cost compared with other paving methods, and ease of **repair**. Drawbacks include less durability than other paving methods less tensile strength than concrete, as well as the tendency to become very slick in the case of a mild oil spill, and a certain amount of hydrocarbon pollution to soils and waterways.

Concrete pavements (specifically, Portland cement concrete) are created using a concrete mix of Portland cement, gravel, and sand. Cement concrete can be either reinforced or non-reinforced. A common failure mode of concrete pavements is loss of support of the slab edges or comers **due to** erosion of the foundation material Advantages of cement concrete roadways include that they are typically stronger and last longer than asphalt concrete pavements They also can easily be grooved to provide a durable skid-resistant surface. Disadvantages are that they have a higher **initial** cost, are more difficult to repair, and are also generally noisier and less smooth.

metal - зд щебень для дорожно-строительных работ
tarmac - I) щебеночное покрытие или основание с пропиткой битумной связкой 2) дёгтебетон
hence - отсюда
fatigue - усталость
tensile - эластичный, растяжимый
slick - скользкий
to groove - желобить, делать пазы, канавки; прорывать, делать углубление
skid-resistant - нескользкий

II. Decide whether the following sentences are true or false.

1. In American English, pavement is the durable surfacing of roads, walkways and sidewalks.
2 The most common paving methods have been asphalt, concrete, brick, as well as metalling.
3 Later road metal became tire name of metal cuttings mixed with tar to form the road surfacing material tarmac.
4. According to road-building terminology, the word “metal is derived from the Latin “metallum” , which means both "mine" and "quarry".
5. In ancient times asphalt concrete was already used for road-building.
6. Because of the viscous nature of the asphalt binder, asphalt concrete is subjected to significant plastic deformation.
7. Advantages of concrete include relatively low cost compared with other paving methods.
8 The advantage of concrete is its more tensile strength than that of asphalt.
9. Concrete pavements can easily be grooved to provide a durable skid-resistant surface, because they have the tendency to become very slick in the case of a mild oil spill.
10. Because of erosion of the foundation material, a common failure mode of concrete pavements is loss of support of the slab edges or corners.

III. Choose the contextual meaning of the words:

1. extensively	a) широко	b) мало	c) экстенсивно
2. chippings	a) камешки	b)гравий	c)щебенка
3. repair	a) ремонт	b)замена	c)укладка
4. due to	a) благодаря	b) из-за	c) несмотря на
5. initial	a)конечный	b) закупочный	c) начальный

IV. Choose the best alternative to complete these sentences.

1. Nowadays, permeable paving methods are used more for low-impact …
   a) footpaths and sidewalks;
   b) runways ;
   c) roadways and walkways;
2. The Latin “metallum” means …
   a) “metal” or “gravel chippings”;
   b) “metal” or “iron” or “steel”;
   c) "mine" and "quarry";
3. The drawbacks of asphalt paving include …
   a) relatively low noise, relatively low cost, and ease of repair;
   b) high durability, high tensile strength;
   c) the tendency to become very slick in the case of a mild oil spill, and a certain amount of hydrocarbon pollution to soils and waterways;
4. Concrete pavements are created with the use of a concrete mix of …
   a) reinforced concrete, gravel and sand;
   b) Portland cement, gravel, and sand;
   c) Portland cement concrete, gravel and sand;
5. Asphalt concrete pavements …

a) are typically stronger and last longer than cement concrete pavements;
b) are as strong as cement concrete paving;
c) are less strong and last less than cement concrete paving;

Part 2

V. Which sentence means exactly the same?

1. The viscous nature of the asphalt binder allows asphalt concrete to sustain significant plastic deformation, although fatigue from repeated loading over time is the most common failure mechanism.

a) Пористая природа асфальтового связующего вещества является причиной того, что асфальтобетон подвергается значительным пластическим деформациям, а усталость при повторяющихся нагрузках по прошествии длительного времени - это наиболее распространенный механизм разрушения.

b) Твердая природа асфальтового связующего вещества позволяет асфальтобетону сопротивляться значительным пластическим деформациям, хотя усталость при повторяющихся нагрузках по прошествии длительного времени - это наиболее распространенный недостаток данного механизма,

c) Вязкая природа асфальтового связующего вещества позволяет асфальтобетону выдерживать значительные пластические нагрузки, хотя усталость при повторяющихся нагрузках по прошествии длительного времени - это наиболее распространенный механизм разрушения.

2. Drawbacks include less durability than other paving methods, less tensile strength than concrete, as well as the tendency to become very slick in the case of a mild oil spill, and a certain amount of hydrocarbon pollution to soils and waterways.

a) Достоинства включают в себя большую износостойкость, чем у других методов покрытия дороги, большую эластичную прочность, чем у бетона, а также тенденцию оставаться нескользким в случае незначительного разлива масла и отсутствие загрязнения углеводородом почвы и водных путей.

b) Недостатками являются непрочность методов покрытия дороги, небольшая эластичная прочность бетона, а также тенденция покрытия становиться очень скользким в случае незначительного разлива нефти и определенное количество загрязнения углеводородом почвы и водных путей.

c) Недостатки включают в себя меньшую долговечность по сравнению с другими методами покрытия дороги, меньшую эластичную прочность, чем у бетона, тенденцию становиться очень скользким в случае незначительного разлива масла и определенное количество загрязнения углеводородом почвы и водных путей.

VI. Choose the correct grammar phenomena.

Caterpillar equipment gives you the ability to construct access and hauling roads into forestry work areas. Motor Graders, Track-Type Tractors, Hydraulic Excavators and Articulated Trucks, Backhoe Loaders and Vibratory Compactors allows versatility and flexibility (1) ___ your forestry applications needs.

Motor Graders are one of (2) ___ machines in the Caterpillar product line, gives you the ability to construct and maintain forestry access and hauling roads.

Track-Type Tractors offers wide variety of models and configurations, (3)___ them one of the most versatile and productive forestry machines.

Hydraulic Excavators have outstanding versatility and productivity when matched with the right forestry work tool.

Vibratory Compactors (4)___ with versatility in mind for various compaction applications. (5)___it’s maintaining forestry access roads or prepping forested areas. Cat Compactors will meet the required specifications.

1. a) to meet	b) meet	c) meeting	d) met
2. a) the versatilest	b) more versatile	c) most versatile	d) the most versatile
3. a) being made	b) making	c) having been made	d) made
4. a) design	b) designing	c) were designed	d) are designed
5. a) both	b) whether	c) however	d) or

Part 3.

VII. Fill **in the blanks using the words from the list below. There are some extra words that you do not need to use.**

a) surface texture; b) efficient; c) challenge; d) traffic; e) civil engineering; f) standards; g) environment; h) developed; i) important;

Highway engineering is the process of design and construction of (1)__ and safe highways and roads. It became prominent in the 20th century and has its roots in the discipline of (2)___. (3)___ of highway engineering are continuously being improved. Concepts such as grade, (4)___, sight distance and radii of horizontal bends and vertical slopes in relation to design speed and in addition to interchange design are all important elements of highway engineering. Most (5)___nations have extensive highway networks.

Part 4.

VIII. Read the text Choose the best summary.

A road is an identifiable route, way or path between two or more places. Roads are typically smoothed, paved, or otherwise prepared to allow easy travel, though they need not be, and historically many roads were simply recognizable routes without any formal construction or maintenance. In urban areas roads may pass through a city or village arid be named as streets, serving a dual function as urban space easement and route Economics and society depend heavily on efficient roads. In the European Union (EU) 44 % of all goods are moved by tracks over roads and 85% of all persons are transported by cars, buses or coaches on roads to original usage, a "road" was simply any pathway fit for riding. The word “street,” whose origin is the Latin strata, was kept for paved pathways that had been prepared to ease travel in some way. Thus, many "Roman Roads" have the word "street” as part of their name. Roads are a prerequisite for road transport of goods on wheeled vehicles. Words with related usage include Avenue, Boulevard, Court, Freeway, Highway, Lane, Street, Turnpike and Way.

A) In the text the author compares the modem European Union’s roads with those in Ancient Rome; the modern and the ancient meanings and usages of the word “road” are given.

B) In the text the meaning of the word “road” and its etymology are given. The important role of roads for economy and society as a whole is mentioned The author gives a list of synonyms to the word “road"

C) The text is a detailed description of road paving methods. The two English synonyms “road” and “street” are compared and analyzed.

ПРЕДМЕТНО-ТЕМАТИЧЕСКОЕ СОДЕРЖАНИЕ ЗАЧЁТА И ЭКЗАМЕНА

СПИСОК
экзаменационных тем по учебной дисциплине
«Иностранный язык (английский)»
для специальности факультета транспортных коммуникаций
1-70 03 01 «Автомобильные дороги»

1. The History of Roads and Highways.
2. Master Road Builders.
3. Paving Materials.
4. The Road. General Information.
5. Highway Network Planning.
6. Organization of Survey Work.
7. Right-of-Way and Road Cross Section.
8. Pavement Structural Layers.
9. Road Construction.
10. Pavement.
11. Maintenance.
12. Road Junctions and Intersection.
13. Roads: Environmental Aspect.

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ВСПОМОГАТЕЛЬНЫЙ РАЗДЕЛ

УЧЕБНАЯ ПРОГРАММА БНТУ ПО УЧЕБНОЙ ДИСЦИПЛИНЕ «ИНОСТРАННЫЙ ЯЗЫК (АНГЛИЙСКИЙ)»

В ЭУМК представлены выдержки из учебной программы по учебной дисциплине «Иностранный язык (английский)» для специальности 1-08 01 01 Профессиональное обучение (по направлениям), касающиеся направления специальности 1-70 03 01 «Автомобильные дороги»

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УТВЕРЖДАЮ
Проректор по учебной работе
Белорусского национального
технического университета

_____А.Г. Баханович
22.06.2017
Регистрационный № УД-ФЭС 102-13/уч.

ИНОСТРАННЫЙ ЯЗЫК
(английский)

Учебная программа учреждения высшего образования
по учебной дисциплине для специальностей:
1-56 02 01 «Геодезия»;

1-70 03 01 «Автомобильные дороги»;

1-70 03 02 «Мосты, транспортные тоннели и метрополитены»

Учебная программа составлена на основе типовой учебной программы «Иностранный язык», утв. 15.04.2008, рег. № ТД-СГ.013/тип.

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ПОЯСНИТЕЛЬНАЯ ЗАПИСКА

<…>

Учебная программа по учебной дисциплине «Иностранный язык (английский)» разработана для специальностей 1-56 02 01 «Геодезия», 1-70 03 01 «Автомобильные дороги», 1-70 03 02 «Мосты, транспортные тоннели и метрополитены».

Целью изучения дисциплины является формирование иноязычной коммуникативной компетенции будущего специалиста, позволяющей использовать иностранный язык как средство профессионального и межличностного общения.

В процессе достижения главной цели решаются следующие **задачи**:

- *познавательные*, позволяющие сформировать представление об образе мира как целостной многоуровневой системе (этнической, языковой, социокультурной и т.п.); об уровне материальной и духовной культуры; системе ценностей (религиозно-философских, эстетических и нравственных); особенностях профессиональной деятельности в изучаемых странах;
- *развивающие*, позволяющие совершенствовать речемыслительные и коммуникативные способности, память, внимание, воображение, формирование потребности к самостоятельной познавательной деятельности и т.д.;
- *воспитательные*, связанные с формированием общечеловеческих, общенациональных и личностных ценностей, таких как: гуманистическое мировоззрение, уважение к другим культурам, патриотизм, нравственность, культура общения;
- *практические*, предполагающие овладение иноязычным общением в единстве всех его компетенций (языковой, речевой, социокультурной, компенсаторной, учебно-познавательной), функций (этикетной, познавательной, регулятивной, ценностно-ориентационной) и форм (устной и письменной), что осуществляется посредством взаимосвязанного обучения всем видам речевой деятельности в рамках определенного программой предметно-тематического содержания, а также овладения технологиями языкового самообразования.

Учебная дисциплина базируется на знаниях курса средней общеобразовательной школы и связана с «Обзорными лекциями по специальности». Знания и умения, полученные студентами при изучении данной дисциплины, позволяют осуществлять коммуникацию на английском языке в различных ситуациях профессиональных и деловых взаимоотношений, а также выполнять реферирование, аннотирование и перевод профессионально значимых англоязычных текстов и научных работ.

В результате изучения учебной дисциплины «Иностранный язык (английский)» студент должен:

знать:

- систему иностранного языка в его фонетическом, лексическом и грамматическом аспектах;
- социокультурные нормы бытового и делового общения в современном поликультурном мире;
- историю и культуру страны изучаемого языка;
- основные формы культурной коммуникации;

уметь:

- вести общение профессионального и социокультурного характера на иностранном языке, сочетая диалогические и монологические формы речи;
- читать литературу на иностранном языке по профилю обучения (изучающее, ознакомительное, просмотровое и поисковое чтение);
- использовать иностранный язык в качестве инструмента профессиональной деятельности: перевод, реферирование и аннотирование профессионально ориентированных и научных текстов, выступление с публичной речью, составление деловой документации;
- использовать стилистические нормы иностранного языка в соответствии с ситуацией профессиональных или деловых взаимоотношений;

владеть:

- системой иностранного языка в его фонетическом, лексическом и грамматическом аспектах;
- правилами речевого этикета;
- рациональным и эффективным языковым поведением в ситуациях межкультурной коммуникации.

Освоение данной учебной дисциплины обеспечивает формирование следующих компетенций:

АК-2. Владеть системным и сравнительным анализом.

АК-4. Уметь работать самостоятельно.

АК-5. Быть способным порождать новые идеи (обладать креативностью).

АК-6. Владеть междисциплинарным подходом при решении проблем.

АК-7. Иметь навыки, связанные с использованием технических устройств, управлением информацией и работой с компьютером.

АК-8. Обладать навыками устной и письменной коммуникации.

АК-9. Уметь учиться, повышать свою квалификацию в течение всей жизни.

АК-10. Иметь лингвистические и коммуникативные навыки.

СЛК-2. Быть способным к социальному взаимодействию.

СЛК-3. Обладать способностью к межличностным коммуникациям.

СЛК-5. Быть способным к критике и самокритике.

СЛК-6. Уметь работать в команде.

ПК-15. Использовать информационные, компьютерные технологии.

ПК-35. Готовить доклады, материалы к презентациям.

Согласно учебному плану для специальности *1-70 03 01* «Автомобильные дороги» на изучение учебной дисциплины отведено:

- для очной формы получения высшего образования всего 255 часов, из них аудиторных – 136 часов;

Распределение аудиторных часов по курсам, семестрам и видам занятий приведено ниже (Таблица 3).

Таблица 3.

Очная форма получения высшего образования					
Курс	Семестр	Лекции, ч.	Лабораторные занятия, ч.	Практические занятия, ч.	Форма текущей аттестации
1	1			51	зачёт
1	2			34	зачёт
2	3			51	экзамен

<…>

СОДЕРЖАНИЕ УЧЕБНОГО МАТЕРИАЛА

РАЗДЕЛ I. МОДУЛЬ СОЦИАЛЬНОГО ОБЩЕНИЯ

Тема 1.1. Социально-бытовое общение

Личностные характеристики (биографические сведения, работа, хобби и т.д.)

Тема 1.2. Роль иностранного языка в профессиональном общении

Роль иностранного языка в профессиональной деятельности инженера. Роль международного сотрудничества в профессиональной деятельности.

Тема 1.3. Современные технологии и окружающая среда

Экологическая культура. Технический прогресс и глобальные проблемы человечества. Пути решения проблем защиты окружающей среды с точки зрения инженера. Экологические проблемы Беларуси, Великобритании и США в сопоставлении.

Раздел II. МОДУЛЬ ПРОФЕССИОНАЛЬНОГО ОБЩЕНИЯ

Тема 2.1. Учебно-профессиональное общение

Вклад белорусов в мировую науку и технику. Организация инженерного образования в Республике Беларусь и странах изучаемого языка: США и Великобритании. Обучение в университете. БНТУ.

Тема 2.2. Профессиональное общение

Предмет и содержание специальности. Общее представление о структуре и характере профессиональной деятельности. Избранная специальность как отрасль инженерии.

Тема. 2.3. Обмен научно-технической информацией

Обмен-научно-технической информацией (на выставке, конференции). Электронная и постерная презентации.

Тема 2.4. Аннотирование статьи по специальности

Составные части аннотации на иностранном языке. Клишированные фразы для написания аннотации.

Тема 2.5. Реферирование статьи по специальности

Основные части реферата на иностранном языке. Клишированные фразы для написания реферата.

Тема 2.6. Производственное общение

Типичные ситуации производственного общения. Социокультурные нормы делового общения. Профессиональная этика.

Раздел III. ЯЗЫКОВОЙ МАТЕРИАЛ

Тема 3.1. Фонетика

Звуковой строй иноязычной речи в сопоставлении с фонетической системой родного языка: особенности произнесения отдельных звуков (гласных, согласных), звукосочетаний, слов и фраз; расхождение между произношением и написанием; фонетическая транскрипция. Интонационное оформление фраз различного коммуникативного типа: повествования, вопроса, просьбы, приказа, восклицания. Фразовое и логическое ударение в сложном предложении.

Тема 3.2. Имя существительное

Категории числа, падежа, определённости.

Тема 3.3. Имя прилагательное

Категория степеней сравнения. Сравнительные конструкции.

Тема 3.4. Местоимение

Типы местоимений (личные, притяжательные, указательные, вопросительные, неопределённые, возвратные).

Тема 3.5. Числительное

Типы числительных (простые, производные, сложные; количественные порядковые; дробные).

Тема 3.6. Наречие

Типы наречий. Категория степеней сравнения.

Тема 3.7. Глагол

Видо-временная система (действительный, страдательный залог). Модальные глаголы и их эквиваленты. Согласование времён.

Тема 3.8. Неличные формы глагола

Инфинитив. Причастие. Герундий. Конструкции с неличными формами глагола.

Тема 3.9. Словообразование

Словообразовательные модели (существительное, прилагательное, наречие, глагол).

Тема 3.10. Служебные слова

Предлоги. Союзы. Союзные слова.

Тема 3.11. Простое предложение

Типы простых предложений; порядок слов. Члены предложения: способы выражения, правила согласования подлежащего и сказуемого. Специфические конструкции и обороты.

Тема 3.12. Сложное предложение

Типы сложного предложения (сложносочинённое и сложноподчинённое). Типы придаточных предложений. Условные предложения. Бессоюзное подчинение.

Тема 3.13. Прямая и косвенная речь

Правила перевода в косвенную речь предложений разных типов.

Тема 3.14. Профессиональная лексика

Наиболее употребительные слова и словосочетания по предметно-тематическому содержанию курса. Сочетаемость слов; свободные и устойчивые словосочетания. Общенаучная лексика и терминология.

Тема 3.15. Разговорные клише

Знакомство. Установление, поддержание контакта. Выражение просьбы. Выражение согласия, несогласия с мнением автора (собеседника). Начало, продолжение, завершение беседы. Выражение собственного мнения. Запрос о мнении собеседника. Уверенность, неуверенность.

<…>

УЧЕБНО-МЕТОДИЧЕСКАЯ КАРТА УЧЕБНОЙ ДИСЦИПЛИНЫ
***очная форма* получения высшего образования для направлений специальности**
1-70 03 01 «Автомобильные дороги», <…>

Номер раздела, темы	Название раздела, темы	Количество аудиторных часов	Форма контроля знаний
		Практические занятия	
1.	2	3	4
	1 семестр		
1.1	Социально-бытовое общение	4	
1.2	Роль иностранного языка в профессиональном общении	4	
1.3	Современные технологии и окружающая среда	4	
2.1	Учебно-профессиональное общение	8	
3.1	Фонетика	4	
3.2	Имя существительное	4	
3.3	Имя прилагательное	4	
3.10	Служебные слова	2	
3.11	Простое предложение	4	
3.12	Сложное предложение	4	
3.14	Профессиональная лексика	7	
	Итого за семестр	**51**	**зачет**
	2 семестр		
2.2	Профессиональное общение	8	
2.3	Обмен научно-технической информацией	4	
3.4	Местоимение	4	
3.5	Числительное	4	
3.6	Наречие	4	
3.14	Профессиональная лексика	8	
3.15	Разговорные клише	2	
	Итого за семестр	**34**	**зачёт**
	3 семестр		
2.4	Аннотирование статьи по специальности	6	

2.5	Реферирование статьи по специальности	6	
2.6	Производственное общение	6	
3.7	Глагол	6	
3.8	Неличные формы глагола	6	
3.9	Словообразование	6	
3.13	Прямая и косвенная речь	6	
3.14	Профессиональная лексика	6	
3.15	Разговорные клише	3	
	Итого за семестр	**51**	**экзамен**
	Всего аудиторных часов	**136**	

СРЕДСТВА ДИАГНОСТИКИ РЕЗУЛЬТАТОВ УЧЕБНОЙ ДЕЯТЕЛЬНОСТИ (МОДУЛЬ КОНТРОЛЯ)

Для оценки достижений студента рекомендуется использовать следующий диагностический инструментарий:

- устный и письменный опрос во время практических занятий;
- проведение текущих контрольных работ (заданий) по отдельным темам;
- защита выполненных в рамках управляемой самостоятельной работы индивидуальных заданий;
- зачёт;
- экзамен.

ТРЕБОВАНИЯ К РАЗЛИЧНЫМ ЭТАПАМ ДИАГНОСТИКИ КОМПЕТЕНЦИЙ СТУДЕНТОВ

Проверка знаний и умений осуществляется в форме текущего, промежуточного и итогового контроля. *Текущий контроль* предусмотрен программой и осуществляется на аудиторных занятиях с целью проверки уровня владения пройденной частью языкового и речевого материала и степени сформированности коммуникативных навыков и умений. Текущий контроль осуществляется в форме комплексных заданий, лексикограмматических тестов, коллоквиумов, собеседований.

Промежуточный контроль проводится в конце прохождения каждой темы в виде лексико-грамматических тестов и самостоятельной работы по текстам по специальности.

Итоговый контроль носит комплексный характер и проводится в двух формах: зачета и экзамена.

Оценка учебных достижений студентов на экзаменах по дисциплине «Иностранный язык (английский)» производится по десятибалльной шкале. Для оценки учебных достижений студентов используются критерии, утвержденные Министерством образования Республики Беларусь.

ЗАЧЁТ по дисциплине «Иностранный язык (английский)» основывается на результатах текущего и промежуточного контроля и направлен, с одной стороны, на проверку умения работы с текстом, а с другой стороны, – на проверку коммуникативных навыков и умений, приобретенных студентами на соответствующем этапе обучения. Требования к зачету:

Письменная часть

1. Лексико-грамматический тест.
2. Чтение и письменный перевод оригинального общенаучного или общетехнического текста с иностранного языка на родной со словарем. Объем – 1000 печатных знаков. Время выполнения – 45 мин.

Устная часть

1. Подготовленное высказывание по заданной ситуации (10-12 предложений) и неподготовленная беседа с преподавателем в рамках данной ситуации (6-7 реплик).
2. Реферирование оригинального или частично адаптированного культурологического или научно-популярного текста на иностранном языке; беседа на иностранном языке по содержанию текста. Объём текста – 700 печатных знаков. Время выполнения – 10 мин.

ЭКЗАМЕН включает следующие задания:

Письменная часть

1. Лексико-грамматический тест.
2. Чтение и письменный перевод оригинального профессионально ориентированного текста с иностранного языка на родной со словарем. Объём – 1300-1500 печатных знаков. Время – 45 мин.

Устная часть

1. Подготовленное высказывание по заданной ситуации и неподготовленная беседа с преподавателем в рамках данной ситуации (по предметно-тематическому содержанию дисциплины).
2. Реферирование аутентичного или частично адаптированного общественно-политического, культурологического, научно-популярного текста; беседа на иностранном языке по содержанию текста. Объём текста – 900 печатных знаков. Время – 5-7 мин.

МЕТОДИЧЕСКИЕ РЕКОМЕНДАЦИИ ПО ОРГАНИЗАЦИИ И ВЫПОЛНЕНИЮ САМОСТОЯТЕЛЬНОЙ РАБОТЫ СТУДЕНТОВ

При изучении дисциплины рекомендуется использовать следующие формы самостоятельной работы:

- подготовка сообщений, тематических докладов, презентаций по заданным темам;
- проработка тем (вопросов), вынесенных на самостоятельное изучение.

МЕТОДЫ (ТЕХНОЛОГИИ) ОБУЧЕНИЯ

Основными методами (технологиями) обучения, отвечающими целям изучения дисциплины, являются:

- *проектная технология*, представляющая самостоятельную, долгосрочную групповую работу по теме-проблеме, выбранную самими студентами, включающую поиск, отбор и организацию информации. В процессе работы над проектом речевое иноязычное общение «вплетено в интеллектуально-эмоциональный контекст другой деятельности»;
- *кейс-технология*, основу которой составляют осмысление, критический анализ и решение конкретных социальных проблем. Кейс-технология ориентирована на развитие способности студентов решать определенные жизненные ситуации, важные повседневные проблемы, с которыми они непосредственно сталкиваются в жизни;

– *симуляция*, которая применительно к иностранному языку представляет собой подражательное, разыгранное воспроизведение межличностных контактов, организованных вокруг проблемной ситуации, максимально приближенной к реальной;

– *технология обучения в сотрудничестве*, предполагающая создание условий для активной совместной учебной деятельности студентов в разных учебных ситуациях. Это обучение в процессе общения студентов друг с другом и с преподавателем при наличии общей цели и индивидуальной ответственности каждого члена группы за собственный вклад в общее дело, за выполнение общего задания;

– *технология дебатов*, представляющая собой полемический диалог, проходящий по определенному сценарию и имеющий целью убеждение третьей стороны – судей или аудитории.

– *компьютерные технологии*, предполагающие широкое использование Интернет-ресурсов и мультимедийных обучающих программ. Компьютерные технологии позволяют интенсифицировать и активизировать учебно-познавательную деятельность студентов, эффективно организовать и спланировать самостоятельную работу, совершенствовать контрольно-оценочные функции (компьютерное тестирование).

<…>

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