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SCIENCE AND TECHNOLOGY

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Метою посібника є навчання читання та розуміння науково-популярних текстів, засвоєння загальнонаукової лексики, формування навичок говоріння з широкого кола тем з галузі науки і техніки. Ефективне практичне оволодіння мовою забезпечується системою лексичних і комунікативних вправ, що стимулюють інтерес і творчу діяльність тих, хто вивчає мову.

Посібник призначений для студентів молодших курсів технічних ВНЗ, а також для широкого кола тих, хто вивчає й удосконалює англійську мову.

SCIENCE AND TECHNOLOGY

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Передмова

Пріоритетною сферою інтересу й уваги у вищому технічному навчальному закладі є галузь науки і техніки.

Наука є однією із визначних особливостей сучасної культури і, можливо, найбільш динамічним її компонентом. Неможливо обговорювати соціальні, культурні, антропологічні проблеми, якщо не брати до уваги розвиток наукової думки. Наука – це сфера людської діяльності, метою і змістом якої є пізнання світу як єдиної системи на основі експериментів і реальних суджень. У якості соціально-мобілізуючої сили наука використовується для здійснення програм соціально-економічного розвитку, а також для вирішення глобальних проблем сучасності.

Первинним у розумінні природи науки і техніки є їхній вплив на саму людину, на систему її інтересів, потреб і можливостей до дії в організації свого буття і його вдосконалення.

Сучасний фахівець повинен бути підготовлений так, щоб іти в ногу з прогресом науки і техніки, мати повну інформацію про всі, у тому числі новітні, досягнення у своїй галузі і мати досить глибокі знання відповідних фундаментальних наук, уміючи все це використовувати на практиці. Фахівець має застосовувати весь арсенал сучасних наукових методів для досягнення необхідних результатів у конкретній сфері, легко адаптуючись при цьому до умов, які змінюються. Це завдання може бути вирішено тільки на базі міцної фундаментальної освіти.

Наукове спілкування в сучасному світі відбувається здебільшого англійською мовою. Також переважна частина наукової інформації стає доступна англійською мовою, яка останнім часом отримала статус міжнародної.

Для організації ефективного професійно - зорієнтованого спілкування і розуміння інформації зі спеціальності необхідна спеціальна підготовка, що і є головним завданням навчання іноземної мови у ВТНЗ. Одним із основних

компонентів такої підготовки є оволодіння науковою термінологією за відповідною спеціальністю. Але, на наш погляд, на перших порах автентичні матеріали повинні мати науково-популярний характер, бути зрозумілими не тільки для студентів як майбутніх спеціалістів певного фаху, але й для викладача іноземної мови, який, як правило, не має додаткової технічної освіти. Тільки після того, як студенти привчаються легко оперувати загальнонауковою лексикою в рецептивних і продуктивних видах діяльності, доцільно переходити до роботи з вузькопрофільними матеріалами.

Наука замінила звичайні слова універсальною термінологією, при цьому величезна кількість наукових досліджень у світі проводиться на межі декількох галузей знання: фізики, хімії, біології, медицини, інформатики тощо. Звідси виникає кілька причин, через які доцільним є випередити у ВТНЗ навчання вузькопрофільної лексики роботою із загальнонауковою або науково-популярною літературою. По-перше, більшість випускників шкіл, які стають студентами технічних ВНЗ, взагалі незнайомі із загальнонауковою лексикою, тому робота зі спеціальними текстами, навіть якщо вони адаптовані, часто викликає значні труднощі. По-друге, науково-популярна література містить велику кількість таких загальнотехнічних термінів, які студент неминуче зустріне в майбутньому як фахівець під час роботи з літературою як за своєю спеціальністю, так і суміжними спеціальностями, які згодом можуть увійти у сферу його професійних інтересів. По-третє, у світлі сучасних тенденцій гуманізації освіти однією із задач іноземної мови як навчальної дисципліни є розширення світогляду, підвищення загальної ерудиції студентів, що стає можливим при знайомстві майбутнього фахівця з досягненнями людства у всіх галузях науки, а не тільки у сфері його спеціалізації.

Таким чином, курс профільно-зорієнтованого навчання іноземної мови в технічному ВНЗ раціонально складати з двох етапів: на першому студенти працюють із матеріалами загальнонаукового характеру, які охоплюють

різноманітні галузі наукового знання, створюючи той самий фундамент, на якому пізніше, на другому етапі, засвоюється конкретний вузькоспеціалізований курс для конкретної групи майбутніх фахівців.

Прикладом матеріалів загальнонаукового характеру є пропонований посібник англійською мовою «Science and Technology», який включає 30 текстів на найрізноманітніші науково-популярні теми. Посібник призначений для студентів молодших курсів технічних ВНЗ, а також для широкого кола тих, хто вивчає й удосконалює англійську мову. Він складається з трьох частин. У першій частині – «Великі винаходи» – студенти знайомляться з основними етапами розвитку техніки і технологій, основними досягненнями наукової думки за всю історію розвитку людства. У другій частині – «Як працює техніка» – викладені основні принципи роботи найпопулярніших технічних пристроїв. У третій частині – «Найвидатніші винахідники всіх часів» – описані долі деяких великих учених і винахідників різних епох.

Кожен текст забезпечений набором до- і післятекстових завдань як лексичного, так і комунікативного характеру. Практика роботи з даним посібником свідчить, що інформація, яка міститься в науково-популярних текстах, викликає інтерес студентів ВТНЗ різних профілів і спеціальностей, а робота з ними може розглядатися як початковий етап навчання спеціалізованої англійської мови у технічному ВНЗ будь-якого профілю.

Автор висловлює надію, що придбані студентами знання будуть використані в їхній майбутній професійній діяльності, розширять кругозір, підвищать рівень володіння англійською мовою.

PART II. HOW THINGS WORK

UNIT 11. METALS

Word list:

1.	shape	форма
2.	to roll	прокатувати, валькувати
3.	to hammer	кувати, чеканити
4.	fairly	досить
5.	sheet	лист
6.	strength	сила
7.	hardness	міцність
8.	soft	м'який
9.	weak	слабкий
10.	pure	чистий
11.	to mix	змішувати, з'єднувати
12.	copper	мідь
13.	to melt	плавити, сплавляти
14.	to conduct, conductor	проводити, провідник
15.	vibrations	коливання
16.	readily	швидко
17.	rod	стрижень, прут
18.	wood, wooden	дерево (як матеріал), дерев'яний
19.	handle	рукоятка
20.	manner	образ дії, спосіб

Task 1. Match the words with close meaning:

1.	strength	a.	way

2.	readily	b.	alloy
3.	shape	c.	rather
4.	pure	d.	quickly
5.	fairly	e.	clean
6.	manner	f.	form
7.	mix	g.	force

Task 2. Make up possible word-combinations with the words from A and B:

A.	1.	conduct	b.	a.	sheet
	2.	roll		b.	heat
	3.	white		c.	material
	4.	copper		d.	point
	5.	soft		e.	metal
	6.	weak		f.	object

Task 3. Complete the table:

Verb	**Noun**
vibrate	
	hammer
shape	
	conductor
harden	
	mixture

Task 4. Match the following definitions with one of the words from the Word list:

1. a thin straight piece of material, such as metal or wood, often having a particular function;
2. to be changed from a solid to a liquid state;
3. the part of trees that have been cut and prepared for use as a building material;
4. the part that is designed to be held or operated with the hand;
5. a single cycle of a periodic motion.

Task 5. Translate into English:

1. Колір і форма дуже важливі, якщо ви робите іграшки для дітей.
2. Люди почали карбувати монети з металу багато століть тому.
3. Це слабка команда, ви можете легко виграти матч.
4. Я їй не вірю, це чиста брехня.
5. Раніше посуд виготовляли з міді.
6. Більшість металів є хорошими провідниками тепла.
7. Ми повинні виготовити дуже міцні стрижні, щоб провести цей експеримент.

Task 6. Read the text and decide if the statements below are true (T) or false (F):

Metals

Metals are worked into the shape needed by rolling or hammering them while hot. When the metal has been rolled into fairly thin sheets (such as for motor vehicle bodies or aluminum saucepans), further heating is unnecessary and shaping is done in a press while cold.

The strength and hardness of metals can be controlled by alloying and heat treatment. A metal is usually at its softest and weakest when pure and can be strengthened by alloying (mixing) with another metal. For example, pure copper and pure tin are soft and weak, but if the two are melted together they make bronze, a hard, strong alloy.

Most metals are good conductors of heat because the atoms are closely packed in the crystal, and vibrations involved in the conduction of heat are readily passed on through the structure. If you held an iron rod with one end in a fire, the other end would soon become hot. On the other hand, an iron rod with a wooden handle can be held in the same manner for a long time without getting hot because wood is a poor conductor of electricity.

1.	Motor vehicle bodies are produced from fairly thin sheets of metals.	T/F
2.	Pure copper and pure tin are usually soft and strong.	T/F
3.	Bronze is a hard strong alloy made of copper and tin.	T/F
4.	Wood is a good conductor of electricity.	T/F

Task 7. Match the sentences halves 1 – 4 with a – d:

1.	If you held an iron rod with one end in a fire	a.	by alloying with another metal.
2.	Alloying and heat treatment	b.	by rolling or hammering them while hot.
3.	Metals are worked into shape	c.	the other end would soon become hot.
4.	A metal can be strengthened	d.	can control the strength and hardness of metals.

Task 8. Tell what you have learnt about the following:

1) how metals are worked into a shape;

2) how metals are made stronger and harder;

3) why metals conduct heat.

UNIT 12. NUCLEAR POWER

Word list:

1.	to unleash	звільнити (енергію), дати волю
2.	shoot (shot)	вистрілювати
3.	nucleus	ядро
4.	split (split)	розщеплювати
5.	to release	звільняти, випускати
6.	to contain	містити, включати
7.	to make up	становити
8.	charge	заряд, заряджати
9.	to generate	виробляти
10.	to explode, explosion	підривати, вибух
11.	dust	пил
12.	dirt	бруд
13.	to carry	нести, переносити
14.	to drift	відносити вітром, дрейфувати
15.	eventually	нарешті
16.	deadly	смертельний
17.	fallout	опади
18.	accident	аварія, подія
19.	huge	величезний
20.	to escape	вириватися, давати витік
21.	creature	істота

Task 1. Match the words with close meaning:

1.	generate	a.	finally
2.	eventually	b.	include
3.	unleash	c.	crash
4.	huge	d.	produce
5.	contain	e.	release
6.	accident	f.	great

Task 2. Complete the table:

Noun	**Verb**
explosion	
	charge
shooter	
	create
generation	
	make up

Task 3. Match the words with their definitions:

1.	dirt	a.	a central part around which other parts are gathered
2.	dust	b.	divide from end to end
3.	nucleus	c.	any unclean substance, soil
4.	split	d.	extreme or terrible
5.	drift	e.	a cloud of dry particles
6.	deadly	f.	be carried along by air or water

Task 4. Translate into English:

1. Атомна бомба стала найнебезпечнішою смертельною зброєю 20го століття.
2. Чому ти так швидко вчора зник з вечірки?
3. Вчені навчилися розщеплювати ядро на більш дрібні частинки.
4. Допомогти вам нести сумку?
5. Після вибуху радіоактивні опади покрили величезну територію.
6. Нарешті, ми прибули на місце.

Task 5. Scan the text. Put the main ideas (A – E) in the same order as they are in the text:

A. Uses of nuclear energy.

B. Composition of the atom.

C. The Chernobyl accident.

D. Scientists unleashed the energy of the atom.

E. Consequences of the atomic explosion.

Nuclear Power

In the 1940s, scientists tried to unleash the energy stored inside the atom. Their plan was simple: if high-speed particles could be shot into the nucleus of an atom, the nucleus would split into two smaller atoms releasing a great amount of energy.

The nucleus contains most of an atom's mass. It is made up of two kinds of particles called "protons" and "neutrons". Protons have a single positive charge – the kind of charge that marks the positive end of a battery, which is marked with a (+) sign. Neutrons have no electrical charge. Scientists have come to believe that both protons and neutrons are made up of smaller particles called "quarks". Each proton and neutron is made up of three quarks.

There are many uses for the energy that is generated by splitting the atom or atomic energy. It was used in atomic bombs. It is also used in atomic power plants that produce electricity, for ships and submarines.

An atomic explosion draws dust and dirt into the giant mushroom-shaped cloud that rises over the place where the bomb went off.

As this happens, this dirt and dust are covered with radioactive particles, which are carried up into the atmosphere to drift around with the wind. Eventually, they fall back to the earth – far from where the bomb exploded. These deadly radioactive particles are called "fallout".

In 1986, there was an atomic accident in what was then the Soviet Union, at Chernobyl, near Kiev. One day in April, there was an explosion inside the

nuclear reactor. A huge cloud of radioactive particles escaped from the reactor, which swept westward and northward, covering much of Europe. Thousands of people were killed in the Soviet Union, and 200.000 were taken from their homes for their own safety. Even worse, millions of people and other creatures were exposed to the possibly deadly radiation that made its way as far away as Scandinavia.

Task 6. Read the text again to find answers to the following questions:

1. What happens to the nucleus of an atom when it is shot with high-speed particles?
2. What is the nucleus made up?
3. What are the main uses of nuclear energy?
4. How is fallout formed?
5. What did the Chernobyl accident cause?

Task 7. Find one meaningful mistake in each sentence and correct it:

1. For releasing a great amount of energy the nucleus should be split into three smaller atoms.

2. Quarks are bigger than protons and neutrons.

3. Dust and dirt covered with radioactive particles fall near the place where the bomb exploded.

4. Only people were exposed to the deadly radiation after the Chernobyl accident.

Task 8. Sum up the information from the text completing the following sentences:

1. Scientists learnt to unleash the energy of the atom in … .
2. The nucleus is made up of … .
3. Both protons and neutrons consist of … .
4. Atomic energy is used in … .

5. On the place where the bomb exploded there appears … .
6. After the explosion inside the nuclear reactor in Chernobyl a huge cloud of radioactive particles … .
7. Millions of people and other creatures were exposed to … .

UNIT 13. SPACE EXPLORATION


Word list:

1.	exploration	дослідження
2.	to orbit	обертатися по орбіті
3.	to land	приземлятися
4.	tranquility	спокій
5.	step	крок
6.	giant	гігантський
7.	leap	стрибок, плиг
8.	mankind	людство
9.	rock	порода (кам'яна)
10.	shuttle	човник
11.	reusable	багаторазового використання
12.	aircraft	літак
13.	to broadcast	передавати, транслювати
14.	to forecast	прогнозувати
15.	survey	спостереження, обстеження
16.	to detect	виявляти
17.	deposits	поклади, родовища
18.	to aid	допомагати
19.	reconnaissance	розвідка
20.	intelligence	дані
21.	Layer	шар

Task 1. Match the words with close meaning:

1.	aircraft	a.	humanity
2.	exploration	b.	observation
3.	survey	c.	data

4.	step	d.	plane
5.	mankind	e.	stage
6.	leap	f.	research
7.	intelligence	g.	jump

Task 2. Find the word opposite in the meaning to the first word of the line:

1. broadcast	a) permit	b) repeat	c) receive
2. land	a) take off	b) take out	c) take over
3. tranquility	a) noise	b) excitement	c) tiredness
4. giant	a) big	b) great	c) tiny
5. detect	a) lose	b) loss	c) lost
6. aid	a) refuse	b) prevent	c) oppose

Task 3. Make up possible word-combinations with the words from A and B:

A.	1.	orbit	b.	a.	apparatus
	2.	hard		b.	weather
	3.	reusable		c.	deposits
	4.	space		d.	intelligence
	5.	forecast		e.	the earth
	6.	coal		f.	rock
	7.	reconnaissance		g.	layer
	8.	thick		h.	shuttle

Task 4. Translate into English:

1. Винахід комп'ютерів став великим стрибком у розвитку науки і промисловості.

2. Людство завжди пам'ятатиме імена великих учених, які зробили сьогоднішню цивілізацію можливою.

3. Ти чув передачу останніх новин? У Японії вибухнув ядерний реактор.

4. Після довгої перевірки група експертів змогла виявити кілька помилок в роботі системи.

5. Фахівці вже почали розробляти нове родовище золота.

6. Він допоміг нам виконати роботу вчасно.

Task 5. Scan the text. Put the main ideas (A – D) in the same order as they are in the text:

A. How artificial satellites can be used.

B. Landing the first humans on the moon.

C. Launching the first satellites.

D. First shuttle going into orbit.

Space Exploration

The first unmanned satellite was Sputnik 1. It was launched by the Soviet Union on October 4, 1957. It was soon followed by Sputnik 2 in November of 1957. The second satellite carried the dog Laika, which was the first living creature to orbit Earth. The first American satellite, Explorer I, was launched in January 1958.

Apollo 11 was the first spacecraft to land humans on the moon. On July 20, 1969, the lunar module Eagle, carrying Neil Armstrong and Edmir Aldrin, landed in the area known as the Sea of Tranquility. Armstrong became the first man to set foot on the moon with the words, "That's one small step for a man, one giant leap for mankind". Together with Aldrin, Armstrong spent about two hours outside the spacecraft, taking photographs, setting up scientific experiments, and collecting rock samples.

A new era in space exploration began on April 12, 1981, when the American space shuttle first went into orbit. It was the first reusable spacecraft that was able to fly back from space and land like an aircraft. Mainly used to launch satellites, the shuttle flights also carried specially designed payloads. One was spacelab, a reusable space laboratory built by the European Space Agency.

There are many different kinds of artificial satellites. Communications satellites are used for broadcasting, telephone, and radio. Weather satellites are helpful in weather forecasting. Earth survey satellites detect mineral deposits, diseased crops, and sources of pollution, and aid in the making of maps. Military satellites are used for reconnaissance and intelligence gathering. Astronomical satellites, which are observatories in space, orbit above the blanketing layer of the earth's atmosphere.

Task 6. Read the text again and say what the following dates from the text are associated with:

- ✓ January, 1958
- ✓ April 12, 1981
- ✓ October 4, 1957
- ✓ July 20, 1969
- ✓ November, 1957

What very important date is not mentioned in this text compiled by the Americans?

Task 7. Make up four questions to the text, one to each of its parts.

Task 8. Tell about the history of space exploration in the chronological order.

UNIT 14. ELECTRICITY

Word list:

1.	spark	іскра
2.	to glow	сяяти
3.	medium	середа
4.	to flow	текти
5.	excellent	відмінно
6.	thunderstorm	гроза
7.	lightning	блискавка
8.	to knock	вдарити
9.	to rub	терти
10.	to insulate, insulator	ізолювати, ізолятор
11.	rubber	гума
12.	to resist	чинити опір
13.	cell	елемент, батарея
14.	plate	пластина
15.	acid	кислота
16.	liquid	рідина
17.	wire	провід
18.	current	струм
19.	circuit	електричний ланцюг
20.	since	так як
21.	switch	вимикач
22.	to interrupt	переривати
23.	gap	зазор, розрив
24.	power plant	електростанція
25.	switchgear	розподільний пристрій, перемикач
26.	pressure	тиск
27.	voltage	напруга

28.	to reduce	скорочувати
29.	to deliver	доставляти
30.	thermal plant	теплова електростанція
31.	oil	нафта
32.	waterfall	водоспад
33.	dam	дамба
34.	suitable	підходящий
35.	coil	котушка

Task 1. Match the words with close meaning:

1.	resist	a.	perfect
2.	medium	b.	cut
3.	since	c.	fluid
4.	knock	d.	oppose
5.	pressure	e.	environment
6.	excellent	f.	because of
7.	liquid	g.	beat
8.	reduce	h.	stress

Task 2. Complete the table:

Noun	**Verb**
rubber	
	insulate
	spark
flow	
	switch
delivery	

Task 3. Make up possible word-combinations with the words from A and B:

A.	1.	summer	B.	a.	plant
	2.	electric		b.	talk
	3.	suitable		c.	voltage
	4.	thermal		d.	lightning
	5.	high		e.	thunderstorm
	6.	bright		f.	current
	7.	glowing		g.	room
	8.	interrupt		h.	star

Task 4. Translate into English:

1. Ця пластина зроблена з алюмінієвого сплаву.
2. Сполучення стало неможливим, оскільки дріт був пошкоджений.
3. Електричний ланцюг складається з лампочки, батареї і вимикача.
4. Хто може полагодити перемикач?
5. Розрив у їх відносинах збільшувався з кожним днем.
6. Вони стояли на майданчику і милувалися видом водоспаду.

Task 5. Match the words with their definitions:

1.	dam	a.	a series of connected spirals
2.	power plant	b.	a substance having a sour taste
3.	coil	c.	a barrier constructed across a waterway to control the level of water
4.	acid	d.	a substance commonly used as fuel
5.	oil	e.	a complex of structures, machinery and equipment for generating electric energy

Task 6. Scan the text and choose the correct answers to questions 1 – 4 below:

1. Why is it dangerous to swim during a thunderstorm?

a. Because you may catch a cold.

b. Because water is a good conductor of electricity.

2. What is lightning?

a. It’s electricity.

b. It’s tiny particles of ice and drops of water.

3. How does an electrical switch act?

a. It keeps the electricity flowing through the circuit.

b. It interrupts the flow of electricity.

4. What voltage is used in homes in Great Britai?

a. Between 220 and 250 volts.

b. Between 200 and 250 volts.

Electricity

If an object is highly charged with electricity, tiny particles of electricity may jump off it. These electrons, as they are called, actually form a spark. That spark is nothing more than the glowing path made by millions of electrons as they jump through the air.

In the world of electricity, a conductor is a medium that electricity flows through quite easily. Water is an excellent conductor of electricity – which is why you are always told not to swim during a thunderstorm. Most metals are also good conductors of electricity.

Lightning is really nothing more than electricity – scientists believe that lightning is produced when tiny particles of ice and drops of water inside a cloud are tossed around and knocked against each other by the wind. When they rub against one another, they produce an electrical spark, sending lightning down from the cloud.

An insulator is a medium that does not conduct electricity well. Rubber, glass, plastic, and dry air resist the flow of electricity and can be used to insulate objects from electricity flow.

Batteries are simple devices. They consist of two or more "cells". The simplest cells are made up of plates of two different kinds of metal, which are kept in salty or acid liquid. When the two plates are connected by a wire, electrical current flows between them.

An electrical circuit is a path going from one place to another that allows electricity to pass through it. The "path" is usually made of metal wire, since it conducts electricity very well.

An electrical switch is simply a device that interrupts the flow of electricity. It usually does this by creating a gap in the wiring of the circuit. This keeps the electricity from flowing all the way through the circuit until the switch is closed again.

Electricity is first made in huge power plants. It flows through a switchgear, which controls its flow and cuts it off if there are any problems along the miles of wires ahead. From here, it goes to a transformer, which increases the pressure so that it can be sent over long distances. High voltage lines then carry the electricity to an area near to where it will be used. The power goes on to a substation, where other transformers reduce the electrical pressure (or "voltage" as it is called), so that it can be safely used. Finally, it is delivered over other wires to your home, business, store, and every other place that uses it.

We measure electric pressure – the amount of electricity flowing through a circuit - in volts. In the United States, most circuits in homes, are set up to run with 110 volts; heavy – duty circuits for washing machines, dryers, and dishwashers are set to have 220 volts. In Great Britain, homes use between 200 and 250 volts.

There are two main kinds of power plants. *Thermal plants* use steam turbines to drive generators to make electricity. The steam to drive these turbines comes from burning fuel like oil or coal or even from a nuclear reactor. *Hydroelectric plants* use falling water from a waterfall or dam to drive the turbines. The difficulties with hydroelectric plants is finding a suitable location – they must be built where the water flow is suitable and where they would be close to the towns or factories that need the power.

A *generator* is a simple device for making electricity. The very first one was made in 1831 by Michael Faraday, an English scientist. Faraday moved a magnet close to a coil of wire, discovering that action made electrical current flow through the wire. Ever since, generators, or dynamos, as they are sometimes called, have been used to make electricity for everything from homes to ships.

Task 7. Match the sentences halves 1 – 8 with a – h:

1.	We measure	a.	that does not conduct electricity well.
2.	Thermal plants use steam	b.	that consist of two or more cells.

	turbines		
3.	Lightning is produced	c.	made of metal wire.
4.	The difficulties with hydroelectric plants	d.	to drive generators to make electricity.
5.	An insulator is a medium	e.	are good conductors of electricity.
6.	Batteries are simple devices	f.	when tiny particles of ice and drops of water rub against one another.
7.	An electric circuit is a path	g.	is finding a suitable location.
8.	Most metals	h.	electric pressure in volts.

Task 8. Get ready to explain

a) the nature of the following:

- ✓ conductor
- ✓ lightning
- ✓ insulator
- ✓ electric circuit
- ✓ generator

b) how the following works:

- ✓ battery
- ✓ switch
- ✓ transformer
- ✓ thermal plant
- ✓ hydroelectric plant.

UNIT 15. LIGHT

Word list:

1.	per (second)	за (секунду)
2.	to slow down	гальмувати, уповільнювати
3.	to depend on	залежати від
4.	substance	речовина
5.	ray	промінь
6.	wave	хвиля
7.	intense	інтенсивний, сильний
8.	regular	звичайний
9.	ordinary	звичайний
10.	coherent	зв'язний, погоджений
11.	film	плівка
12.	to coat	вкривати
13.	to absorb	вбирати, адсорбувати
14.	to develop	проявляти (плівку)
15.	to strike (struck, stricken)	вдарити
16.	to account for	пояснювати
17.	visible	видимий

Task 1. Match the words with close meaning:

1.	ray	a.	strong
2.	regular	b.	knock
3.	slow down	c.	explain
4.	account for	d.	accorded
5.	intense	e.	cover
6.	coat	f.	brake
7.	coherent	g.	beam
8.	strike	h.	ordinary

Task 2. A. Translate into English:

- ✓ за секунду
- ✓ за хвилину
- ✓ за годину
- ✓ на рік
- ✓ на місяць

B. Find an equivalent for each expression in Latin:

1.	per annum	a.	на тисячу
2.	per capita	b.	щорічно
3.	per diem	c.	процент
4.	per mille	d.	на душу населення
5.	per cent	e.	з іншого боку
6.	per contra	f.	в день

Task 3. Fill in the gaps with the suitable words from the box:

depends	substance	absorb
film	wave	visible

1. This _____ can be found very seldom in nature.
2. The distance covered _____ on the time and the speed of the vehicle.
3. Greek plants are considered very useful for their ability to _____ carbon dioxide.
4. After developing the _____ he was pleased to see how many beautiful views he had taken.
5. Suddenly he was covered with the huge _____ .
6. He switched on the headlamps and the part of the road became _____ .

Task 4. Translate into English:

1. Вона зазвичай збавляє швидкість, коли проїжджає повз це місце.
2. Він сказав, що все буде залежати від результатів досліджень.
3. Ми виграли завдяки узгодженим діям усіх членів команди.

4. За його ідеями пішла інтенсивна експериментальна робота.
5. Діти в цьому віці легко вбирають будь-яку інформацію.
6. Вугілля - звичайне джерело тепла в цьому регіоні.
7. Чим вкрита поверхня цього виробу?

Task 5. Scan the text and match the questions (A – E) with the related paragraph. Then answer these questions:

A. What makes lasers powerful?
B. What accounts for different colors and shapes on the photo?
C. What does the speed of light depend on?
D. What makes light visible?
E. What is the term “radiation” used for in science?

Light

Light travels at a speed of 300,000 km per second when it travels in outer space or in an area without air to slow it down. Light, as you know, travels at different speeds, depending on what it is traveling through. It would be slower through water, glass or other substances.

The term *radiation* comes to us from the Latin word "radius" meaning "beam" or "ray". In science, radiation is the term used for anything that travels by waves – light, heat, X rays, or even cosmic rays.

Lasers can send an intense beam over long distances because they are different from regular light in one important way. Ordinary light contains waves vibrating in several different directions. Lasers are coherent – all of their waves are vibrating in the same direction at the same time. This makes them powerful and intense - able to do everything from burn their way through metal to "read" the message coded onto the surface of a CD disc.

Photography film is coated with crystals of silver bromide. Energy from light is absorbed by these crystals. As this happens, they are changed so that when the film is developed the crystals that have been struck by light will react

differently from those that have not been struck by light. This accounts for the different colors and shapes that you see in the finished picture.

Visible light is made up of radiation with wavelengths that are a little longer than those of ultraviolet rays. It runs from about 400 nanometers, which is the color violet, up to about 740 nanometers, the color red.

Task 6. Read the text again and decide if the statements below are true (T) or false (F):

1.	Light travels fast in outer space than in other medium.	T/F
2.	Cosmic rays travel by waves.	T/F
3.	Ordinary light contains waves vibrating in the same direction at the same time.	T/F
4.	Photography film is coated with crystals which absorb energy from light.	T/F
5.	Ultraviolet rays are longer than waves of visible light.	T/F

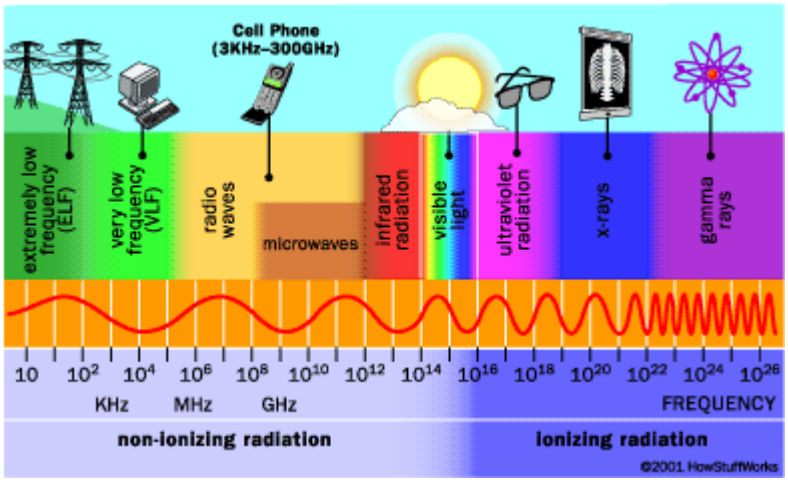
Task 7. Restore the questions to the following answers:

1. 300,000 km per second.
2. Beam or ray.
3. Everything from burning their way through metal to reading the coded messages.
4. With crystals of silver bromide.
5. From 400 to 740 nanometers.

Task 8. Give short characteristics of

- ✓ light;
- ✓ radiation;
- ✓ lasers;
- ✓ principles of photographic film development.

UNIT 16. RADIATION SPECTRUM



Word list:

1.	frequency	частота
2.	ultraviolet	ультрафіолетовий
3.	skin	шкіра
4.	shadow	тінь
5.	bone	кістка
6.	to cause	викликати, бути причиною
7.	cancer	рак
8.	extremely	надзвичайно
9.	damage	збиток
10.	cell	клітина (організму)
11.	however	однак
12.	stream	потік
13.	whenever	будь-який раз, коли
14.	to tap	стосуватися
15.	oscillation	коливання, вібрація
16.	distance	відстань
17.	in order to	для того, щоб
18.	to solve (e.g. the problem)	вирішувати (напр., проблему)
19.	surface	поверхня
20.	exactly	точно

Task 1. Make up possible word-combinations:

1.	broken	a.	skin
2.	lung	b.	rays
3.	high	c.	surface

4.	solve	d.	distance
5.	ultraviolet	e.	cancer
6.	cover	f.	frequency
7.	burnt	g.	bone
8.	shining	h.	task

Task 2. Match the words with close meaning:

1.	cause	a.	touch
2.	damage	b.	vibration
3.	whenever	c.	definitely
4.	tap	d.	destruction
5.	oscillation	e.	result
6.	exactly	f.	every time

Task 3. Fill in the gaps with the suitable words from the box:

shadow	cells	stream
however	extremely	in order to

1. The Gulfstream is a warm _____ in cold Atlantic waters.
2. _____ calculate the speed of the body one must divide distance by time.
3. One day scientists will find the medicine which can stop the growth of cancer _____ .
4. They were sitting in the _____ of trees talking quietly.
5. He had promised not to be late many times, _____ he was late again.
6. The chief said he was _____ pleased with the results of our common activities.

Task 4. Translate into English:

1. Усякий раз, коли я бачу його, я згадую той кумедний випадок.
2. Він пообіцяв, що проблема скоро буде вирішена.
3. Радіо працює на різних частотах.
4. Поверхня води біля берега була вкрита тонкою плівкою нафти.
5. Плівка показує, що кістка поламана в декількох місцях.

6. Цей вибух заподіяв величезної шкоди навколишньому середовищу.
7. Делегація прибула, щоб обговорити питання відкриття філії своєї компанії в нашому місті.

Task 5. Scan the text and choose the correct answers to questions 1–4 below:

1. Where are X rays widely used?

a. In construction.

b. In medicine.

2. What are the shortest waves of radiation spectrum?

a. X rays.

b. Gamma rays.

3. What waves did Marconi use to send sound from place to place?

a. Microwaves.

b. Electromagnetic waves.

4. What is used for radio or TV programs to be received well?

a. Satellites.

b. Towers.

Radiation Spectrum

Gamma Rays	*High Frequency*
X Rays	
Ultraviolet	
Visible Light	
Infrared	_____
Microwaves	*Low*
Radio Waves	*Frequency*

X Rays pass through many kinds of materials that reflect light. When an object is exposed to X rays, we can often see right inside. When a broken arm is placed between a source of X rays and a piece of photographic film, the X rays

pass right through a person's clothing and skin to show us a picture of a dark shadow that is actually the person's bone. As you probably know, X rays are very valuable in medicine.

Sunburn occurs when too much ultraviolet light comes in contact with the skin. This can lead to more than just redness and discomfort, since scientists now believe that long exposure to ultraviolet light can cause skin cancer.

The beta rays that come from radioactive materials are extremely dangerous. They can cause burning as well as skin cancer. Gamma rays (the shortest waves of all) and X rays can cause even more damage. In small doses, they are often used to kill dangerous cells, like cancer cells, within the body. Long contact with them, however, can kill healthy cells and cause permanent damage to the body.

When Guglie Marconi showed the world his first wireless "radio" in 1896, it made use of electromagnetic waves to send sound from place to place. Marconi's device was simple. It had a coil connected to a battery, which caused high voltage across two metal spheres. Because of the presence of electricity in the spheres, a stream of sparks jumps across the gap between them whenever Marconi tapped an electrical switch. This stream of sparks sent vibrations, or oscillations, up an antenna–and out into the atmosphere.

Radio waves get weaker and weaker as they cover great distances. A radio or TV program that is being broadcast over a long distance needs to be received and rebroadcast at several stops along the way in order to be received well. Scientists have solved this problem by using communications satellites above the surface of the earth. Signals are sent up to these satellites, which then beam down to exactly where they are to go without lots of stops, towers, or radio equipment along the way.

Task 6. Read the text again and match the sentences halves 1–7 with a–g:

1.	Scientists believe that long exposure to ultraviolet light	a.	by using communication satellites.
2.	Gamma rays and X rays when used in small doses	b.	connected to a battery which caused high voltage across two metal spheres.
3.	Marconi's radio looked like a coil	c.	was shown in 1896.
4.	When an object is exposed to X rays	d.	can cause skin cancer.
5.	Radio waves get weaker and weaker	e.	can kill dangerous cells.
6.	The first wireless radio	f.	we can often see right inside.
7.	Scientists solved the problem of rebroadcasting	g.	as they cover great distances.

Task 7. Complete the definitions below with the highlighted words in the text:

1. _____ means a specified quantity of a therapeutic agent prescribed to be taken at one time.

2. _____ means electromagnetic radiation used in radar, cooking etc.

3. _____ means a three-dimensional body all points of which are at the same distance from a fixed point.

4. _____ means to give back or show an image of an object.

5. _____ means mental or bodily distress.

6. _____ means inflammation of the skin caused by overexposure to the sun.

7. _____ means a tall, slender structure used for observation, signalling etc.

8. _____ means a metallic apparatus for sending or receiving electromagnetic waves.

Task 8. Tell your partners about

- ✓ the way X rays act;
- ✓ advantages and disadvantages of beta and gamma rays;

- ✓ design of the first wireless radio;
- ✓ solving the problem of rebroadcasting radio or TV programs.

UNIT 17. AUTOMOBILE FACTS


Word list:

1.	cycle	цикл, такт
2.	gasoline	бензин (am.)
3.	hydrogen	водень
4.	to save	економити, рятувати
5.	precious	цінний
6.	to run out of	вичерпати запас ч.-л.
7.	to regain	відновити, знайти знову
8.	silent	тихий, беззвучний
9.	average	середній
10.	to range	варіювати в діапазоні
11.	knob	кнопка (для натискання)
12.	complicated	складний
13.	board	приладова дошка
14.	actually	фактично, справді
15.	clutch	зчеплення
16.	to press	натискати
17.	gear	передача, передавальний механізм
18.	to pull	тягнути
19.	needle	стрілка (приладу)
20.	to point	вказувати
21.	fluid	рідина
22.	manufacturer	виробник
23.	to reach	досягати

Task 1. Match the words with close meaning:

1.	fluid	a.	middle

2.	complicated	b.	valuable
3.	gasoline	c.	difficult
4.	pull	d.	quiet
5.	average	e.	produce
6.	precious	f.	in fact
7.	manufacture	g.	draw
8.	silent	h.	liquid
9.	actually	i.	petrol

Task 2. Make up possible word-combinations:

1.	regain	a.	success
2.	press	b.	gasoline
3.	save	c.	westward
4.	point	d.	health
5.	run out of	e.	money
6.	reach	f.	knob

Task 3. Match the following definitions with one of the words from the Word list:

1. a colorless, highly flammable element.
2. a periodically repeated sequence of events.
3. to vary within specified limits.
4. an electrical equipment panel.
5. a device for gripping and holding two working parts of a driving mechanism.
6. a toothed machine part to transmit motion or to change speed or direction.
7. a slender pointer or indicator on a dial of a mechanical device.

Task 4. Fill in the gaps with the suitable words from the box:

regain knobs	precious gears reach	cycle manufacturing

1. The working _____ was stopped because the equipment was damaged.

2. The value of _____ stones is estimated in carats.
3. His race car was the first to _____ the finish.
4. He got confused when he saw so many unknown _____ on the board.
5. The _____ allow the car to travel at different speeds.
6. This factory has been _____ draperies for car saloons since 1950's.
7. I had such a wonderful holiday last year that I could completely _____ my health and fitness.

Task 5. Translate into English:

1. Він сказав, що збирає гроші для покупки недорогого уживаного автомобіля.
2. Нам розповіли, для чого використовуються всі кнопки на приладі.
3. Час від часу він поглядав на приладову дошку, оскільки побоювався, що бензин скоро закінчиться.
4. Він натиснув на зчеплення, і машина рушила.
5. Якщо хочеш збільшити швидкість, зміни передачу.
6. Стрілка на спідометрі показувала 120 км на годину.
7. Під час експерименту вони отримали рідину, яка не мала ні запаху, ні кольору.

Task 6. Scan the text and choose the one best answer (A), (B), (C) or (D) to each question:

1. What substance has never been tried as automobile fuels?

A. hydrogen B. kerosene C. helium D. natural gas

2. What material is not used for producing car parts?

A. steel B. coal C. silicon D. plastic

3. Which of the following is not a car part?

A. wheel B. clutch C. glasses D. gears

4. Which of the following is not considered the fastest car in the world?

A. Toyota B. Porsche C. Lamborghini D. Ferrari

Automobile Facts

A steam-powered tricycle built by Frenchman Nicolas-Joseph Cugnot in 1769 was the first vehicle built that moved along under its own power. It was powerful enough to carry up to four passengers at speeds of 3.6 kph (kilometer per hour).

In the 1880s, the first automobile with a gasoline engine was created by Carl Benz of Germany. He patented his car in 1886, and his name is still on one of the world's most famous cars – the Mercedes-Benz.

Cars need engines of one kind or another in order to work. Internal combustion engines that burn gasoline are the most common kind of automobile engine.

Kerosene, natural gas, and even hydrogen have all been tried as automobile fuels. Most recently, engineers have been trying to use solar power. Energy from the sun would make cars pollution-free and would save precious fuel. A race is held in Australia every year to find the fastest solar-powered vehicle in the world.

Electricity was used to power cars as far back as the 1880s. In fact, electric cars were fairly popular up until the 1920s. Power for the cars came from large storage batteries. The cars could run along at a fairly low speed, until the batteries run out of "juice". Then the cars had to be plugged into a recharger so the batteries could regain their power. Electric cars were most popular among people who did not need to get anywhere in a hurry and who enjoyed having a completely silent automobile.

Today's average car is made up of over 14,000 separate parts! They range from simple knobs to complicated electronic circuit boards and are made of everything from plastic to steel and silicon.

The car's engine provides the energy to make the car move. Its transmission joins the engine to the wheels, which actually move the car.

A car's clutch, when pressed to the floor, disconnects the engine from the transmission. This allows you to change gears so that you can move faster or have

more pulling power. The gears allow the car to travel slowly even though the engine is running very quickly.

A car's speedometer is connected to a set of gears inside its transmission. When the car starts moving, these gears turn the shaft that connects the speedometer to the transmission. This shaft turns a magnet that controls the speedometer's needle. As it turns, it points to the speed at which the car is traveling.

Automatic transmissions contain fluid that allows the car to change gears by itself, depending on how fast the engine is working and how fast the car is going .

For the past ten or 15 years, the cars from three manufacturers – Porsche, Ferrari, and Lamborghini - have generally been considered the fastest cars in the world, with models that reach speeds of just under 320 kph. Certain custom-built cars and racing machines, of course, are capable of even higher speeds.

Task 7. Read the text again and say what the following numbers from the text are associated with:

1769; 3.6; 1886; 1920s; 14,000; 15; 320.

Task 8. Answer the questions below. Then, based on your answers, sum up the information from the text:

1. What were the characteristics of the first steam-powered automobile?
2. Who created the first automobile with a gasoline engine?
3. What sources of energy have been used to power cars?
4. What number of parts is today’s average car made up?
5. How does the car’s engine (clutch, speedometer, transmission) operate?
6. What speed can the fastest cars in the world develop?

UNIT 18. WATER TRANSPORT

Word list:

1.	drawing	малюнок
2.	to row, rower	гребти, весляр
3.	sails	вітрила
4.	to add	додавати
5.	craft	судно
6.	to float	плавати, триматися на поверхні
7.	vessel	судно
8.	steamship	пароплав
9.	to tow	тягти (на буксирі)
10.	barge	баржа
11.	to cruise	здійснювати рейси, крейсирувати
12.	exclusively	виключно
13.	warfare	бойові дії
14.	missile	ракета (бойова)
15.	to hit	ударяти
16.	freight	вантаж, фрахт
17.	run	рейс
18.	tramp steamer	трампове судно
19.	to wander	мандрувати, бродити
20.	cargo	вантаж
21.	tug	буксир
22.	lumber schooner	шхуна для перевезення лісоматеріалів
23.	ore	руда
24.	double	подвійний
25.	icebreaker	криголам
26.	to crush	роздрібнять, роздавлювати

27.	weight	вага

Task 1. Find the word close in the meaning to the first word of the line:

1. craft	a) tool	b) vessel	c) raft
2. exclusively	a) only	b) partially	c) wholly
3. hit	a) crush	b) strike	c) damage
4. cargo	a) weight	b) tug	c) freight
5. drawing	a) image	b) picture	c) painting

Task 2. Make up words or word-combinations from the following parts:

1.	tramp	a.	breaker
2.	lumber	b.	ship
3.	Ice	c.	decker
4.	steam	d.	steamer
5.	war	e.	schooner
6.	double	f.	fare

Task 3. Make up as many word-combinations as you can with the following words:

1. to tow … (e.g. to tow a broken car)
2. to cruise over …
3. … run
4. to wander around …
5. … ore
6. to crush …
7. … weight.

Task 4. Match the words with their definitions:

1.	float	a.	a piece of fabric to convert the force of the wind into forward motion of the vessel
2.	row	b.	join or unite so as to increase in size, quantity etc.

3.	sails	c.	propel a boat
4.	add	d.	a vehicle that moves or tows other vehicles
5.	barge	e.	remain on the surface of a fluid without sinking
6.	missile	f.	a weapon that is fired projected at a target
7.	tug	g.	a long, large boat for transporting freight

Task 5. Translate into English:

1. Хоча ми гребли щосили, течія була такою сильною, що ми просувалися вперед дуже повільно.

2. У спекотну погоду тут можна бачити багато маленьких парусних човнів.

3. Судно було дуже старим і потребувало ремонту.

4. Командування наказало знищити вороже судно, яке плаває в наших водах.

5. Перший пароплав перетнув Атлантичний океан в 1819 році.

6. Це маленьке пасажирське судно здійснює рейси між двома прибережними містами.

7. Вантаж був сильно пошкоджений, оскільки корабель потрапив у бурю.

8. Я люблю бродити лісом, спостерігаючи природу.

9. Нам доведеться шукати буксир, так як ми не можемо зрушити з місця.

10. Перший атомний криголам пустили на воду в Ленінграді в 1957 році.

Task 6. Scan the text and say what the following dates are associated with:

6000 B.C.; 1500 B.C.; 1801; 1807; 1776; 1890s.

Water Transport

Egyptian drawings made about 6000 B.C. show the earliest known ships. The ships in those pictures were made of reeds and were crescent-shaped. The first ones were rowed; later, large square sails were added. By 1500 B.C., ships were common enough for the people of Crete to build them for war and for carrying people and things from place to place. Most early ships used sails, although many also used rowers to power the craft when the wind was light.

A ship is a large floating vessel that can cross open waters. A boat is a much smaller craft.

The first working steamship was built in 1801 by a British engineer, William Symington. His boat towed barges in the canals of Scotland. In 1807, the American inventor Robert Fulton built a steam-boat that went up the Hudson River in about one-fourth the time that it usually took in a sailboat.

Most ships today are powered by diesel engines. A few nuclear-powered ships have been built, but almost all ships still use gasoline as a source of fuel.

The first working submarine was built in 1776. At that time, an American named David Bushnell built the "Turtle", a tiny submarine used to attack British ships during the Revolutionary war. Submarines were also used in the 1860s during the American Civil war. By the 1890s, submarines were able to cruise for long distances under the sea.

Submarines have always been used almost exclusively for warfare. They attack surface ships, launch missiles, or set floating bombs (called mines) in areas where they could be hit by passing ships.

Most ships carry freight. They travel either on regular runs or as "tramps". The tramp steamer carries with it a bit of the romance of the old days of sailing. It wanders from port to port, picking up cargoes and not knowing where it will go next.

Many ships – oil tankers, for example – are built especially for certain kinds of cargo. Other special ships include refrigerator ships, tugs, lumber

schooners, grain ships, ore boats, ventilated ships for tropical fruits, ferryboats that are usually double-ended, icebreakers that are designed to ride up over the ice and crush it with their weight, and container ships whose cargo is placed inside many large boxes made of aluminum alloy.

Task 7. Read the text again. Then find one meaningful mistake in each sentence and correct it:

1. The first ships were powered by sails.
2. Most early ships used sails to power the craft when the wind was light.
3. The first working steamship towed barges along the Hudson River.
4. Few ships are powered by diesel engines.
5. Submarines have always been used mainly for warfare.
6. Most freight ships travel only on regular runs.
7. Most ships are built for any kinds of cargo.

Task 8. Someone is talking about the following types of vessels:

1. a ship
2. a submarine
3. a tramp steamer
4. a ferryboat
5. an icebreaker
6. a container ship

Which are they referring to each time?

a. It is designed to ride up over the ice and crushes it with its weight.

b. It attacks surface ships, launches missiles or sets floating bombs.

c. In it the cargo is placed inside many large boxes made of aluminium alloy.

d. It is usually double-ended.

e. It can cross open waters.

f. It wanders from part to part picking up cargoes and not knowing where it will go next.

UNIT 19. AIR TRANSPORT

Word list:

1.	successful	успішний
2.	horsepower	кінська сила, потужність в кінських силах
3.	circle	коло
4.	plane	літак
5.	to compete	змагатися
6.	several	кілька
7.	to capture	захоплювати
8.	imagination	уява
9.	Jet	реактивний
10.	to push	штовхати
11.	span	розмах
12.	to check	перевіряти
13.	constantly	постійно
14.	to avoid	уникати
15.	conditions	умови
16.	to make sure	переконуватися
17.	collision	зіткнення
18.	smoothly	рівно, гладко
19.	to be in charge of	відповідати за
20.	to maintain	підтримувати, дотримуватися
21.	conversation	розмова
22.	deck	борт
23.	crash	аварія, катастрофа
24.	failure	збій, помилка
25.	version	версія
26.	to hover	зависати (про вертоліт)
27.	runway	злітно-посадкова смуга

28.	troops	війська
29.	to rescue	рятувати
30.	to be willing	хотіти, мати бажання
31.	downtown	центр міста

Task 1. Match the words with close meaning:

1.	conversation	a.	wish
2.	rescue	b.	monitor
3.	failure	c.	some
4.	several	d.	keep
5.	be willing	e.	save
6.	check	f.	talk
7.	maintain	g.	error
8.	downtown	h.	centre

Task 2. Make up as many word-combinations as you can with the following words:

1. successful (e.g. successful project)
2. to compete in …
3. to capture …
4. to push …
5. to avoid …
6. to be in charge of …
7. … version.

Task 3. Fill in the gaps with the suitable words from the box:

jet	horsepower	conditions
failure	circles	runway
	make sure	

1. This make of the car has a 70-_____ engine.
2. The airport can’t take our plane because of unfavorable weather _____.

3. The real cause of the _____ can't be discovered unless the "black box" is detected.

4. Don't forget to _____ that the iron is switched off before leaving the house.

5. The aircraft made several _____ looking for safe place to land.

6. As different from helicopter the plane needs a _____ to speed up.

7. _____ – propelled plane was first used in 1950.

Task 4. Translate into English:

1. Він постійно виглядає засмученим. В чому справа?
2. В результаті повітряного зіткнення загинуло багато людей.
3. Всі вважали, що аварія сталася через погані погодні умови.
4. У неї багата уява, тому вона любить складати забавні історії.
5. Машина їхала рівно, так як дорога була відремонтована лише торік.
6. Вертоліт завис в повітрі на деякий час, так як туристи захотіли сфотографувати вподобані місця.
7. Ти знаєш, який розмах крила у сучасного літака?
8. Повідомляють, що ворожі війська підійшли близько до кордону.
9. «Чорний ящик» фіксує всі розмови пілотів на борту літака.

Task 5. Scan the text and match the paragraphs (1 – 6) with the topics (A – F):

A. How the modern plane is controlled.

B. The history of jet aircrafts.

C. The beginning of the age of flights.

D. What modern helicopters are used for.

E. Invention of first helicopters.

F. The first nonstop flights.

Air Transport

1. Flight began when two Americans, Wilbur and Orville Wright, began work on an airplane in 1899. By 1902, they had created a successful two-winged glider. In 1903, the Wrights added a 12-horsepower engine and two propellers. On December 17, 1903, the Wright Brothers "Flyer" (as they named it) flew for 59 seconds. By 1905, their third "Flyer" was flying, turning, making circles, and staying in the air for up to half an hour at a time. Within a few years, Europeans were also building planes - the age of flight had begun.

2. Charles Lindbergh was the first person to compete a solo, nonstop flight across the Atlantic Ocean. Although people had crossed the Atlantic before, they had done so by making several stops. Lindbergh, however, left Roosevelt Field, outside New York City, and, a little more than 33 hours later, landed outside of Paris, France. The flight, which took place May 20–21, 1927, captured the public's imagination.

3. A jet engine works by pushing hot gas out of itself. This gives the engine the power to move things through the air or off the ground. The first jet aircraft was created in Germany, in 1939, just before World War II. By the late 1940s, jets were used in most of the world's air forces, and by 1952, the first jet airliners were in service. The first of the wide-bodied jets, the Boeing 747, has a wing span of 60m and a length of 56,4m. Powered by four very large turbofan engines, it cruises about 970 km per hour.

4. Either the pilot or copilot is always seated at the controls during every moment of flight. Flight plans must be created, reviewed, and registered for each flight. Weather must be checked constantly so that the plane can avoid dangerous weather conditions. The pilot must also be on the lookout for other aircraft to make sure that there are no midair collisions. A plane's pilot and copilot are also at the controls for most takeoffs and landings, just to make sure that everything goes smoothly. The captain is even in charge of maintaining law and order on the plane-just like a captain on a ship. The so-called "black box" flight recorder automatically records every detail of the flight, and recordings can also be made of

conversations on the flight deck. Should any thing go wrong, and the aircraft be forced to suddenly land or even crash, these records are invaluable in helping experts to discover the cause of the failure.

5. The first real helicopter was built by the famous Russian engineer, Igor Sikorsky. By 1910, Sikorsky had built two helicopters, and, within a few years, other people had made their own versions of these flying machines. The first helicopter that was actually good enough to be used for practical tasks was built in Germany during the 1930s. In 1938, Hanna Reitsch flew it and established several world records – proving that helicopters would soon be an excellent form of transportation.

6. Because they can hover in the air and lift straight off the ground without a runway, helicopters are extremely useful. They are used in warfare to carry troops into battle as well as to attack enemy positions. They are also widely used for rescuing people, especially at sea and in hard-to-reach areas. Today, they are also popular for making short air flights, often from the middle of one city to another. Many passengers, for example, are willing to pay a high price for the privilege of having a helicopter take them from a city's downtown area to a nearby airport.

Task 6. Read the text again and find equivalents of the following words and word-combinations:

1. двокрилий планер (para 1)
2. безпосадковий політ (para 2)
3. повітряні сили (para 3)
4. турбовентилятор (para 3)
5. уважно шукати (para 4)
6. злети і приземлення (para 4)
7. закон і порядок (para 4)
8. встановив декілька світових рекордів (para 5)
9. важкодоступні райони (para 6)

10. підніматися прямо з землі (para 6)

Task 7. Put the dates and rearrange the following in the chronological order:

_____ Charles Lindbergh made the first nonstop flight across the Atlantic Ocean.

_____ Jets were used in most of the world's air forces.

__1899__ The Wright brothers began work on an airplane.

_____ Hanna Reitsch established several world records by helicopter.

_____ The first jet airliners were in service.

_____ The Wright Brothers "Flyer" stayed in the air for half an hour.

_____ The first helicopter for practical tasks was built in Germany.

_____ Igor Sikorsky built two helicopters.

_____ The first jet aircraft was created in Germany.

Task 8. Point out:

- ✓ the features of the aircrafts with jet engines;
- ✓ due to what modern planes are controlled;
- ✓ advantages of helicopters as a means of transportation.

UNIT 20. CARTOONS, MOVIES, COMPUTERS

Word list:

1.	animated cartoon	мультфільм
2.	character	персонаж
3.	dozen	десяток
4.	editor	редактор
5.	to assemble	збирати
6.	director	режисер
7.	to satisfy	задовольняти
8.	frame	кадр, фрагмент
9.	to remove	прибирати, витягувати
10.	crew	команда
11.	to devise	винаходити, придумувати
12.	to process	обробляти
13.	amplifier	підсилювач
14.	conventional	звичайний, традиційний
15.	tape	стрічка
16.	to wear down	зношуватися
17.	cellular	стільниковий
18.	portable	портативний, переносний
19.	to route	направляти (за певним маршрутом)
20.	to type, typewriter	друкувати, друкарська машинка
21.	word processor	текстовий редактор
22.	keyboard	клавіатура
23.	brain	мозок
24.	to erase	стирати

25.	item	предмет
26.	to identify	впізнавати, розрізняти
27.	width	ширина
28.	cash register	касир
29.	slip	чек
30.	input (output) unit	пристрій введення, виводу
31.	to subtract	віднімати, обчислювати
32.	fraction	частка
33.	set	набір, комплект
34.	order	порядок

Task 1. Match the words with close meaning:

1.	devise	a.	please
2.	assemble	b.	hero
3.	crew	c.	object
4.	character	d.	cut out
5.	item	e.	traditional
6.	satisfy	f.	invent
7.	conventional	g.	put together
8.	remove	h.	team

Task 2. Make up words or word-combinations from the following parts:

1.	wear	a.	cartoon
2.	key	b.	phone
3.	input	c.	processor
4.	type	d.	down
5.	animated	e.	register
6.	cellular	f.	board
7.	word	g.	writer
8.	cash	h.	unit

Task 3. Fill in the gaps with the suitable words from the box:

identified	editor	width
erased	tape	fraction
subtract	brain	

1. She works as an _____ in one of the film studios and is said to be a good specialist.
2. The police _____ the criminal according to the database.

3. They had to restore information because its biggest part was _____ by chance.

4. The _____ of the river in this place is more than a kilometer.

5. Everything happened in a _____ of a second.

6. Our parents used _____-recorders to record music.

7. If you _____ five from ten you receive five.

8. The human _____ consists of two spheres being responsible for emotional and intellectual activities of a man.

Task 4. Translate into English:

1. Я вже прочитав десяток книг, але ніде не зміг знайти потрібну інформацію.

2. Режисер був незадоволений, коли побачив, які кадри були вирізані редактором.

3. Нам доведеться обробити велику кількість інформації, щоб знайти відповідь на це питання.

4. Давайте візьмемо з собою на пікнік переносний магнітофон. Ми зможемо послухати музику і потанцювати.

5. Вона бачила, як він підійшов до каси, заплатив гроші і отримав чек.

6. Вона витрачає багато часу, щоб підтримувати в будинку порядок.

7. На день народження йому подарували набір інструментів.

8. Після того, як сигнали проходять через підсилювач, вони направляються в потрібні місця.

Task 5. Scan the text and choose the correct answers to questions 1–5 below:

1. How are cartoons made?

a. By creating separate individual pictures for some scenes.

b. By creating separate individual pictures for each step of an action.

2. How long does it take a crew of film editors to edit a major film?

a. Nearly half a year.

b. Up to six weeks.

3. Where does information stay longer?

a. On tapes.

b. On a CD.

4. What helps you change electronic signals in a word-processor?

a. Other electronic signals.

b. Printer.

5. What does your sales slip in the supermarket show?

a. How much you saved, what you bought and what it cost.

b. How much you spent, what you bought and what it cost.

Cartoons, movies, computers

Making Cartoons Come Alive

It takes hundreds of hours of work to make today's animated cartoons, even though computers have made the job faster and easier. Cartoons are made by creating separate individual pictures for each step of an action. To show a character throwing a football, for example, cartoonists create dozens of pictures, each showing a separate step – how a football player lifts an arm, pulls it back, and then throws the ball through the air. These pictures are then photographed one after another and shown very quickly on the screen.

Film Editing

An editor or team of editors receives all of the parts of a film – sometimes in many pieces. The parts are then put together, taken apart, and reassembled until the editor and the director are satisfied. If a particular scene is too long, the editor can cut out any number of frames to shorten the movie or arrange the frames in a different order. For this reason, film editors are really artists in their own field. They can remove the boring, poor scenes to make a film fast-moving and exciting,

or they can change the whole way a story is told. As you might expect, it takes a crew of film editors up to six months to edit a major film.

Laser Power

A CD (compact disk) player uses small plastic discs to reproduce sound better than any system yet devised. Sounds are placed on the disc using digital recording techniques. When you play the disc, a laser beam inside the CD player reads the information that has been placed on the disc. The information is then processed by the amplifier and speaker. Not only is the sound quality of a CD excellent, it is also more likely to stay that way than conventional records or tapes. That is because the information is read by beams of light, so there is no needle or magnetic head to wear down the recording.

Cellular Phone News

Cellular phones were first used in cars. They were called so because the cellular radio network of car and portable phones split each area into sections, or cells. As people drive from one cell to another, their calls are routed in special ways so that the phone call continues uninterrupted.

Computerized Typing

A word processor is a computer-type machine that takes the place of a typewriter. When you type the words you want on a keyboard, electronic signals are sent to the computer "brain" where letters are formed and projected onto a video screen. Because these are electronic signals, you can change, erase, or move them using other electronic signals. Then, when you are ready to make a printed copy of your work, you simply tell the "brain" to send the work to the printer.

Supermarket Laser Scanner

Today's supermarkets often use lasers to "read" the prices on the things you buy. Each item is marked with a special code. When you buy something, the clerk in the store passes the object over the laser scanner. The laser identifies the lines and their widths, and a small computer tells the cash register what the item is and how much it costs. That's why your sales slip not only tells you how much you spent, but what you bought and what it cost.

The mind of a Computer

Computers all work pretty much the same way. Electronic signals from words (numbers, symbols, etc.) come into an input unit. These signals are passed to a memory unit, where they are stored. A central processing unit then carries out what has to be done-adding or subtracting, putting words on a screen, or even moving a ball around in a computer game. The new signals are then sent to an output unit, which is usually a television-type screen or a printer. Because everything happens electronically, all of this takes only a fraction of a second to carry out.

A computer program is a set of instructions telling a computer what to do. The program may tell it to "input", to "print", or even to let one symbol stand for another in a code. Writing a program is a matter of knowing the right language and getting the directions to the computer in exactly the right order.

Task 6. Match the sentences halves 1–7 with a–g:

1.	The editor can cut out any number of frames	a.	a laser beam reads the information that has been placed on the disk.
2.	Cellular phones were called so	b.	you simply tell the computer “brain” to send the work to the printer.
3.	To show a character throwing a football	c.	to read the prices on the things you buy.
4.	Lasers are used	d.	the right language and getting the directions to the computer in exactly the right order.
5.	When you play the disk	e.	because the radio network split each area into cells.
6.	When you are ready to make a printed copy of your work,	f.	cartoonists create dozens of pictures each showing a separate step.
7.	Writing a program is a matter of knowing	g.	to shorten the movie or arrange the frames in a different order.

Task 7. Someone is talking about the following:

1. animated cartoons;
2. film editors;
3. compact disk;
4. cellular phone;
5. word processor;
6. computer;
7. laser scanner.

Which are they referring to each time?

a. It identifies the lines and their widths, and a small computer tells the cash register what the item is and how much it costs.

b. As people drive from one cell to another, their calls are routed in special ways so that the phone call continues uninterrupted.

c. They can remove the boring scenes to make a film fast-moving and exciting.

d. Electronic signals come into an input unit and are stored in a memory unit.

e. They are made of separate pictures which are photographed and shown very quickly on the screen.

f. Sounds are placed on the disk using digital recording techniques.

g. When you type the words you want on a keyboard, electronic signals are sent to the computer "brain" where letters are formed and projected onto a video screen.

Task 8. Describe how the following people or things work:

- ✓ cartoonists;
- ✓ film editors;
- ✓ CD;
- ✓ cellular phone;
- ✓ word processor;
- ✓ laser scanner;

- ✓ computer.

TEST 2 (Units 10-20)

Choose the best word to fill each gap:

1. If copper and tin melted together they make a strong … .
   a) rod
   b) handle
   c) alloy
   d) sheet
2. There are many uses of the energy that is generated by … the atom.
   a) releasing
   b) shooting
   c) charging
   d) splitting
3. An atomic … causes deadly radioactive particles called “fallout”.
   a) experiment
   b) explosion
   c) exploration
   d) execution
4. The first unmanned satellite was … in 1957.
   a) launched
   b) carried
   c) landed
   d) orbited
5. Communication satellites are used for …, telephone and radio.
   a) casting
   b) forecasting
   c) weather forecasting
   d) broadcasting
6. As water is an excellent conductor of electricity, it is dangerous to swim during a ….
   a) storm

b) tornado

c) thunderstorm

d) rain

7. An electrical … is a device that interrupts the flow of electricity.

a) battery

b) generator

c) circuit

d) switch

8. Radiation is the term used for anything that travels by

a) rays

b) light

c) beams

d) waves

9. Long contact with gamma rays can kill healthy cells and cause permanent … to the body.

a) discomfort

b) attack

c) inconvenience

d) damage

10. Scientists have … the problem of rebroadcasting by using communication satellites above the surface of the earth.

a) decided

b) discussed

c) solved

d) put off

11. Internal combustion engines that burn … are the most common kind of automobile engine.

a) oil

b) hydrogen

c) gasoline

d) coal

12. A car's speedometer is connected to a set of … inside its transmission.

a) wheels

b) batteries

c) knobs

d) gears

13. … have always been used almost exclusively for warfare.

a) oil tankers

b) submarines

c) icebreakers

d) ferryboats

14. The first … was built by the famous Russian engineer, Igor Sikorsky.

a) plane

b) jet aircraft

c) airliner

d) helicopter

15. If you want to type the words on a computer, you have to use letters on a …

a) board

b) keyboard

c) dashboard

d) blackboard

Match the sentences halves:

16.	The strength and hardness of metals	a.	can be used to insulate objects from electricity flow
17.	The nucleus is made up of	b.	when too much ultraviolet light comes in contact with the skin

18.	Armstrong became the first man	c.	picking up cargoes and not knowing where it will go next.
19.	Rubber, glass, plastic and dry air resist the flow of electricity and	d.	by creating separate individual pictures for each step of an action.
20.	Light travels at different speeds	e.	can be controlled by alloying and heat treatment.
21.	Sunburn occurs	f.	disconnects the engine from the transmission.
22.	A car's clutch when pressed to the floor	g.	two kinds of particles called protons and neutrons.
23.	The tramp steamer wanders from port to port	h.	and recording can also be made of conversations on the flight deck.
24.	The so-called "black box" flight recorder automatically records every detail of the flight	i.	to set foot on the moon.
25.	Cartoons are made	j.	depending on what it is travelling through.

Choose the correct answers to the following questions:

26. How can metals be strengthened?

a) by rolling them

b) by hammering them while hot

c) by shaping in a press while cold

d) by alloying with another metal

27. What can be seen on a place of an atomic explosion?

a) dirt and dust

b) earth and stones drifting around with the wind

c) a huge cloud of split atoms

d) the giant mushroom-shaped cloud

28. What are military satellites used for?

a) for broadcasting

b) for detecting mineral deposits

c) for reconnaissance and intelligence gathering

d) for weather forecasting

29. What is the difficulty with hydroelectric plants?

a) finding a suitable location

b) building a dam

c) finding coal deposits

d) increasing the pressure

30. How are lasers vibrating?

a) in the same direction at the same time

b) in different directions at the same time

c) in the same direction at different time

d) in the different directions at different time

31. When can we see the object right inside?

a) when it is exposed to ultraviolet rays

b) when it is exposed to X rays

c) when it is exposed to gamma rays

d) when it is exposed to microwaves

32. Which of the following is not used as automobile fuel?

a) solar power

b) hydrogen

c) electricity

d) wind power

33. What kind of the engine is used in most today's ships?

a) diesel

b) steam

c) internal combustion

d) jet

34. What cannot be considered as helicopter’s advantage?

a) it does not need a runway

b) it can make short air flights

c) it can accommodate only a few people

d) it can be used in warfare

35. What does not your sales slip in the supermarket tell you?

a) what you bought

b) how much you spent

c) what it looked like

d) what it cost

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