МІНІСТЕРСТВО ОСВІТИ І НАУКИ, МОЛОДІ ТА СПОРТУ УКРАЇНИ
ХАРКІВСЬКА НАЦІОНАЛЬНА АКАДЕМІЯ МІСЬКОГО ГОСПОДАРСТВА

МЕТОДИЧНІ ВКАЗІВКИ

ДЛЯ ОРГАНІЗАЦІЇ ПРАКТИЧНОЇ РОБОТИ З ДИСЦИПЛІН

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Методичні вказівки для організації практичної роботи з дисциплін «Іноземна мова (за професійним спрямуванням)», «Іноземна мова » (англійська мова) для студентів 1 курсу денної форми навчання напряму 6.050701 «Електротехніка та електротехнології» спеціальності «Світлотехніка і джерела світла»/ Харк. нац. акад. міськ. госп-ва; уклад.: Г. Б. Сергєєва. – Х.: ХНАМГ, 2012. –76 с.

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Методичні вказівки призначені для організації самостійної роботи студентів у першому семестрі (Модуль 2) згідно з затвердженою робочою програмою навчальної дисципліни «Іноземна мова (за професійним спрямуванням)», укладеної відповідно освітньо-кваліфікаційним вимогам до знань і вмінь студентів напряму підготовки «Електротехніка та електротехнології», які в майбутньому будуть працювати у сфері світлотехніки та джерел світла.

Рекомендовано кафедрою іноземних мов,
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MODULE 2.1
UNIT 1

1 LEAD-IN

1 What facts from the history of lighting do you know or don't know?

2 What do you think are the advantages and disadvantages of natural and artificial lighting?

2 READING

Text 1. Introduction to Lighting

No technology has changed humanity more than the electric light. The electric light infiltrates every part of human activity, it has changed the way we work, play, and travel. The electric light has changed industry, education, warfare, and entertainment.

When most people think of the electric light they think of Thomas Edison. He was only one of many great engineers who made the light practical, energy efficient, and long lasting.

Edison's greatest contribution to the problem of electric light was in filament design. He tried over 6,000 alternative filament materials over two years, and spent $40,000 conducting more than 1,200 experiments.

After testing substances from around the world, Edison found platinum to be effective. However, it was expensive and provided only limited efficiency as a practical filament. Finally, Edison tried carbonized cotton sewing machine thread. On Sunday evening, October 19, 1879, Edison and his assistants powered up his cotton filament and took turns watching it around the clock. More than 40 hours later it was still glowing and Edison knew he had the problem solved.

The invention of the electric light bulb was announced in the New York Herald on December 21, 1879. In following weeks gas stocks dropped dramatically while stock in the Edison Electric Company soared, eventually hitting $3,500 a share.

Light bulbs went on sale in 1880, and while the first full-scale introduction of the Edison lighting system was made in London at Holburn Viaduct in early 1882, the era of general electric illumination via a centralized municipal power source began on September 4, 1882 at the Pearl Street Station, New York City. In response to a reporter's question Edison said simply, "I have accomplished all I promised".

2.1 Reading Comprehension. Mark the statements as true (T) or false (F).

1 Electric light has changed humanity greatly. ___

2 The electric light was made practical, energy efficient, and long lasting by Thomas Edison. ___

3 It was in 1882 when light bulbs went on sell. ___

4 The first full-scale introduction of the lighting system was made in London in early 1880s in London. ___

5 The era of general electric illumination via a centralized municipal power source began in1882 in New York. ___

Text 2. Basic Concepts: Lighting Source, Lighting Systems, Lighting Fixture

Light is electromagnetic radiation with a wavelength that is visible to the eye (visible light) or, in a technical or scientific context, the word is sometimes used to mean electromagnetic radiation of all wave lengths.

The elementary particle that defines light is the photon.

The three basic properties of light (i.e., all electromagnetic radiation) are as follows:

● intensity, or alternatively amplitude, which is related to the perception of brightness of the light;

● frequency, or alternatively wavelength, perceived by humans as the colour of the light, and

● polarization (angle of vibration), which is only weakly perceptible by humans under ordinary circumstances.

Due to its wave–particle duality, light can exhibit properties of both waves and particles. The study of light, known as optics, is an important research area in modern physics.

Lighting Systems

Lighting systems are transforming electrical energy into light. Systems may use elements or gas to produce light.

The common light bulb is incandescent lighting source, and it uses element (filament) which heats until it glows. Examples of the gaseous discharge method are fluorescent, high-intensity discharge (HID) and low-pressure sodium light sources.

Lighting fixtures

A lighting fixture or luminaire is an electrical device used to create artificial light or illumination. A complete lighting fixture unit consists of the light source or lamp, the reflector for directing the light, an **aperture** (with or without a lens), the outer shell or housing for lamp alignment and protection, an electrical ballast, if required, and connection to a power source. A wide variety of special light fixtures are created for use in the automotive industry, aerospace, marine and medicine.

Lighting fixtures are classified by how the fixture is installed, the light function or lamp type.

2.2 Reading Comprehension. Choose the correct answer.

1 Basic concepts of the electrical light include everything EXCEPT

a lighting fixtures. **c** lighting systems.
b lighting scheme. **d** lighting source.

2 Electromagnetic radiation is characterized by everything EXCEPT

a intensity or amplitude. **c** a lighting systems or a light bulb.
b frequency or wavelength. **d** polarization or angle of vibration.

3 A lighting fixture is

a a light source. **c** the light function.
b artificial light. **d** a special device.

4 General lighting, accent lighting, task lighting and decorative lighting are

a lighting features. **c** lighting tasks.
b lighting fixtures. **d** lighting categories.

1- …; 2- …; 3- …; 4- …

3 VOCABULARY

3.1 Group the following terms from Text 2 according to the titles in the table (four terms in each group).

lighting fixture	***pendant lighting***	***to glow***	***luminaire***
to spotlight	***portable lamps***	***recessed lighting***	***to accentuate***
track lighting	***to embellish***	***chandelier***	***ambient lighting***

Types of lighting or light	Lighting devices	Verbs to do with lighting
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

3.2 Find in Text 2 the four sources of light and use the word combinations to complete the sentences.

1 ***incandescent lighting source*** **3** ***high-intensity discharge light source***
2 ***low-pressure sodium light source*** **4** ***fluorescent light source***

a Generally, a _____ requires a warm up period of about ten minutes before it reaches substantially full light output.
b The _____ or lamp contains a gas that produces invisible ultraviolet light (UV) when the gas is excited by electricity.
c The _____ or incandescent lamp produces light by heating a metal filament wire to a high temperature until it glows.
d _____ are used in the commercial sector and also in the high-end private sector.
(high-end=relating to products or services that are more expensive and of better quality than other products of the same type)

3.3 Here are the pictures of lights for different uses. Match the pictures to the names of the lights.

1	hall/foyer light	___	**7**	paddle fan	___
2	pendant or chandelier	___	**8**	track light	___
3	ceiling light	___	**9**	recessed light	___
4	sconce or wall-mounted light	___	**10**	under cabinet light	___
5	bath lighting	___	**11**	outdoor light	___
6	portable lamp	___	**12**	landscape light	___

a

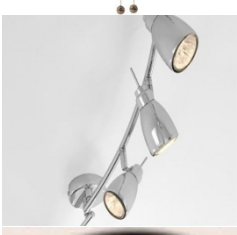
d

g

j

b

e

h 

k

c

f

i

l

3.4 Complete the following paragraph with words given below. Then translate it into your native language.

device	***operate***	***directing***	***medicine***	***contrast***
illumination	***source***	***protection***	***describe***	***source***
hold	***fixtures***	***power***	***table***	***classified***

An electrical (**1**)_____ such as a light fixture, light fitting, or luminaire is used to create artificial light and/or (**2**)_____ , by use of an electric lamp. All light fixtures have a fixture body, a light socket to (**3**)_____ the lamp and allow for its replacement—which may also have a switch to (**4**)_____ the fixture, and also require an electrical connection to a power (**5**)_____, often by using electrical connectors (e.g. plugs) with portable fixtures. Light (**6**)_____ may also have other features, such as reflectors for (**7**)_____ the light, an aperture (with or without a lens), an outer shell or housing for lamp alignment and (**8**)_____, and an electrical ballast and/or (**9**)_____ supply. A wide variety of special light fixtures are created for use in the automotive lighting industry, aerospace, marine and (**10**)_____.

The use of the word "lamp" to (**11**)_____ light fixtures is common slang for an all-in-one luminary unit, usually portable "fixtures" such as a (**12**)_____ lamp or desk lamp (in (**13**)_____ to a true fixture, which is fixed in place with screws or some other semi-permanent attachment). In technical terminology, a lamp is the light (**14**)_____, what is typically called the light bulb.

Light fixtures are (**15**)_____ by how the fixture is installed, the light function or lamp type.

4 LANGUAGE REVIEW

● The Passive, changing from active into passive voice. ● Adjectives; the order of adjectives.

4.1 Match the sentence to the relevant form of the Passive.

1	The office ***is locked*** every evening.	**a**	present simple
2	His car is ***being serviced*** now.	**b**	present continuous
3	My car ***was stolen*** last night.	**c**	past simple
4	The bridge ***was being repaired*** when we approached it.	**d**	past continuous
5	Sarah ***has*** already ***been invited*** to the party.	**e**	present perfect simple
6	I thought that you ***had been told*** the news.	**f**	past perfect simple
7	The papers ***will be delivered*** in two days.	**g**	future simple
8	The lights ***will have been changed*** by Monday.	**h**	future perfect simple
9	I don't want ***to be disturbed***.	**i**	present infinitive
10	The report should ***have been delivered*** last week.	**j**	perfect infinitive
11	I enjoy ***being praised*** by people.	**k**	simple –***ing*** form
12	The date ***having been*** finally ***changed***, we made a decision.	**l**	perfect –***ing*** form
13	The meeting ***should be opened*** on time**.**	**m**	modals + ***be*** + past participle

1-…; 2-…; 3-…; 4-…; 5-…; 6-…; 7-…; 8-… ; 9-…; 10 -…; 11-…; 12-…; 13-…

4.2 Match the sentences in the Passive to the relevant description.

1	The new hospital ***will be opened*** by the Queen on May 15th.	**a**	the person, who carries out the action, is unknown, unimportant or obvious from the content
2	Our house ***was built*** in 1990.	**b**	the action itself is more important than the person who carries it out (as in news headlines, newspaper articles, formal notices, instructions, advertisements, etc.)
3	A lot of mistakes ***have been made***.		
4	Two teenagers ***were*** seriously ***injured*** in a car accident last night.	**c**	we refer to an unpleasant event and we do not want to say who or what is to blame (or we want to make statements more polite)
5	My new laptop ***is damaged.***		
6	***Is*** this room ***cleaned*** every day?		

1- …; 2- …; 3- …; 4- …; 5-…; 6- …

4.3 Complete the second sentence so that it has a similar meaning to the first sentence. Do not use *by* unless it is important to the meaning.

1 The teacher has marked all the homework.
All the homework *has been marked.*

2 My boyfriend kept me waiting for half an hour.

I _____ .

3 The students must pay their own fees for this course.
All the fees for this course _____ .

4 Do you suppose your brother could have written that email?
Do you suppose that email _____ .

5 They use a computer to do that job nowadays.
A computer _____ .

6 During the summer, the café was employing more waiters every week.
During the summer, more waiters _____ .

7 Nobody informed the police that there had been a mistake.
The police _____ .

8 Where will your company send you next year?
Where will you _____ .

9 The news about the war worried Josephine.
Josephine _____ .

10 I've still got the camera because no-one claimed it.
I've still got the camera because it _____ .

11 Has anyone asked you about your opinion?
Have you _____ .

12 The children shouldn't have opened that parcel.
That parcel _____ .

13 All visitors must wear identity budgets.
Identity budgets _____ .

14 Someone must have changed the time of the meeting.
The time of the meeting _____ .

15 Is anyone using this computer?
Is the computer _____ .

4.4 Comet Magazine(CM) is interviewing aerospace engineer Dr Bernard Kay (BK). Complete the interview with the passive form of the verbs in brackets. Reproduce the dialogues in pairs.

CM: Dr Kay, I'd like to ask how meals will be handled in the Space Station. _____ food _____ on board or _____ from tubes?

2.(be going to/ prepare) ***3. (squeeze)***

BK: Neither. Gourmet meals _____ on Earth and then they_____

4.(will / prepackage) ***5.(can/ warm up)***

on board.

CM: The Space Station will have an international crew. How _____ food _____ to suit everyone's taste?

6.(should/choose)

BK: An international menu _____. Food _____ from food preference

7.(have to/offer) ***8. (could/select)***

forms that the crew members complete.

CM: _____ dishes _____ in board?

9.(Will/use)

BK: Probably. But utensils _____ to the plates so they won't fly

10.(had better/attach)

around! Meals _____ as pleasant as possible!

11.(ought to/make)

4.5 Match the rules of the usage of adjectives to the relevant sentences.

1	Adjectives describe nouns.	**a**	They seem ***unhappy***.
		b	It is a ***warm*** day.
		c	She is ***beautiful***.
2	Adjectives show what a person thinks of somebody or something (opinion adjectives).	**d**	It was a ***pleasant*** evening.
		e	I've got a ***valuable*** book as a present.
3	Adjectives give factual information about age, size, colour, origin, material etc. (fact adjectives).	**f**	There is an ***old black*** telephone on the table.
		g	The people are skiing on the ***crisp white*** snow.
		h	Judy wears too much ***eye*** make-up to the office.

4 Nouns are used as adjectives before other nouns.

5 There are compound adjectives formed with
a) present participle (V_4)
b) past participle (V_3)
c) cardinal numbers +nouns

6 Adjectives may have difference in meaning.

i Could I borrow your ***telephone*** book for a minute?

j I often think of that never-***ending*** journey.

k ***broken***-down washing machine

l The reason of failure was in his ***three-hour*** delay.

m He gave her a ***gold*** ring.(= ring made of gold)
They walked on the ***golden*** sand.(= sand the colour of gold)

1- …; 2- …; 3- …; 4- …; 5-…; 6- …

4.6 Write a word in each gap. The words you need are at the bottom.

1 He finds country life infinitely _____to living in the city.
2 *The children always get* _____ *on long journeys.*
3 It is absolutely _____ that we make a quick decision.
4 The client was always very _____about punctuality.
5 She gave me a _____look when I mentioned John's name.
6 I lead a busy life so my free time is _____to me.
7 Sometimes even the most _____remark can result in a lasting grudge.
8 These seats are _____for special guests.
9 The island has a long and _____ past.
10 Is English a _____subject at your school?

compulsory	***colourful***	***reserved***	***casual***	***precious***
knowing	***fussy***	***imperative***	***restless***	***Preferable***

4.7 Put the following into the correct order.

1 suede / Italian / new / red / soft / shoes
2 elderly / tall / Englishman
3 oval / Venetian / ancient / valuable / glass
4 shiny / large /expensive / brown / leather / case
5 square / wooden / old / nice / table
6 modern / stone / large / beautiful / cottage
7 porcelain / tea / blue / thin / old / cup
8 young / blonde / handsome / tall / man

9 old / several / English / beautiful / castles
10 pretty / French / young / a lot of / girls
11 dark blue / best / silk / my / shirt
12 young / many / factory / German / workers

4.8 Two managers are going to buy a photocopier. Choose the best word to complete the dialogue. Reproduce the dialogues in pairs.

best fastest colour different cheapest attractive service free

A: So, Peter, which photocopier do you think we should buy?
B: Well, Xcopy produces the (**1**) _____ model – it costs only £ 599. It has a lot of new features and can do (**2**) _____ copies too. It has an (**3**) _____ design and can do 200 copies in a minute.
A: So which Internet(**4**) _____ provider do you think we should use?
B: Well, BusinessNet is the (**5**)_____. It costs £39 per month and they provide broadband connection and (**6**) _____ upgrades after a year. The service has a lot of (**7**) _____ functions, but the (**8**) _____ connection will cost more. They also offer discounts if we use the service in all our branches. We can register on-line and an engineer will come and install the modem and software the next day.

5 SKILLS

Describing processes

First define where the following components are:

1. cardboard insulation sleeve

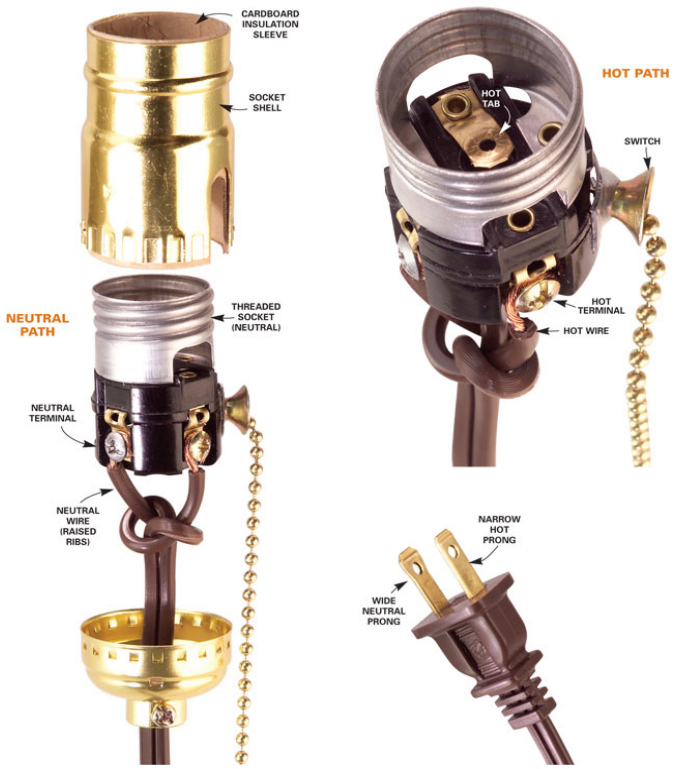
2. socket shell

3. neutral path
- **a**. threaded socket
- **b**. neutral terminal
- **c**. neutral wire

4. hot path
- **a**. hot tab
- **b**. switch
- **c**. hot terminal
- **d**. hot wire

5. narrow hot prong

6. wide neutral; prong



- Which wires should you connect correctly?
- Will the lamp work either way?
- What does normally power come through on?
- Is the threaded socket neutral?
- Are all "hot" parts of the lamp well protected when the switch is on?
- Is the tab at the bottom of the socket "hot" when the switch is on?
- Is the threaded socket always hot if the wiring is reversed and the power goes to the threaded socket?
- When is a greater potential for getting a dangerous shock?
- Can a dangerous shock occasionally occur in old fixtures?
- How is the neutral wire in the lamp cord usually marked?
- How is a neutral wire usually marked?

Now describe how to wire the lamp correctly.
http://www.familyhandyman.com/DIY-Projects/Electrical/Electrical-Repair/how-to-wire-a-light-socket

UNIT 2

1 LEAD-IN

1 Do you use different lighting lamps at home or at work? Why? Why not?
2 Do you have any experience (practice) in replacing lamps?
3 When is it a good or bad time to use the lighting lamps?

2 READING

Text 1. History of Lighting

The first lamp was invented around 70,000 BC. A hollow rock, shell or other natural found object was filled with moss or a similar material that was soaked with animal fat and ignited. Humans began imitating the natural shapes with manmade pottery, alabaster, and metal lamps. Wicks were later added to control the rate of burning. Around the 7th century BC, the Greeks began making terra cotta lamps to replace handheld torches. The word lamp is derived from the Greek word lampas, meaning torch.

Oil Lamps

In the 18th century, the central burner was invented, a major improvement in lamp design. The fuel source was now tightly enclosed in metal, and an adjustable metal tube was used to control the intensity of the fuel burning and intensity of the light. Around the same time, small glass chimneys were added to lamps to both protect the flame and control the flow of air to the flame. Ami Argand, a Swiss chemist is credited with first developing the principal of using an oil lamp with a hollow circular wick surrounded by a glass chimney in 1783.

Lighting Fuels

Early lighting fuels consisted of olive oil, beeswax, fish oil, whale oil, sesame oil, nut oil, and similar substances. These were the most commonly used fuels until

the late 18th century. However, the ancient Chinese collected natural gas in skins that was used for illumination.

In 1859, drilling for petroleum oil began and the kerosene (a petroleum derivative) lamp grew popular, first introduced in 1853 in Germany. Coal and natural gas lamps were also becoming wide-spread. Coal gas was first used as a lighting fuel as early as 1784.

Gas Lights

In 1792, the first commercial use of gas lighting began when William Murdoch used coal gas for lighting his house in Redruth, Cornwall. German inventor Freidrich Winzer (Winsor) was the first person to patent coal gas lighting in 1804 and a "thermo-lamp" using gas distilled from wood was patented in 1799. David Melville received the first U.S. gas light patent in 1810.

Early in the 19th century, most cities in the United States and Europe had streets that were gaslight. Gas lighting for streets gave way to low pressure sodium and high pressure mercury lighting in the 1930s and the development of the electric lighting at the turn of the 19th century replaced gas lighting in homes.

2.1 Reading Comprehension

1 When did the history of lighting start?
2 What materials and natural matter were used to produce light in ancient times?
3 What are the names of the first inventors of lights?

Text 2. Lamp Types

Incandescent

Incandescent lamps are the most familiar type of light source. They generate light using a thin filament wire that creates a white heat by an electric current passing through it. Incandescent lamps are all-purpose lamps and can be used for general, supplemental or decorative lighting. They provide a true to life, warm coloring with an energy efficiency up to 18 lumens per watt. They are available in a variety of styles including standard bulbs, tubular, reflective spot and flood lamps, decorative bulbs, three way or rough-service bulbs. A typical life can range from 5001000 hours and long-life bulbs can last up to 2000 hours. Incandescent bulbs are readily available in stores, are easy to install and their life is not affected by switching them on and off.

Halogen

Halogen lamps generate light by using a thin filament wire enclosed in a quartz tube that contains a pressurized gas such as halogen, iodine or bromine. This design allows the bulb to burn hotter which produces a whiter, brighter light more efficiently than an incandescent bulb. Halogen bulbs are used for accent lighting, display lighting, outdoor flood-lamps and automobile headlights. They are available in a variety of styles including single and double-ended quartz, reflective spots and floods, parabolic aluminized spots, floods and mini-can bulbs. They have a typical life range from 20 005 000 hours. Halogens provide a brilliant white light with an

energy efficiency up to 22 lumens per watt. The bulbs come in compact sizes, do not blacken with use and provide an intense, focused light.

Fluorescent

Fluorescent lamps create light by passing an electric arc through an inert gas. The heat generated from the arc vaporizes tiny drops of mercury which emit ultra-violet (UV) light. The released UV light stimulates a phosphor coating on the inside of the glass bulb, glowing brightly in all directions. A ballast is required to heat the bulb electrodes on initial start-up, then regulates the power flow to keep the lamp burning. Fluorescent lamps excel at providing high levels of general lighting very efficiently. They can last 10 to 20 times longer than an incandescent light and use one-fifth to one-third the electricity to generate the same brightness. They are available in several styles such as u-shaped, circular and straight tubes up to 96" long. The typical life range is from 1 200 024 000 hours, with an energy efficiency up to 105 lumens per watt. A drawback to fluorescent lights is that they can only be dimmed with expensive special equipment and are sensitive to cold temperatures.

Compact Fluorescent

Compact fluorescent lamps operate in a similar fashion as linear fluorescent lamps. These lamps are designed for use in standard incandescent sockets and serve as energy-saving replacements to incandescent lights. They are available in bulb, circular or twin-tube configurations. A typical life ranges from 900 010 000 hours with an energy efficiency up to 105 lumens per watt. They have color similar to incandescent lights, last 9 to 13 times longer and save 64% to 82% in energy consumption compared to incandescent lights. To maximize the life of the bulb, compact fluorescent must be used in locations where they stay on for several hours at a time. No lamp dimming is possible.

High Intensity Discharge

High intensity discharge (HID) lamps generate light by passing electrical current through an internal tube filled with a blend of gases under pressure. Electricity through the tube is regulated with a ballast in similar fashion of a fluorescent lamp. HIDs are powerful light sources used for general area, landscape or outdoor floodlighting. Three types of HID lighting available include mercury, high-pressure sodium and **metal halide** all in a screw-base bulb. Typical life ranges from 1,000,024,000 hours, with an efficiency of 65 to 140 lumens per watt. These lamps are the most energy efficient bright lights that provide long life in hot or cold environments. HIDs take a few minutes to warm up as they gradually reach full brightness.

2.2 Reading Comprehension.

1 What are the most common electric lamps?
2 Which of the lamps has the longest life?
3 What types of electric lamps are in regular use in our homes today?

3 VOCABULARY

3.1 Match the left and the right side.

1	an electric lamp/bulb	**a**	дуговая лампа
2	an arc lamp	**b**	электрическая лампа
3	a bulb	**c**	электрическая лампа/лампочка
4	a light bulb	**d**	колба электрической лампочки
5	an incandescent /filament lamp	**e**	лампа дневного света
6	a fluorescent lamp	**f**	лампа накаливания
7	a halogen light	**g**	вольфрамовая/угольная лампа
8	a tungsten/carbon (filament) lamp	**h**	галогенная лампа
9	gas discharge (vapour)lamp	**i**	лампа дугового разряда
10	an arc discharge lamp	**j**	газоразрядная
11	a mercury vapour lamp	**k**	разрядная лампа высокой интенсивности
12	a high intensity discharge lamp	**l**	ртутная лампа

1-…; 2-…; 3-…; 4-…; 5-…; 6-…; 7-…; 8-…; 9-…; 10-…

3.2 Differentiate the types of lamps and lamp technologies.

1	ballast	**a**	high pressure incandescent lamps containing halogen gases such as iodine or bromine, allowing filaments to be operated at higher temperatures.
2	fluorescent light	**b**	light emitting diodes (LED) are solid state lamps without the filaments that would burn out on ordinary light bulbs. LEDs emit light produced from the movement of electrons in a semiconductor material.
3	halogen	**c**	a ballast is an auxiliary piece of equipment designed to start and properly control the flow of power to discharge light sources such as fluorescent and high intensity discharge
4	neon	**d**	CFLs are designed to replace incandescent lamps in existing and new installations
5	light emitting diodes	**e**	a low pressure gas contained within a glass tube; the color emitted depends on the gas.
6	compact fluorescent lamps	**f**	a long straight tube coated with phosphor containing low pressure mercury vapor that produces white light.

1- …; 2- …; 3- …; 4- …; 5- …; 6- …

3.3 Now match the left and the right side from 3.2 to the pictures.

A

B

C

D **E** **F**

1- …; 2- …; 3- …; 4- …; 5- …; 6- …

3.4 Match the left and the right side. Then use the words in the sentences given below.

A

1	luminaire	**a**	(*книжн.)* светило
2	luminary	**b**	светильник; источник света
3	luminous	**c**	светящийся, люминесцентный
4	luminous intensity	**d**	свечение, яркость света
5	luminosity	**e**	сила света
6	luminescence	**f**	люмен, лм (единица светового потока)
7	luminescent	**g**	светящийся, светлый
8	lumen	**h**	свечение, люминесценция

1-…; 2-…; 3-…; 4-…; 5-…; 6- …; 7-…; 8-…

B

1 The lumen is the standard unit for the _____ flux of a light source.
2 _____ is the amount of energy emitted by a star each second.
3 __ is the low-temperature emission of light (as by a chemical or physiological process).
4 The ___ is the official base unit for light.
5 ___materials such as phosphors are materials that emit light (infrared to ultraviolet) under external energy excitation.
6 An object, such as a celestial body, that gives light is called a **__.**
7 LED _____ and replacement lamps available today often claim long life.
8 LED manufacturers publish _____ depreciation curves based on testing of their products.

3.5 Complete the following paragraph with words given below. Then translate it into your native language.

lighting engineering pleasing quantitative guidelines office

Lighting Design

There are two aspects to (**1**) _____ design that go hand in hand. The qualitative or aesthetic aspect and the quantitative or (**2**) _____aspect.
The qualitative aspect has to do with ensuring that the space has a (**3**) _____ feel and ambiance. It is the artistic interspersing of light and shadow, of illumination and darkness, of figure and form.

The (**4**) _____ aspect revolves around making sure that there is adequate light for the task at hand. The Illuminating Engineering Society (IES) of North America publishes (**5**) _____ of light levels for many tasks and activities based on the nature of the task, the size of objects handled, the detail required, the average age of the people in that space and so on. A typical (**6**) _____ is lit to an illumination of 30 to 100 "foot-candles". Light (**7**) _____ can also be expressed in the metric unit "lux"; 1 foot-candle is approximately 10 lux.

4 LANGUAGE REVIEW

● Personal/Impersonal Passive Constructions ● Comparative and superlative degrees of adjectives; irregular adjectives; ● *much more, far less,* etc.

4.1 Complete the second sentence so that it has a similar meaning to the first sentence.

1 It is said that house prices are too high.
House prices are said to be too high.

2 It is thought that the hospital is short of money.
The hospital _____ .

3 It was alleged that the athlete has cheated.
The athlete _____ .

4 It is reported that the prime minister is resigning.
The prime minister _____ .

5 It is expected that the new sports stadium will be finished soon.
The new sports stadium _____ .

6 It is generally considered that sixteen is too young to get married.
Sixteen _____ .

7 It was thought that the book had been destroyed.
The book _____.

8 It is believed that the children had been hiding for two weeks.
The children _____ .

9 It is reported that the building has been badly damaged by then fire.
The building _____ .

10 It is alleged that the man was driving at 110 miles an hour.
The man _____ .

4.2 Give the comparative and superlative forms of each word. Remember that some adjectives of two syllables can make their comparative and superlative either with *-er/-est* or with *more/most*. Make up at least three sentences of your own with some of the adjectives.

clever	_____	***narrow***	_____
common	_____	***pleasant***	_____
cruel	_____	***polite***	_____

expensive	_____	***quiet***	_____
friendly	_____	***simple***	_____
gentle	_____	***stupid***	_____
happy	_____	***tired***	_____

1. _____
2. _____
3. _____

4.3 Fill in the blanks with the correct comparative or superlative forms.

1 My project was _____ in my team. (***bad***)
2 Istanbul is one of _____ cities in the world. (***cosmopolitan***)
3 Some people want a _____ house than they had before. (***large***)
4 What's _____ place in the world? (***far***)
5 I think London is much _____ Oxford. (***quiet***)
6 My friend is _____ person in our company. (***generous***)
7 Pam is _____ any other person. (***polite***)
8 Many people seek a _____ way of life than they have. (***healthy***)
9 You are _____ (***sweet***) and _____ (***funny***) person in the world.
10 On Tuesdays, Antony has _____ business hours. (***short***)

4.4 Complete these sentences from a newspaper. Use *the +adjective* or *the +adjective+ noun* in brackets (e.g. *the hungry* or *the hungry people*).

Examples:
- Rich nations can afford to feed ***the hungry*** (***hungry***). (*in general*)
- ***The homeless people*** (***homeless***) whose story appeared in this paper last week have now found a place to live.
  (*a specific person or a specific group of people)*

1 _____ (***sick***) need to be looked after, so money must be spent on hospitals.
2 Life must be hard for _____ (***unemployed***) in our society today
3 What is the government doing to help _____ (***poor***)?
4 _____ (***homeless***) usually have great difficulty in getting a job.
5 There is a special television programme for _____ (***deaf***) every Sunday morning.
6 Some of _____ (***young***) at the youth club here are running in a marathon.
7 There was a fire at a nursing home in Charles Street, but none of _____ (***old***).

4.5 Complete the sentences using different comparative patterns: (*less*+ adjective, *much/much more/ far/ a bit/ a lot/ a little/ any* + comparative adjective).

1 John and Jack normally have lots to do, but they're _____ busy this week.
2 The supermarket is _____ _____ expensive than the shop.
3 Rita's new flat is _____ convenient for shopping.
4 Your coat is _____ longer than is a fashionable coat.

5 It's _____ faster by tube. A bus is _____ chreaper than a taxi.
6 It was _____ colder than today.
7 Are you sleeping _____ better since you've been taking the pills?
8 I got up _____ later than usual.
9 If we leave _____ later than seven, we'll get caught in the rush hour.
10 I left wor k _____ earlier this afternoon.

4.6 Roger Ball and Angie Fox from the trading company of table lamps are reading a magazine article comparing three types of a famous Tiffani table lamps manufacturer. Study the information and complete their conversation as in the example. Reproduce the dialogue in pairs.

Dale Tiffany Traditional Table Lamp - $324.00

Stephen Tiffany Table Lamp - $50.00

Paul Sahlin Tiffany Table Lamp - $167.40

	Dale Tiffany Traditional Table Lamp	***Stephen Tiffany Table Lamp***	***Paul Sahlin TiffanyTable Lamp***
stylish/good looking	••	••••	•••
expensive	••••	••	•••
good/reliable	••••	••	••••
value for money	••••	••	••••

Roger: Well, what do you think of this research, Angie?
Angie: Mm, it's interesting. I think we do quite well, don't we?
Roger: Yes, it says the Dale Tiffany Traditional Table Lamp is (**1**) ***the best*** (*good*) value for money of the three and that the Paul Sahlin Tiffany Table Lamp is (**2**) _____ (*good*) value than the Stephen Tiffany Table Lamp.
Angie: Yes, did you notice that they say the Dale Tiffany Traditional Table Lamp is much (**3**) _____ (*expensive*) than the others?
Roger: Yes, they must be true ! However, it does say that Stephen Tiffany Table Lamp is the (**4**) _____ (*stylish*). I was rather disapponted by that.
Angie: Me, too. I think our table lamps are much (**5**) _____ (*good*) looking. The thing that worries me the most is our table lamps are_not the (**6**) _____ (*easy*) to buy because of high prices. That may put a lot of people off.
Roger: Yes, the Tiffani manufacturer_did very (**7**) _____ (*good*) there due to the design. The shades are of piecis of lighting glass. In fact no two pieces of lighting glass are exactly alike. These differences are not defects, but are

simply characteristic of hand crafted stained glass lamps.

Angie: Maybe that appeals to a lot of customers. The Dale Tiffany Traditional Table Lamp is (**8**) _____ (*expensive*) and that means it's the (**10**) _____ (*reliable*) too. But it may do extremely (**9**) _____ (*bad*) for our sales.

Roger: I'm not glad that the report says the Tiffani table lamps are (**10**) _____ (*reliable*).

Angie: Yes, according to this, the Paul Sahlin Tiffany Table Lamps and Dale Tiffany Traditional Table Lamps are our (**11**) _____ (*strong*) rivals. The Stephen Tiffany Table Lamp can't really compete.

4.7 Your office has been burgled and you need to replace everything you have lost. You are discussing what you've lost with a colleague. Complete the dialogue using the words given below. Reproduce the dialogue with a partner.

expensive noisy new old-fashioned complicated easier ~~modern~~

A: Let's see, do you want to get the same mobile?

B: No, the old one was not (**1**) _____ enough so I'd like to update it.

A: Right, and what do you want to do about the photocopier?

B: The old one was too (**2**) _____ . It was difficult to hear customers on the telephone. It was also too (**3**) _____ , so I think we should get one that's (**4**) _____ to use.

A: OK, what about your laptop?

B: Well, I'm going to get a (**5**) _____ one because the other one was too (**6**) _____ and it didn't have enough memory.

A: OK, I hope it won't be too (**7**)_____ !

5 SKILLS

The light source is the actual light-producing component of the lighting system. It may operate simply as a lamp (incandescent/halogen) or as a lamp powered by a ballast (fluorescent and high-intensity discharge (HID). The fixture protects the light source, connects it to the power source and distributes its light.

Here is the light guide with basic factors.

Task: Specify and compare the three basic lamp types to find similarities and differences.

Incandescent Lamps	Fluorescent Lamps	HID Lamps
● Do not require a ballast	● Require a ballast	● Require a ballast
● Warm color appearance with a low color temperature and excellent color rendering (CRI 100)	● Range of color temperatures and color rendering capabilities	● Ambient temperature does not affect light output, although low ambient temperatures can affect starting, requiring a special ballast
● Compact light source	● Low surface brightness	● Compact light source

	compared to point sources	
• Simple maintenance due to screw-in Edison base	• Cooler operation	• High lumen packages
• Less **efficacious** light source	• More efficacious compared to incandescent	• Point light source
• Shorter service life than other light sources in most cases	• Ambient temperatures and convection currents can affect light output and life	• Range of color temperatures and color rendering abilities depending on the lamp type
• Filament is sensitive to vibrations and **jarring**	• All fixtures installed indoors must use a Class P ballast that disconnects the ballast in the event it begins to overheat; high ballast operating temperatures can shorten ballast life	• Long service life
• Bulb can get very hot during operation	• Options for starting methods and lamp current loadings	• Highly efficacious in many cases
• Must be properly shielded because incandescent lamps can produce direct glare as a point source	• Requires compatibility with ballast	• Line voltage variations, possible line voltage drops, and circuits sized for high starting current requirements must be considered
• Require proper line voltage as line voltage variations can severely affect light output and service life	• Low temperatures can affect starting unless a "cold weather" ballast is specified	

http://www.lightsearch.com/resources/lightguides/fixtureselect.html

UNIT 3

LEAD-IN

1 Tick (✓) the methods of lighting which are common for you.

down lighting ☐ up lighting ☐ front lighting ☐

2 Why do people use different types of lighting? Choose and tick (✓) the reasons you think are the most important.

- ☐ To illuminate their home and the area where they work.
- ☐ To make you feel more secure about your safety.
- ☐ To create a certain mood for any event in your life.
- ☐ To create a visual interest and attract attention to an area.
- ☐ To perform various activities.
- ☐ To see and walk around safely.

2 READING

Text 1. Methods of Lighting (Способы освещения)

Lighting methods indicate how lighting is used to create an atmosphere or ambiance in a room or to highlight a focal point.

The most common method of lighting is **down lighting**, which are light fixtures on the ceiling casting light downward. This tends to be the most efficient method, used in both offices and homes. Although it is easy to design it has dramatic problems with glare and excess energy consumption due to large number of fittings.

The most common types of interior lighting to install are down-lights. Down-lights create cones or arcs of light on the walls with shadows on the ceiling. Having a single central down-light as the main light source lights the floor but leaves the perimeter and the ceiling in shadow creating a gloomy effect. This can be rectified with wall lights. When deciding where to position down-lights, consider the effect of the lighting on the walls, rather than trying to create a symmetrical pattern on the ceiling.

A less common method is **up lighting**, which bounces indirect light off the ceiling and back down. This is a less effective form of direct lighting, but it can be used to create a dramatic effect, like casting interesting shadows by shining the light through houseplant leaves or across brick or stone walls. Up lighting (indirect) uses a diffuse surface to reflect light in a space and can minimize disabling glare on computer displays and other dark glossy surfaces. It gives a more uniform presentation of the light output in operation. However indirect lighting is completely reliant upon the reflectance value of the surface. While indirect lighting can create a diffused and shadow free light effect it can be regarded as an uneconomical lighting principle.

Up-lighting gives a sense of height to a room by directing light towards the ceiling which then reflects it back. This works particularly well if the ceiling is light in colour. Up-lights can be free-standing or wall-mounted and work well at different heights. Halogen lights create sharp lines against the wall so try not to position them near paintings or furniture.

“Wall-washing” fixtures direct light evenly across a wall to provide ambient lighting. They make any room feel bigger!

Another very common method is lighting **from the front.** This method though has a tendency to make the subject appear flat because it will almost cast no visible shadows.

A less common method is lighting **from the side.** This method however, tends to produce glare near eye level.

The method of **backlighting** either around the object or through it is used mainly for accent.

Lighting designers use a range of interior lighting design techniques to achieve different moods. The overall effect is created by balancing the array of methods available. Indoor lighting needs to provide a general overall ambience, highlight specific features and be practical enough to work by.

Paintings, sculptures or architectural features can be spot-lit with focused lighting to draw attention to them. Task lighting is required in work areas in kitchens, such as counter tops where food is prepared, and for reading by. Each lighting element adds to the effect as a whole so should be considered in conjunction with the rest of the lighting.

Another important aspect of interior lighting is being able to dim the lighting to create different moods in a room. Each lighting element needs to be controlled separately to be able to vary the relative brightness between the different light sources

2.1 Reading Comprehension.

1 Which is the most efficient method of lighting?
2 Which method of lighting is regarded as an uneconomical one?
3 What can be the negative results of some methods of lighting?

Text 2. Types of Lighting (Виды освещения)

Basically, there are three types of lighting that work together to illuminate your home: general (or ambient), accent, and task (or function). A good lighting plan combines all three types to light an area according to function and style.

General lighting provides an area with overall illumination. It enables you to move about easily and safely, defines a space and customarily provides a comfortable visual environment. It is fundamental to your lighting plan. General lighting can be accomplished with pendants, chandeliers, ceiling or wall mounted fixtures, recessed or track lights and with lanterns outside your home.

Accent lighting directs additional light to a specific area, adding drama and creating visual interest. It will focus attention on art, prized possessions, and architectural features. However, be selective: if you light everything, nothing will stand out. Wall washing and grazing are two popular techniques typically used to draw your eyes to the perimeter of the room and create space and texture.

Accent lighting requires at least three times as much light on the focal point as the general lighting around it. This is usually achieved by track, recessed or wall-mounted fixtures. A line of low voltage lighting systems can be used in coves, shelves, niches, glass cabinets, and valances to create a beautiful accent.

As the name implies, **task lighting** is light to work by: it illuminates areas where work is performed. The type, angle and amount of light should be determined based on the work involved. A reading area and hobby bench require different light. All task lighting should be bright enough to prevent eyestrain and be free of glare and shadows. It can be provided by recessed and track lighting, pendant lighting, portable lamps and under cabinet lights.

Decorative lighting can incorporate any one of the three previously mentioned types of illumination. A decorative lighting fixture draws attention to itself and embellish the décor in its own right. A great example of a decorative lighting fixture would be a chandelier. However, even a pair of decorative wall sconces that complement and accentuate the surrounding décor would also fit into this fourth lighting category.

2.1 Reading Comprehension. Mark the statements as true (T) or false (F).

1 The existing types of lighting to illuminate your home never work together. ___
2 General lighting is only used to highlight the interior. ___
3 Accent lighting is used to draw your attention to the focal point. ___
4 Task lighting is common for illuminating any working area. ___
5 Decorative lighting can be provided by task, accent and general lighting. ___

3 VOCABULARY

3.1 Match the left and the right side to make word partnership.

1	overall	**a**	environment
2	visual	**b**	illumination
3	popular	**c**	décor
4	lighting	**d**	techniques
5	surrounding	**e**	systems
6	wall	**f**	lighting
7	natural	**g**	sconces

1-…; 2-…; 3-…; 4-…; 5-…; 6- …; 7-…

3.2 Match the verbs on the left with the relevant translation on the right.

1	to accentuate	**a**	выполнять, завершать
2	to accomplish	**b**	слегка касаться, задевать
3	to complement	**c**	следить, прослеживать
4	to graze	**d**	дополнять
5	to track	**e**	подчеркивать, выделять
6	to embellish	**f**	делать выемку, углублять
7	to recess	**g**	украшать

1-…; 2-…; 3-…; 4-…; 5-…; 6- …; 7-…

3.3 Complete the following paragraph with words given below. Then translate it into your native language.

. ***fatigue exposure individuals light consequence impact***

The (**1**) _____ of color and lighting conditions on the emotions and performance of people is gaining greater importance in our urban societies. Studies show that light deprivation alters brain chemistry, which causes (**2**) _____. For people who are outdoors for a significant part of each day, the quality of indoor lighting to which they are exposed may be of little (**3**)_____ . Their needs for natural light stimulation may be adequate. But for people who spend almost all of

their time indoors, and with outdoor (**4**) _____ limited to morning and evening light, there may be a need for artificial lighting that is supplemented with light stimulation in the spectrum areas of energy deficiency especially blue.

While high doses of UV (**5**) _____ may contribute to health-related problems, the doses received from the lights from an 8 hour day are the equivalent of less than 15 minutes in the sum. This level is well within the ranges recommended for most (**6**) _____ . So heed the experts' advice and experience natural indoor lighting today, raise your spirits, save our eyes and see what you've been missing!

3.4 Fill in the remaining gaps in the table.

Person (device) noun	Abstract noun	Verb	Adjective	Adverb
_____	protection	_____	_____	_____
_____	_____	illuminate	_____	_____
_____	_____	_____	perceptible	_____
_____	_____	_____	_____	safely
_____	practice	_____	_____	_____
_____	_____	light	_____	_____
_____	_____	_____	decorative	_____
_____	_____	_____	_____	alternatively

3.5 Group the following lamps according to the titles in the table (six styles in each group). Then decide which ones could be used for the types of lighting discussed in Text 2.

Floor Lamps ____ ____ ____ ____ ____ ____

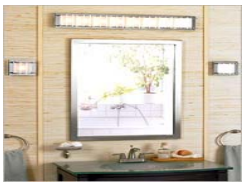
Wall Lamps ____ ____ ____ ____ ____ ____

1.Three Globe Floor Lamp

2.Wall Sconces

3.Traditional

4.Bathroom Lighting



5.Contemporary

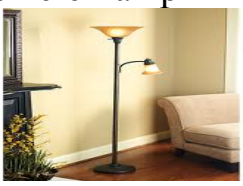
6.Black Metal and White Glass Tulip 4 Light Floor Lamp

7.Candle Wall Light

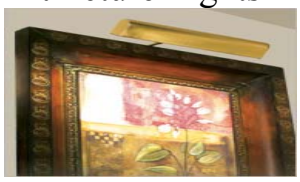
8.Plug-In

9.Under Cabinet Lights

10. Torchiere Lamp



11. Picture Lights



12. Arc Floor Lamp

4 LANGUAGE REVIEW

• **Comparison structures:** ***as…as, not so …as, the more… the less, the same as; the + comparative*; *so* and *such, enough* and *too* with adjectives.**
• **Adjectives ending in *-ing* and *-ed***

4.1 Read these comments about the restaurant. Complete them with the comparative form of the words in brackets to show cause and effect or a change.

1 A: I can't believe the size of this menu. It's going to take me forever to choose.
B: *The longer* the menu, *the more difficult* the choice is.
(long) ***(difficult)***

2 A: They say the food here is getting _____ and _____ .
(good)
B: And _____ the food, _____ _____ it is.
(good) ***(expensive)***

3 A: The service seems a little slow tonight.
B: Yes, _____ _____ the restaurant, _____ _____ the service.
(popular) ***(slow)***

4 A: The cigarette smoke here is getting _____ and _____ .
(bad)
B: _____ the room, _____ my cough gets.
(smoky) ***(bad)***

5 A: It's pretty loud in here.
B: _____ _____ the restaurant, _____ _____ it is.
(crowded) ***(noisy)***

6 A: They certainly give you a lot of food. I can't eat any more.
B: _____ the portions, _____ it is to finish.

(big) *(hard)*

7 **A:** Their desserts keep getting _____ and _____.
(delicious)

B: And I keep getting _____ and _____.
(heavy)

4.2 Match the structures of comparison on the left with the relevant sentences on the right.

1	This ball is **as big as** the other ball.	**a**	Compare three or more things → *superlative degree.*
2	This ball is **bigger than** the other ball.	**b**	Compare two things, which are the same → *positive degree*
3	This ball is **the biggest of** them all.	**c**	Compare two things with each other → *comparative degree*

1- …; 2- …; 3- …

4.3 Complete the sentences using *so* and *such, enough* and *too.*

1 We couldn't see what was in the room because it was _____ dark.
2 They didn't go to the beach yesterday because the weather wasn't warm _____ .
3 Don't be _____ foolish!
4 The flat isn't really big _____ for all of us.
5 I couldn't hear everything she said because she spoke _____ quietly.
6 It's _____ an interesting town; there really is _____ much to do there.
7 I was _____ disappointed when I failed my driving test.
8 Doctors say that _____ much sugar it bad for you.
9 There were _____ many people on the train.
10 He works _____ quickly and makes a lot of mistakes.

4.4 Complete each sentence with *as … as, not so … as, the same as.*

1 The other students learn more quickly than me.
I don't learn _____the other students.
2 You're very angry and I'm very angry also.
I'm _____ you.
3 The price for the seats at the front is expensive (high). The price for the seats at the back is expensive too.
The price for the Seats at the front is _____the price for the Seats at the back .
4 Central Park in New York is bigger than Hyde Park in London.
Hyde Park in London isn't _____Central Park in New York.
5 Her last film is very good and her new film is also very good.
Her last film is _____her last film
6 The report of Mr Smith was very short. The John's report was very short too.
The report of Mr Smith was _____ the John's report.

4.5 Complete the sentences. Use the correct form of the adjective.

1 John was flying on the _____ plane he had ever seen. (***big***)
2 From high in the sky the cars looked _____ than ants. (***small***)
3 Frightened, John decided to be _____ about future travel. (***careful***)
4 He thought that the _____ travel might be by car. (***good***)
5 Then John saw one of the _____ sunsets ever. (***beautiful***)
6 Maybe flying was not the _____ way to travel, after all. (***awful***)

4.6 Complete the conversations using a word ending in *-ing* or *-ed.* Mind the use of the *–ing* and *–ed* forms of the verbs.

- *confus**ed**, bor**ed**, exit**ed** etc.* say how people fell
- *confus**ing**, bor**ing**, exit**ing** etc.* describe the things (or people) that cause the feeling

1 ***Daniel:*** The museum was interesting, wasn't it?
Rachel: It was OK. I was quite _____ in those old maps.
2 ***Vicky:*** It was annoying to lose my ticket.
Emma: You looked really _____ when you had to buy another one.
3 ***Sarah:*** You look exhausted. You should go to bed.
Mark: Driving down from Scotland was pretty _____ .
4 ***Trevor:*** I think I need to relax.
Laura: Well, lying by the pool should be _____ .
5 ***Matthew:*** I'm fascinated by these old photos.
Emma: I always find it _____ to see what people looked like as children.

4.7 Complete the sentences with *'the … the'*. Use the expressions given after the model.

older, longer	***less, dangerous***	***less, longer***	***more, more***
less, warmer	***darker, more***	***more, longer***	***less***

1 … he drove, … we laughed.
2 … I live here, …I like it.
3 … I get, … my hair gets.
4 … money he lost, … it made him unhappy.
5 … I learn, … I forget and …I know.
6 … I get to know you, … I understand you.
7 … clothes she buys, … clothes she wants to buy.
8 … money he has, … useless things he buys.
9 … it got, … time we spent on the beach.
10 … he reads, … he forgets.
11 … she ignores him,… he loves her.
12 … he drives, … nervous he gets.
13 … it is, ... I like it.
14 … money we spent, … friend we have.
15 …. I sleep, … tired I am.

4.8 Read the conversation between Martin and Louise about their friend Alice. Choose and underline the correct words to complete the conversation. Then dramatize the conversation.

Martin: What's the matter with Alice?
Louise: Who knows? She's always (**1**) ***annoyed/~~annoying~~*** about something.
Martin: I know. I try to understand her but this time I', really (**2**) ***puzzled/ puzzling.***
Louise: Really? What's so (**3**) ***puzzled/ puzzling*** this time?
Martin: I thought she was happy. She met an (**4**) ***interested/interesting*** guy last week.
Louise: That's nice. Was she (**5**) ***interested/interesting*** in him?
Martin: I thought she was. She said they saw a (**6**) ***fascinated/fascinating*** film together.
Louise: Well, maybe she was (*7*) ***fascinated/fascinating*** by the film but (**8**) ***disappointed/ disappointing*** with the guy.
Martin: I don't know. It's hard to tell with Alice. Her moods are always very (**9**) ***surprised/surprising***.
Louise: I'm not (**10**) ***surprised/surprising*** at all. That's just the way she is.

5 SKILLS

For general lighting in industry, two basic types of lighting solutions are available:

1. Lighting solutions based on linear light sources.
2. Lighting solutions based on point light sources.

The comparison is based on three characteristics: lighting, installation and maintenance.

Task: Make a lighting design decision on the basis of a decision scheme with typical characteristics.

Room and environmental characteristics	Fluo line	Fluo point	CDM point	HID point	Information
Low mounting height (<6 m)	+	○	○	○	
Very high mounting height (>18 m)	○✳	○✳	○	+	✳80/95/120W
Space is not climate controlled (e.g. outdoor)	_	_	○	+	
Extreme ambient temperature (e.g. cold stores, heat-generating industry)	_✳	_✳	+	+	✳Polar version
Lighting characteristics / lighting quality					
Dimmable installation is needed (e.g. daylight linking, different lighting levels at different times of the day)	+	+	_	○✳	✳SON only
Vertical illumination is needed	+	○	_	_	
Large obstructions within the space (uniformity)	+	○	○	○	
Instant restrike is regarded	+	+	_	_	
Colour rendering is critical	+	+	+	○	
Colour rendering > 80 is required	+	+	+	_	
Improved colour rendering (e.g. print industry)	○✳	○✳	○✳	_	✳De Lux Pro,

					Graphica Pro, CDM-T 942
Maintenance					
Difficult maintenance (e.g. 24/7 operations, process industry)	○✳	+✳	–	–	✳Xtra, Xtreme
Extra safety required (e.g. food and pharmaceutical industry)	+✳	+✳	–	○	✳Secura
Fixtures are likely to get bumped	○	○	○	+	

✳ applicable solution, preferred
○ applicable solution
+ not applicable

UNIT 4

1 LEAD-IN

1 Read the information in the table and tick (✓) which form of lighting is the best for the following purposes:

	Indoor lighting	*Outdoor lighting*
To illuminate any facility of your home	_____	_____
To find the lighting solution for your space	_____	_____
To match your personal style	_____	_____
To create the mood you want for your home or business	_____	_____
To provide better vision and perception of things	_____	_____
For security purposes	_____	_____

2 READING

Text 1. Forms of Lighting: Indoor lighting (Типы освещения)

Forms of lighting include **alcove lighting**, which like most other up lighting is indirect. This is often done with fluorescent lighting (first available at the 1939 World's Fair) or rope light, or occasionally with neon lighting. It is a form of backlighting.

Soffit or close to wall lighting can be general or a decorative wall-wash, sometimes used to bring out texture (like stucco or plaster) on a wall, though this may also show its defects as well. The effect depends heavily on the exact type of lighting source used.

Recessed lighting (often called "pot lights" in Canada, "can lights" or "high hats" in the US) is popular, with fixtures mounted into the ceiling structure so as to appear flush with it. These downlights can use narrow beam spotlights, or wider-angle floodlights, both of which are bulbs having their own reflectors. There are also downlights with internal reflectors designed to accept common "A" lamps (light

bulbs) which are generally less costly than reflector lamps. Downlights can be incandescent, fluorescent, HID (high intensity discharge) or LED.

Track lighting, invented by Lightolier, was popular at one point because it was much easier to install than recessed lighting, and individual fixtures are decorative and can be easily aimed at a wall. It has regained some popularity recently in low-voltage tracks, which often look nothing like their predecessors because they do not have the safety issues that line-voltage systems have, and are therefore less bulky and more ornamental in themselves. A master transformer feeds all of the fixtures on the track or rod with 12 or 24 volts, instead of each light fixture having its own line-to-low voltage transformer. There are traditional spots and floods, as well as other small hanging fixtures. A modified version of this is cable lighting, where lights are hung from or clipped to bare metal cables under tension.

A **sconce** is a wall-mounted fixture, particularly one that shines up and sometimes down as well. A torchiere is an up-light intended for ambient lighting. It is typically a floor lamp but may be wall-mounted like a sconce.

The **portable** or **table** lamp is probably the most common fixture, found in many homes and offices. The standard lamp and shade that sits on a table is general lighting, while the desk lamp is considered task lighting. Magnifier lamps are also task lighting.

The illuminated ceiling was once popular in the 1960s and 1970s but fell out of favor after the 1980s. This uses **diffuser panels** hung like a suspended ceiling below fluorescent lights, and is considered general lighting. Other forms include neon, which is not usually intended to illuminate anything else, but to actually be an artwork in itself. This would probably fall under accent lighting, though in a dark nightclub it could be considered general lighting.

In a movie theater each step in the aisles is usually marked with a row of small lights, for convenience and safety when the film has started, hence the other lights are off. Traditionally made up of small low wattage, low voltage lamps in a track or translucent tube, these are rapidly being replaced with LED based versions.

2.1 Reading Comprehension

1 How many lighting fixtures for indoor lighting are mentioned in the text?

2 What do you think is the most common lighting fixture among the variety of indoor lights?

3 What proper purposes can be satisfied with the lighting fixtures discussed in the text?

Text 2. Forms of Lighting: Outdoor lighting

Outdoor lighting has both functional and decorative purposes. Adequate lighting is important and can help keep homeowners and their guest's safety. When lighting is too dim or non-existent, individuals are at risk of tripping and falling. Besides the issue of safety, another, though less important purpose for outdoor lighting is aesthetics. It is also a pretty inexpensive way to beautify one's home.

There are many places where individuals can add outdoor lighting to their homes. Along pathways, around the pool, patio, the deck and standing alone are all options. With a little planning and good design, a person really can transform their outdoor space.

The primary functional use of outdoor lighting is safety. Individuals are at risk of falling down and hurting themselves when they are unable to see where they are going. Walking up and down steps, along paths, near pools and ponds without being able to see can be quite dangerous, not only for the person living in the house but also for individuals who come to visit. A homeowner can be held responsible if someone comes on their property and hurts themselves. The risk that someone will get hurt increases when a homeowner fails to provide basic safeguards such as lighting. Placing lights around one's home where people will be trafficking makes good sense and is a pretty inexpensive way to improve safety.

Not only can outdoor lighting keep people from hurting themselves while on a homeowner's property, it can also keep the homeowner safe. Lights can illuminate places where burglars may be hiding, helping persons feel safer and also acting as a crime deterrent.

There are a number of outdoor lighting options. Outdoor wall, ceiling, hanging and post lighting are but a few. Lighting features come in different styles and create varying visual effects. It is a good idea of individuals to consider matching a fixtures style with their home. For example, if a person lives in a grand home, then there light fixtures should also be grand. If a home is ornate, the lighting should be similar in style. This helps to give the home a cohesive sense of style and appearance.

There are a number of outdoor lighting techniques. A few common ones include path lighting, up lighting, down lighting, accent lighting and backlighting. Path lighting involves placing lamps or whatever particular lighting style a person prefers, along the pathways on a person's property. These lights help individuals move from one part of the property to another, safely.

Up lighting is placed in positions where it is facing up, illuminating an object from below. Flood lights and spot lights, as well as in-ground lighting are all great options for the up lighting technique. Down lighting allows property owners to illuminate objects from above. Back lights are placed behind the objects an individual wants to bring attention to. The exact lighting techniques that a person uses will be dependent upon what effect they want the lighting to have. Experimenting with placement until it gives the right effect is one way to approach lighting design.

.

2.2 Reading Comprehension.

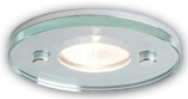
1 What are the two purposes of the outdoor lighting?
2 What methods are possible for outdoor lighting?
3 What types of lighting fixtures for outdoor lighting are mentioned?

3 VOCABULARY

3.1 Match the types of lamps for indoor lighting to the pictures.

1	chandelier	____	**9**	reading light	____
2	ceiling light	____	**10**	rise and fall lights	____

3 desk lamp ____
4 down light ____
5 floor light ____
6 lampshade ____
7 picture light ____
8 pendant light ____
11 spot light ____
12 table lamp ____
13 track light ____
14 under cabinet light ____
15 wall light ____

a
d
g
j
m 

b
e
h
k
n

c
f
i
l
o

3.2 Match the types of lamps for outdoor lighting to the pictures.

1 well light ____
2 landscape light ____
3 underwater light ____
4 hanging (pendant) light ____
5 close to ceiling light ____
6 flood light ____
7 security light ____
8 patio and porch light ____
9 outdoor ceiling fan ____

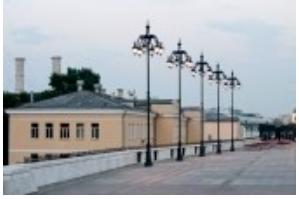
a
d
g

b
e
h

c
f
i

3.3 Match the type of a lighting fixture for outdoor lighting to its functional use.

1 ***street lights***



2 ***floodlights***

3 ***beacon lights***

4 ***security lights***

5 ***entry lights***

6 ***underwater lights***

a **…**are used to illuminate outdoor playing fields or work zones during nighttime. The most common type of floodlights are metal halide and high pressure sodium lights.

b **…** are used to light roadways and walkways at night. Some manufacturers are designing LED and photovoltaic luminaires to provide an energy-efficient alternative to traditional street light fixtures.

c **…** can be used along roadways in urban areas, or behind homes or commercial facilities. These are extremely bright lights used to deter crime. Security lights may include floodlights.

d **…** can be positioned at the intersection of two roads, in a lighthouse to aid in navigation or on a vehicle to ensures machinery an easily seen.

e **…** are used for accent lighting near ponds, fountains, swimming pools and the like.

f **…** can be used outside to illuminate and signal the entrance to a property. These lights are installed for safety, security, and for decoration.

1- …; 2- …; 3- …; 4- …; 5- …; 6- …

3.4 Complete the following paragraph with words given below. Then translate it into your native language.

fixture ***activities*** ***button*** ***controls*** ***intensity***

Lighting (**1**) _____ are very important elements of your lighting plan. Because such a wide variety of (**2**) _____ takes place in every room of your home, it becomes crucial that you be able to adjust the (**3**) _____ of the light to suit the task at hand. A dimmer or control system will do it! Controls allow you to alter the mood of a room with the touch of a (**4**) _____. They conserve energy and increase bulb life. And today, lighting controls can handle a single (**5**) _____ or a whole house.

3.6 Use the words in brackets to complete the sentences. Add the necessary suffix and put the word in the correct form.

1 Lighting should be _____ to complement our lifestyle. (PLAN)
2 Learn as much as you can about _____ to maximize your benefits. (LIGHT)
3 Vertical illumination becomes necessary for blackboards in _____ institutions. (EDUCATION)
4 Main purpose of industrial lighting fixtures is to cover the _____ work area effectively. (SPECIFY)
5 Decisions must be made as to how much light is_____ . (REQUIRE)

4 LANGUAGE REVIEW

• Adverbs; formation of adverbs; • order of adverbs; • comparisons of adverbs; • adverbs of degree: *quite – rather*

4.1 Match the types of adverbs to the relevant sentences with adverbs.

1	adverbs of **manner**	**a**	He is ***always*** ready to help.
		b	Sam ***often*** complains about his salary.
		c	Tim is ***usually*** prepared.
2	adverbs of **degree**	**d**	There is a café ***nearby***.
		e	I'll meet you ***tomorrow.***
		f	Shall I wait ***outside***?
3	adverbs of **frequency**	**g**	She ***easily*** passed the exam.
		h	We are ***eagerly*** waiting for his letter.
		i	He acted ***foolishly***.
4	adverbs of **place** and **time**	**j**	This is ***totally*** unacceptable.
		k	They arrived ***rather*** early.
		l	We ***absolutely*** love her sense of humour.
5	adverbs of **opinion**	**m**	I've known Susan ***for five years.***
			I haven't seen him ***since January.***
			I arrived here ***two months ago***.
		n	I'll wait here ***till (until)*** 5 o'clock.
			She won't arrive ***by*** 5.
		o	We had a lot of fun ***during/in*** the holidays.
			We stayed in Paris ***for a week***.
6	adverbial phrases of **duration**	**p**	***Hopefully*** the situation will get better.
		q	Her work record is ***quite honestly*** awful.

r ***In actual fact*** I think she's wrong.

1	___	___	___	**3**	___	___	___	**5**	___	___	___
2	___	___	___	**4**	___	___	___	**6**	___	___	___

4.2 Examine the following table. Mind the position of adverbs in the sentence. Underline all types of adverbs and translate the sentences into your native language.

Front position	***Mid position***	***End position***
Finally he could stand the noise no longer.	We *almost* missed our way.	He worked in the room *quietly.*

1 I expect Sue to win the race easily.
2 He greatly regretted missing the concert.
3 I secretly hated playing the piano.
4 She kindly offered to do the work.
5 I don't pretend to understand instructions completely.
6 As a result, Japan faces crises.
7 Tomorrow the weather will be much cooler.
8 We considered the probable briefly.
9 I first met him in 1995.
10 Next, add three teaspoons of sugar.

4.3 Supply the right adverb of manner. Some adverbs end in –*ly* and some do not.

1 She's a ***hard*** worker. She works _____ .
2 He's a ***fast*** runner. He runs _____ .
3 This is an ***airmail*** letter. Send it _____.
4 The train is ***early***. It has arrived _____.
5 My name is ***last***. I come _____ .
6 The bus was ***late***. It came _____ .
7 I get a ***monthly*** bill. I pay _____ .
8 He's a ***quick*** thinker. He thinks _____ .

4.4 Answer each question in full putting the adverb of frequency a) in the middle and b) at the beginning.

1 Do you ever bring work home from the office? (often)
I often bring work home from the office. Often, I bring work home.
2 Does John leave home before his wife does? (***normally***)
_____
3 Have ever forgotten to lock the back door? (***frequently***)
_____
4 Do you know when to wake up? (***usually***)

_____

5 Are the one who pays bills? (***generally***)

_____

6 Is the traffic heavy in the morning? (***often***)

_____

7 Do ever have power cuts? (***sometimes***)

_____

8 Are there complains about the service? (***often***)

_____

4.5 Complete each sentence using the correct adverb of degree in brackets. Sometimes either word is possible. Consult the following scheme.

_____	●	_____	●●	_____	●●●	_____	●●●●	_____
	fairly *good*		***quite*** *good*		***rather/pretty*** *good*		***very*** *good*	

Examples*:** She's ***quite a generous woman. (***quite/fairly***)
It's ***rather/fairly*** cold in this room. (***rather/fairly***)

1 I've made _____ a stupid mistake. (***pretty/rather***)
2 She _____ enjoys working at night. (***fairly/quite***)
3 It was a _____ boring report of the company activity. (***pretty/rather***)
4 I'm _____ looking forward to the party on Saturday. (***pretty/quite***)
5 The weather was _____ worse than we'd expected. (***quite/rather***)
6 Mr Spenser speaks English _____ well, doesn't he? (***quite/ pretty***)
7 I'm feeling _____ better today. (***fairly/ rather***)

4.6 Put in the adverbs of duration *during, in, by, till, since, for* or *ago* to complete the passage .

Peace and Quiet

I moved to this area seven years (**1**) *ago*, (**2**)_____ years I have had noisy neighbours. Ever (**3**) _____ I moved into this flat, I've had to put up with noise (**4**) _____ the night. I decided I'd had enough and I've been looking for a new flat (**5**) _____ the beginning of the year. I haven't found anything (**6**) _____ now. Every week I go to the local estate agent's office, but it's the same story. "I might have something (**7**) _____ the end of the week," he says, or, "Wait (**8**) _____ next week. I think I might have a few flats (**9**) _____ then." I've seen a few flats (**10**) _____ my search, but I don't like any of them. One flat I saw has been empty (**11**) _____ two years. "It's got a busy road on one side and a railway on their other!" I exclaimed. "I want peace and quiet." Last week I visited the agent again. "I won't leave (**12**) _____ you show me something," I said. He smiled and said, "I've got just the flat for you." I went to see it and I was horrified. "But it's next to a cemetery!" I

cried. “But you won’t have noisy neighbours,” my agent said.” It’s ideal for peace and quiet!”

4.7 Adverb position.

A Complete this e-mail by placing the adverbs in the correct position on each line.

Hi! Thanks for your last e-mail. I’m sorry I haven’t	***very***
got back to you sooner but we’ve been rushed	***terribly***
in the office. We seem to be so busy.	***always***
It seems the launch has been successful,	***remarkably***
beyond our wildest dreams in fact. We are delighted	***obviously***
and we have had a large order from a company	***already***
in China. This is fabulous news. See you soon.	***absolutely***

B Insert the adverbs into each line of this message in the most natural position.

Thank you for the e-mail you sent. I have spoken to Eric	***yesterday;already***
but he says he is waiting for confirmation from the board	***still***
before we can go ahead with the proposed changes. The delay	***quite frankly***
is getting on my nerves but I hope to get started on the project.	***very soon***
As is the case, we will receive confirmation at the last	***often; suddenly***
minute and have to work for the next couple of months	***flat out***
in order to get into production.	***fast***

4.8 Read the conversation between colleagues. Complete it with the comparative and superlative forms of the words in brackets. Add *the* and *than* where necessary.

Billy: Did you hear about that new speed-typing course? It helps you type (**1**) …*faster* … (***fast***) and (**2**) _____ (***well***).

Michael: I don’t believe it! The (**3**) _____ (***fast)*** you type, the (**4**) _____ (***many***) mistakes you make .

Billy: The advert says that after the course, you’ll type ten times (**5**) _____ (***rapidly***) and can do five times more typing. And the best thing is that you won’t have to work any (**6**) _____ (***hard***).

Michael: I’d like to see that. Not long ago I typed (**7**) _____ (***slowly***) of any colleague in my office and I remember that my practice (**8**) _____ (***clear***).

Billy: Maybe you could type even (**9**) _____ (***quickly***) that . That way, you’d have more time to do your paperwork.

Michael: Did you read the course description (**10**) _____ (***proper***)?

Billy: I read it (**11**) _____ (***thoroughly***) I read most things.

5 SKILLS

Fluorescent lighting is a type of electrical lamp choice that works through the use of mercury and neon gas, producing a chemical reaction; standard incandescent

bulbs, on the other hand, work by reacting to heat. Fluorescent lighting used to be office-only lightning, but is now becoming more and more popular in homes because of their many advantages. If you are considering fluorescent lighting for your home, here are some of the advantages and disadvantages of this type of lighting to help you decide if it's right for you.

Task: Discuss advantages and disadvantages of fluorescent lighting in groups of four or five students using the information below. Support your opinion with the examples from your personal experience.

ADVANTAGES

- Fluorescent lighting is 66 percent cheaper than regular lighting while providing the same brightness. When you consider that a quarter of any home's electrical consumption is done through light bulbs, the savings can add up considerably.
- Fluorescent lighting lasts longer. On average, a fluorescent tube has a lifespan six times longer than a regular incandescent bulb. They tend to burn less after continuous use, and can be turn on and off without being afraid of burning it.
- Fluorescent lighting does not give off heat, which makes them great for area lightning and for areas where additional heat can cause equipment to malfunction or bother the users.

DISADVANTAGES

- The initial cost of fluorescent lighting can be up to three times higher than other types of bulbs. Many people see this as meaning that fluorescent lighting is more expensive, but the truth is quite the opposite, since fluorescent lights last longer and save money in the long run.
- Some fluorescent lighting may require professional installation the first time around, as the electrical connections are more complex.
- Fluorescent lighting can flicker noticeably and produce an uneven light that may bother some users. Once the flicking becomes obvious to the eye, there is no choice but to replace the lamp.
- Fluorescent lighting is less attractive. Unless you invest in special decorative ways to hide the lamps, they are often visible and can take a lot from the visual aspect of the room. Fluorescent lighting only comes in bright white, which means they cannot be used for mood lighting.

http://www.wisegeek.com/what-are-advantages-and-disadvantages-of-fluorescent-lighting.htm

MODULE 2.2

UNIT 5

1 LEAD-IN

Create a vocabulary map based around the word *(electric) light (Two examples are given.)*. Add as many other words and word combinations as you can. Use a dictionary to help you.

_____ *soft ambient ~*_____		_____
_____*~ travel* _____		_____
_____	***(electric) light***	_____
_____		_____
_____		_____

2 READING

Text 1. Industrial Lighting Equipment

The types of fixtures used in industrial spaces are limited compared to the vast array of equipment available for other work places. Appropriately applied, however, they can help to create a comfortable and energy effective environment.

Linear fluorescent fixtures with slotted reflectors are designed to minimize accumulation of dirt by allowing upward air-flow. Lenses of diffusers are uncommon for this reason. Where airborne particles call for greater protection, dust-tight covers are used. In damp locations, diffusers with vapour-tight gaskets are necessary. Improvements in fluorescent lamp technology, with the introduction of height output T-5 lamps, have made fluorescent an attractive alternative to more commonly used HID fixtures.

High intensity discharge (HID) fixtures designed for metal halide lamps is often categorized as high-bay fixtures or low-bay distribution. The light distribution of high-bay fixtures is usually symmetrical, and is often adjustable to produce narrow to medium wide (44 – 60 degrees) with spacing criteria values of 1.0 or less. This light distribution is meant to concentrate light on horizontal work surfaces from lofty mounting heights of 25 feet or more.

Aisle-lighting fixtures designed with asymmetric light distribution to specifically solve the unique requirements of this kind of area. In two directions, perpendicular to the stacks, the light distribution is high and broad to light the stored material top to bottom. Parallel to the aisle, light distribution is narrow so that workers are not disturbed by high angle light as they travel down the aisles.

Both twin-tube and linear fluorescent fixtures equivalent to HID are available; typically these have better colour rendering properties.

Here is the selection of equipment for industrial lighting.

1.Metal halide high-bay reflector

2.Metal halide open prismatic glass reflector

3.Resessed metal halide aisle-lighting

4.Metal halide low bay reflector

5.Metal halide, pole top, prismatic glass lighting

6.Swing Arm HID Metal Halide Light

7.Wall-pack LED industrial lighting for harsh conditions

8.Aquarium Metal Halide lamp

9.30 – 100W LED High Bay Light

10. Fluorescent Pendant Industrial Reflector (Grid Lamp / Grille light)

11.Pendant highly efficient diffused type T5/T8 fluorescent light fixture

12.Professional construction and industrial lighting

2.1 Reading Comprehension.

1 What is a comfortable and energy effective environment at work provided by?

2 What types of lamps are more commonly used for industrial illumination?

3 What types of lights provide symmetrical/asymmetrical illumination of a working plane?

Text 2. Lighting System

A lighting system comprises a lamp (the artificial source of light), luminaires and the control gear. Commercial luminaires can be categorized into general or industrial. Luminaires are also characterized by the way they control and direct light i.e. luminous intensity, luminous distribution and the number of lamps. Although the use of mirrors in luminaires is avoided as they cause glare the modern luminaires do have properly positioned mirrors to act as reflectors. Efficiency of a luminaire is characterized in terms of **l**ight **o**utput **r**atio (LOR). This includes both downward as well as upward light. Practically DLOR (downward LOR) is of importance.

Luminaires for hazardous areas should maintain temperature and hence are encapsulated to resist pressure. Gasketted luminaires which are completely sealed protect the inside from moisture and dust. Emergency lighting should have self-supporting power system to provide lighting when normal lighting fails.

Control gears are the accessories that help in controlling the required amount of light flux on the work plane. Gas discharge lamps are constant current devices. Constant current is achieved by the use of ballast which limits the amount of current in an electric circuit and provides proper starting conditions. It should have as high power factor as possible. To improve power factor capacitors are used in series. Excepting high pressure mercury vapour lamps, all lamps have starting voltage more than spark over voltage, hence require starters and igniters to be used as starting devices. Igniters are small three electrode devices which are fired by controlled pulses from small electronic circuits. Apart from local and general lighting dimmers/timers are used in lighting systems to have good control and direction of light.

2.1 Reading Comprehension

1 What are the main components of a lighting system?
2 What exactly does a lighting system control?
3 What accessories help control the required amount of lighting?

3 VOCABULARY

3.1 Match the word combinations from Text 1 and Text 2 to the relevant translations into your native language.

1	commercial luminaire	**a**	пыленепроницаемый источник света
2	gasketted luminaire	**b**	источник света общего назначения
3	control gear	**c**	коэффициент мощности
4	power factor	**d**	механизм/прибор управления
5	work plane	**e**	рабочая поверхность
6	linear fixture	**f**	освещение прохода
7	aisle lighting	**g**	линейное приспособление

1-…; 2-…; 3-…; 4-…; 5-…; 6-…; 7-…

3.2 Match the left and the right side.

1	***beam***	**a**	An observable characteristic produced by light rays with different wavelengths. The seven colors seen in the spectrum are: red, orange, yellow, green, blue, indigo, and violet.
2	***colour***	**b**	A ray of light. A laser produces a narrow beam of light.
3	***illuminate***	**c**	Form of electromagnetic radiation that can be detected by the eye. Light allows human beings to see.
4	***light***	**d**	To light up something. It is easier to see an object when it is illuminated.
5	***spectrum***	**e**	Having the property of allowing light to pass through. Clear water and glass are transparent.

6	***translucent***	**f**	The colors that make up white light. These colors are found in a rainbow.
7	***transparent***	**g**	Having the property of allowing some light to pass through, although some of the light that strikes is scattered. Some examples of translucent objects are frosted glass, thin cloth, and paper.

1-…; 2-…; 3-…; 4-…; 5-…; 6-…; 7-…

3.3 Complete this paragraph with correct alternatives.

Industrial **(1)**_____ , like all workplaces, require well planned lighting systems to support various **(2)**_____ . Appropriate quantities of light are essential, but quality **(3)**_____ are just as important in providing a comfortable and safe working atmosphere. When the lighting **(4)**_____ both quantity and quality needs, it adds measurably to **(5)**_____ performance and productivity.

Quality lighting also contributes to the comfort and **(6)**_____ of manufacturing personnel. It also contributes to their safety, especially **(7)**_____ moving machinery. Glare control, balanced **(8)**_____ ratios and reduced lamp flicker or strobe effect must be taken into **(9)**_____ to ensure safety and security in the work place.

1	**a**	house	**b**	building	**c**	room
2	**a**	activities	**b**	movements	**c**	figures
3	**a**	questions	**b**	words	**c**	issues
4	**a**	directs	**b**	meets	**c**	approves
5	**a**	worker	**b**	person	**c**	friend
6	**a**	training	**b**	production	**c**	productivity
7	**a**	on	**b**	around	**c**	between
8	**a**	brightness	**b**	heat	**c**	air
9	**a**	mind	**b**	head	**c**	account

1-…; 2-…; 3-…; 4-…; 5-…; 6-…; 7-…; 8-…; 9-…

3.4 Put the words in brackets into the correct form to complete the sentences.

1 Our lighting consultants are _____ trained and qualified to layout and suggest lighting combinations. (PROFESSION)

2 Lighting is classified by intended use as general, accent, or task lighting, depending _____ on the distribution of the light produced by the fixture. (LARGE)

3 There is a trend nowadays for road lighting to be _____ directed. (GOOD)

4 Properly-designed full cutoff lighting reduces _____ costs, saves energy and prevents light pollution. (OPERATE)

5 HID lights get their name from the intense white light produced by _____ discharge. (ELECTRICITY)

3.5 Complete sentences *1)* to *7)* with suitable endings *a)* to *g).*

1	Better performing equipment	**a**	drastically shorten bulb life.
2	HID lights are used in higher	**b**	energy efficient than HIDs.

3	Too high or low a temperature can	**c**	with high ceilings.
4	Flourescents are more	**d**	ceilings and outdoor applications
5	Replacing bulbs can be a huge problem	**e**	costs more and vice versa.
6	More advanced lighting technologies	**f**	of 15 feet or higher.
7	"High-bay" refers to ceiling heights	**g**	become commercially available every year

1-…; 2-…; 3-…; 4-…; 5-…; 6-…; 7-…

4 LANGUAGE REVIEW

- **Modal verbs to express prohibition, obligation/duty/ necessity, absence of necessity.**

- Prohibition (*mustn't-can't*)
- Obligation / Duty / Necessity (*must-have to-should/ought-need*)
- Absence of necessity (*needn't/don't have to, didn't need to – needn't have done)*

Task 4.1 Fill the gaps with *needn't have* or *didn't need to* and the correct form of the verb in brackets.

1 I ran all the way to work, but I ...*needn't have hurried*... (***hurry***) because I was the first person to arrive.
2 We _____ (***hurry***), so we stopped to have lunch on the way.
3 I went to the Academy today, but I _____ (***go***) as all the lectures were cancelled.
4 I _____ (***ask***) the way to the Information Center, since I'd been there before.
5 I (***buy***) any food, so I didn't go to the supermarket.
6 I (***buy***) any food after all, because we had plenty at home.
7 I _____(***pack***) my shorts, as it rained all week. We _____ (***pack***) many things, as we would only be away for one night.

4.2 Fill in the gaps with *must, mustn't* or *needn't/don't have to*.

A: You ...*must*... study hard to pass the exams.
B: I know. I study every evening.
A: You _____ be late for your job interview.
B: I know. I'll leave early so as to get there on time.
A: Shall I collect the children from the party?
B: No, you _____ collect them. Mrs Shaw is giving them a lift home.
A: Do you want me to wait for you after work?
B: No, you _____ wait. I can walk home by myself.
A: You _____ interrupt while people are talking.
B: No. It's very bad manners to do that.
A: My dog has been ill all week.
B: Oh dear! You _____ take him to the vet.
A: It's Sally's birthday on Wednesday.

B: I know. I _____ remember to buy her a present.

A: Shall I wash the dishes for you?

B: No, you _____ do that. I'll do them later.

4.3 Use suitable forms of *have to* only when it is impossible to use *must.*

1 You _____ take a taxi if you intend to catch the next train.

2 Since the new boss took over, we _have had to_ change our working methods.

3 We _____ talk about this again tomorrow.

4 If you _____ bring up a large family, you wouldn't have had so much money to spend.

5 I was late for work this morning because I _____ go to the bank first.

6 I (not) _____ speak French since I was at school.

7 I hate _____ wait for people who don't know how to keep appointments.

8 He _____ get up early tomorrow morning if he wants to see the sunrise.

4.4 Supply the forms *must* or *have (got)* to which 'feel right' in the sentences. Sometimes more than one form is possible.

1 We really _must__ do something about having this house decorated.

2 We _____ pay this electricity bill by the end of the week.

3 You _____ write and let us know you've arrived safely.

4 I _____ be at my desk by 9.00 every morning.

5 We always _____ clock in when we arrive at work.

6 ALL VISITORS _____ REPORT TO THE DUTY OFFICER.

7 _____ you always slam the door when you come in?

8 You really _____ come and see the new extension to our house some day.

4.5 Use a construction with *have to* in place of the words in italics.

1 ***It will be necessary for him*** to try harder if he wants to win the prize.

He will have to

2 ***It has been necessary for them*** to save hard to buy their new hi-fi.

_____

3 Because of the snow ***she has been finding it necessary*** to walk to college.

_____

4 ***It had already been necessary for us*** to clear the office floor twice before the boss asked us to clear it again. _____

5 ***It would have been necessary for me*** to pay twice as much to travel first class.

_____

6 ***We are finding it necessary*** to cut back on staff because of a shortage of orders. _____

4.6 a) Complete the dialogue between the Managing Director (MD) and the Personnel Manager (PM). The first has been done for you.

b) Underline the modal verbs in the dialogue and define their functions. Then reproduce the dialogues in pairs.

sales	***distribution***	***manage***
decisions	***~~courses~~***	***promotion***
managers	***results***	***structures***
communications	***technology***	***balance***
decisions	***systems***	***MBA(Master of Business Administration)***

MD: John, we must think about specialist-management (**1**) *courses* for our junior managers.

PM: Yes, our promising younger people need to learn about management (**2**) _____.

MD: They need to know how to take (**3**) _____ and the (**4**) _____of these decisions.

PM: And, of course, accounting for (**5**) _____is essential. And they must know how to read the (**6**) _____ sheet.

MD: Without it, they will never (**7**)_____ successfully, and they won't know anything about stock control, costing, pricing … you name it.

PM: Yes, cost and price (**8**) _____ depend on knowing this.

MD: Of course, that's not the only thing they need to know. New (**9**) _____ means that they need to know about things like computer (**10**)_____ ,

PM: What else?

MD: **(11)** _____ , for example.

PM: Yes, and I think that the (**12**) _____ and marketing need managers with this background, as well as the (**13**) _____ department.

MD: Even the (**14**) _____ managers could benefit, too.
Perhaps we should only appoint managers with a Harvard (15) _____ !

5 SKILLS

Industrial Materials Preparation Area: Lighting Case Study.

Background

A composite materials and structure fabrication company is located in an old industrial warehouse, with high ceilings. The pre-production area was poorly lit by eight mercury vapour high-bay fixtures. Staff had great difficulty seeing measurements and cut-line marks.

The company specializes in high quality, close tolerance, composite structures made from fiberglass or carbon fibre materials. These structures include large and complex flight simulator shells, and wind turbine blades with complex topology all of which must be made with very high precision.

Lighting Renovation Objective

- to raise the lighting level in the area significantly
- improve colour rendering of walls
- reduce the electrical power consumption

Initial Lighting Measurements

Factory floor area • at floor level

	• eight locations spaced evenly (2 rows of 4 fixtures)
Lighting Readings	• 157/ 140,1/ 124 /118 / 135,5 / 107,7 Lux
Factory ceiling	• four large skylights

Lighting Renovations Performing
- initial lighting measurements – Friday night
- electrical work – Saturday, Sunday – during a day
- final light measurements – Sunday night after dark
- mode of approach – to minimally disrupt the company's production schedule

Lighting Renovation
- 15 new high-bay magnetic induction lamps
- evenly spaced five by three grid array
- 5,5 meters above the floor

Final Lighting Readings • 236 / 268 / 248 / 282 / 234 Lux

Summary
- electrical load reduction from 4,100W to 3,168W – about 22% energy saving
- everage light level impovement from 130.3 to 277.5 Lux about 98% brighter
- more productive work environment

Task: Present an oral report on the renovations in the warehouse made by *InduLux Technologies Inc.* (Ontario, Canada).

UNIT 6

1 LEAD-IN

1 Do you know what the most common type of general purpose lighting is?
2 Do you know the cost for lighting your home?
3 Do you know what type of lamp has become increasingly popular in recent years?
4 How can you decide how much lighting to use?
5 What types of lighting work together in your home?

2 READING

Text 1. A Lighting Control System

A lighting control system consists of a device that controls electric lighting and devices, alone or as part of a daylight harvesting system, for a public, commercial, or residential building or property, or the theater. Lighting control systems are used for working, aesthetic, and security illumination for interior, exterior, and landscape lighting, and theater stage lighting productions. They are often part of sustainable architecture and lighting design for integrated green building energy conservation programs.

Lighting control systems, with an embedded processor or industrial computer device, usually include one or more portable or mounted keypad or touchscreen console interfaces, and can include mobile phone operation. These control interfaces allow users the ability to remotely toggle (on-off) power to individual or groups of

lights (and ceiling fans and other devices), operate dimmers, and pre-program space lighting levels.

A major advantage of a lighting control system over conventional individual switching is the ability to control any light, group of lights, or all lights in a building from a single user interface device. Any light or device can be controlled from any location. This ability to control multiple light sources from a user device allows complex "light scenes" to be created. A room may have multiple scenes available, each one created for different activities in the room. A lighting scene can create dramatic changes in atmosphere, for a residence or the stage, by a simple button press. In landscape design, in addition to landscape lighting, fountain pumps, water spa heating, swimming pool covers, motorized gates, and outdoor fireplace ignition can be remotely or automatically controlled.

Other benefits include reduced energy consumption, and power costs through more efficient usage, longer bulb life from dimming, and reduced emission carbon footprints. Newer, wireless lighting control systems provide additional benefits including reduced installation costs and increased flexibility in where switches and sensors can be placed.

Lighting control systems provide the ability to automatically power a device based on:

- Chronological time (time of day)
- Astronomical time (sun-rise/sun-set)
- Room or outdoor space occupancy (motion sensors)
- Presence of daylight (lighting costs and energy conservation, and daylight harvesting)
- Events
- Alarm conditions
- Programme logic (any combination of events)

Chronological time is a specific time of day as pre-set timers use. Astronomical time includes sunrise, sunset, a specific day of the week or days in a month or year. Room occupancy might be determined with motion detectors or RFID tags, and is part of security and energy conservation programs. Artificial lighting energy use can be reduced by automatically dimming and/or switching electric lights in response to the level of daylighting, a technology known as daylight harvesting. Mobile phone operated controls can turn on a basic group of circulation—safety fixtures serving exterior—interior locations on approach, or to preheat a "water spa" in advance of returning. Events might include special fixtures for social occasions and holiday lighting, or overall brightness for cleaning. Alarm conditions can include doors opening and motion detected in a protected area, or manual "panic buttons-all lights on" for occupants sensing a possible intrusion. Programme logic can tie all of the above elements together using constructs such as if-then-else statements and logical operators.

2.1 Reading Comprehension

1 What forms of illumination do we use lighting control systems for?

2 What devices can lighting control systems include?
3 What are the advantages of a lighting control system over any other type of controlling the illumination?
4 What controlling categories are considered when designing different devices for lighting control systems?

Text 2. Daylight Saving Time

Daylight saving time (DST) is time observed when clocks and other timepieces are set ahead so that the sun will rise and set later in the day as measured by civil time. The amount of daylight on a given day of the year at any given latitude is fixed, but over the year the hours of sunrise and sunset vary from day to day. During the summer months, the sun rises earlier and sets later and thus there are more hours of daylight. If clocks are set ahead in the spring by some amount (usually one hour), the sun will rise and set later in the day as measured by those clocks. This provides more usable hours of daylight for activities that occur in the afternoon and evening such as outdoor recreation. Daylight saving time can also be a means of conserving electrical and other forms of energy. In the fall, as the period of daylight grows shorter, clocks are set back to correspond to standard time.

Daylight saving time begins in the northern hemisphere between March–April and ends between September–November. In the southern hemisphere it begins between September–November and ends between March–April.

The concept for DST was adopted by the railroad industry during the 19th century to standardize their schedules. During World War I, it was introduced nationwide as an energy-saving measure. It did not become a standardized method for moving the clock back one hour in the autumn and forward one hour in the spring until the Uniform Time Act of 1966.

Evidence that DST saves energy is mixed and contradictory. This may be due to inconsistencies in study methods, as well as technology and lifestyle changes since its inception.

Lighting systems are much more efficient and energy use patterns for heating and cooling systems have changed significantly. It is likely the increased use of computers and electronics have reduced the impact of DST on overall energy use as well. In recent years, there has been debate over whether to end DST or even extend it year-round. Future research will be helpful in weighing the cost and benefits of DST and comparing it with other energy conservation methods.

2.2 Reading Comprehension

1 Why can the amount of daylight change during a year?
2 What reasons are known to adopt DST?
3 Why are there debates on the DST practice?

3 VOCABULARY

3.1 Match the word combinations from Text 1 to the relevant translations into your native language.

1	interface device	**a**	регулирование уровня освещенности в соответствии с уровнем дневного света
2	alarm condition	**b**	устройство сопряжения
3	daylight harvesting	**c**	аварийное состояние
4	carbon footprints.	**d**	зажигание камина
5	fireplace ignition	**e**	следы углерода

1-…; 2-…; 3-…; 4-…; 5-…

3.2 Match *1-5* on the left to *a-e* on the right side. Then complete the table. Use a dictionary to help you, if necessary.

			verb	*noun*	*adjective*
1	занимать (*место, пространство*)	**a**	ignite	_____	_____
2	встраивать, вставлять	**b**	intrude	_____	_____
3	вторгаться, появляться без приглашения	**c**	embed	_____	_____
4	раскалить до свечения	**d**	occupy	_____	_____
5	тускнеть, делаться тусклым	**e**	dim	_____	_____

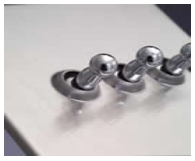
1-…; 2-…; 3-…; 4-…; 5-…

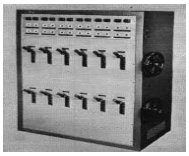
3.3 The most common types of lighting controls are as follows:

dimmers	***timers***	***photosensors***
motion sensors	***occupancy sensors***	***simple on-off switches***

Now match the lighting controls to the pictures and then to the relevant definitions *a)* to *f).*

1 _____ **2**_____ **3**_____ **4**_____





12 _____ ***a*** **-** _____ are used to integrate an electric lighting system with a daylighting **5** _____

11 _____

10_____

system so lights operate only when daylighing is insufficient.

b **-** _____ proves the periodic control of day and night.

c **-** _____ , when flipped, opens and closes the circuit, feeding or cutting off the electric current necessarily to operate the lamps.

d **-** _____ detect activity within a certain area.

e **-** _____ are able to detect a person`s motion in the sensor sensitivity zone.

f **-** _____ adjust the voltage which gets to the lamp.

9_____ 8_____

6_____

7_____

3.4 Complete the following paragraph with words given below. Then translate it into your native language.

areas levels places systems source control

Lighting Control

When an area is not in use, reduced light (**1**)_____ save energy and operating expense for the building owner. These are several ways of lighting (**2**)_____ including

- Occupancy sensors
- Manual or equipment activated interval timer switches
- High/low switched ballasts
- Building high switch or automated control systems

The amount and type of control depends on the type of (**3**)_____ and how often the area is used. Some light should be on in all (**4**)_____ of medium to heavy use when the building is occupied, especially in areas that are visible from other work (**5**)_____ . Reduced light levels in unoccupied areas, instead of complete darkness, help to maintain acceptable contrast ratios.

Industrial space lighting (**6**)_____ can be optimized for comfort and energy savings by careful planning of automated controls.

3.5 Choose the correct word to complete the sentence.

1 Luminaires control, distribute and direct the _____ on to the object.

a beam **b** energy **c** light

2 In industrial lighting the fluorescent lamps with matt white reflectors are used for interior _____.

a method **b** glare **c** lighting

3 In industrial lighting the discharge lamps with mirror reflectors are used for high_____ .

a bays **b** ceilings **c** floors

4 To achieve a quality lighting environment, carefully choose the _____ to satisfy both performance and aesthetics needs.

a alarm condition **b** equipment **c** power factor

5 When you find the perfect lighting fixture, you have to be sure that you have the _____ lamp and lighting parts to complete your installation.

a left **b** right **c** new

1-…; 2-…; 3-…; 4-…; 5-…

4 LANGUAGE REVIEW

Modal verbs to express ability, lack of ability, logical assumption, probability.

- Ability (*can-could- be able to/was able to*)
- Lack of ability (*can't-couldn't/wasn't able to*)
- Logical assumption (*must-can't/ couldn't*)
- Probability (*should/ought*)

4.1 Study these examples.

I'm sure she ***knows*** him well. Perhaps he ***will be*** late	*present infinitive*	She must ***know*** him well. He ***may*** be late.
It's possible that he'***s working*** late tonight. I'm sure she'***ll be working*** tomorrow.	*present continuous infinitive*	He could ***be working*** late tonight. She must ***be working*** tomorrow.
I'm sure he ***didn't know*** the truth. Perhaps they ***have missed*** the bus. It's possible he ***had got*** lost.	*perfect infinitive*	He can't ***have known*** the truth. They might ***have missed*** the bus He may ***have got*** lost.
I'm certain he ***was sleeping***. Perhaps she ***has been lying***. It's likely they ***had been hiding.***	*perfect continuous infinitive*	She may ***have been lying.*** He must ***have been sleeping***. They could ***have been hiding***.

4.2 Fill in the gaps with *can, can't, could, couldn't* or *was/wasn't able to* to express ability or lack of ability.

1 I had my hands full, so I ...***couldn't/wasn't able to***… open the door.

2 When I was young, I _____ stand on my head.
3 Although he felt ill, he _____ finish all the paperwork.
4 Tony is clever. He _____ speak three languages.
5 I _____ afford that bag. It's too expensive.
6 Although it was dark, he _____ find his way through the woods.
7 I heard his voice calling me, but I _____ see him.
8 We're busy tonight, so we _____ come to the party.
9 When I entered the house, I _____ smell fresh bread baking.
10 I _____ drive a car. I learnt when I was eighteen

4.3 Identify the use of the modal verbs expressing logical assumption and underline them.

Example: They must have gone out; the lights are off. (*positive/present*)
He could be exhausted. (*positive/past*)
They can't have lied. (*negative/present*)
They couldn't have been friends. (*negative/past*)

1 She must have lost the race.
2 She could be considering your offer.
3 They couldn't have gone out so late.
4 She can't be feeling well
5 She must have worked late last night; she looks exhausted.
6 You can't have done it! It's so stupid!
7 He must have taken your car since he has the keys.
8 He could have won the competition.
9 You must be very tired; you are pale.
10 This price couldn't be right. It was too much for a camera.
11 Something wrong must have happened to Anna. She is usually very punctual.
12 I must have been out last evening. She did not answer the telephone.

4.4 Put these phrases into the correct position on the scale of probability.

A
a The price of electricity will definitely rise.
b The price of electricity may rise.
c The price of electricity is unlikely to rise.
d I'm sure that the price of electricity will rise.
e It's likely that the price of electricity will rise.
f The price of electricity might rise.
g I'm certain that t he price of electricity won't rise.
h It's unlikely that the price of electricity will rise.
i The price of electricity should rise.
j I'm certain that the price of electricity will rise.

1 **2**		**100% certainty**

3		
4 **5**		**75% probability**
6 **7**		**50% possibility**
8 **9**		**25% improbability**
10		**0% impossibility**

B Complete the gaps using the information in brackets.

Sir Jonathan Travis, the Managing Director of Nightingale said "I (*100% certainty*) (**1**) _____ our workers will receive a big pay rise this year and I (*100% certainty*) (**2**) _____ Nightingale will be the most profitable retailer in the country very soon". City analyses were not as certain as Sir Jonathan. Roger Klein of Euro Bank said "Pay (*50% possibility*) (**3**) _____ increase but I (*100% certainty*) (**4**) _____ the rise will not be very big." Lucy-Anne LaForge, of NY was less hopeful. "I (*0% impossibility*) (**5**) _____ Nightingale won't be profitable by the end of this year. I think (*75% probability*) (**6**) _____ Sir Jonathan Travis will not be MD of the company next year and that Nightingale will have a new strategy."

4.5 Martin and Anne have arrived at check-in at Heathrow Airport. Complete their dialogue with *must, might, can't, must have* or *can't have*. Use each word once only. Then reproduce the dialogues in pairs.

Martin: Oh no, I can't find my passport.
Anne: You're joking.
Martin: No, really, it's not in my briefcase.
Anne: Well, it (**1**) *must* be in your other bag. Quick have a look.
Martin: It's not there. Where on earth is it?
Anne: Well, I don't know. Do you think you (**2**) _____ left it at home?
Martin: That's impossible. I (**3**) _____ done. I checked I had it with me four times before I left the house.
Anne: OK, calm down. What about checking your coat pockets? You never know, it (**4**) _____ be there.
Martin: No, it isn't. This is ridiculous. We're going to miss our flight.
Anne: Look, you (**5**) _____be looking in the right place.
Check-in Attendant: Excuse me, sir. Is that your passport there on the ground?
Martin: Oh, yes, so it is. Ah, I (**6**) _____ dropped it when I was looking for the tickets.

5 SKILLS

LEDs represent the most significant development in Lighting since the invention of the electric light more than a century ago. They allow us to create unique, low energy lighting solutions, not to mention their lower maintenance costs and as investment continues and volumes increase, the price of LEDs should come down by 10% or more a year. But when will LEDs become more mainstream? Assuming LED lighting continues to develop as expected, it is now possible to predict the future with some certainty.

Surf the Internet to find the latest information on the future of LED Lighting for business, in industry, for the leisure industry, in retail sector, in commercial freezers, in shelf lighting.

As development continues the main question is not when they will replace what, but what new developments will be made possible.

http://www.neweysonline.co.uk/The-Future-Of-LED-Lighting/Static.raction

Task: Make predictions about lighting choices and prove what so smart about LEDs is.

UNIT 7

1 LEAD-IN

1 What applications of electrical lighting do you know?
2 What is the dependence of the daylight saving time on the lighting energy use?
3 What measures do you adopt to conserve energy at home and at work?

2-*A* READING

Text 1. Electrical Energy Consumption and Energy Efficiency in Lighting Engineering

Artificial lighting consumes a significant part of all electrical energy consumed worldwide. In homes and offices from 20 to 50 percent of total energy consumed is due to lighting. Most importantly, for some buildings over 90 percent of lighting energy consumed can be an unnecessary expense through over-illumination. The cost of that lighting can be substantial. A single 100 W light bulb used just 6 hours a day can cost over $25 per year to use (.12/kWh). Thus lighting represents a critical component of energy use today, especially in large office buildings where there are many alternatives for energy usage in lighting. There are several strategies available to minimize energy requirements in any building:

- Specification of illumination requirements for each given use area.
- Analysis of lighting quality to ensure that adverse components of lighting (for example, glare or incorrect color spectrum) are not biasing the design.

- Integration of space planning and interior architecture (including choice of interior surfaces and room geometries) to lighting design.
- Design of time of day use that does not expend unnecessary energy.
- Selection of fixture and lamp types that reflect best available technology for energy conservation.
- Training of building occupants to use lighting equipment in most efficient manner.
- Maintenance of lighting systems to minimize energy wastage.
- Use of natural light - some big box stores are being built with numerous plastic bubble skylights, in many cases completely obviating the need for interior artificial lighting for many hours of the day.
- Load shedding can help reduce the power requested by individuals to the main power supply. Load shedding can be done on an individual level, at a building level, or even at a regional level.

Specification of illumination requirements is the basic concept of deciding how much illumination is required for a given task. Clearly, much less light is required to illuminate a hallway or bathroom compared to that needed for a word processing work station. Generally speaking, the energy expended is proportional to the design illumination level. For example, a lighting level of 80 footcandles might be chosen for a work environment involving meeting rooms and conferences, whereas a level of 40 footcandles could be selected for building hallways. If the hallway standard simply emulates the conference room needs, then twice the amount of energy will be consumed as is needed for hallways. Unfortunately, most of the lighting standards even today have been specified by industrial groups who manufacture and sell lighting, so that a historical commercial bias exists in designing most building lighting, especially for office and industrial settings.

2.1 Reading Comprehension.

1 How can be explained the unnecessary expences for the consumed energy?
2 What strategies are available to minimize energy requirements in any building?
3 Who are the lighting standards for lighting and energy consumption specified by?

2-*B* READING

1 We often discuss the problems dealing with air pollution, water pollution, noise pollution. What is light pollution? What causes light pollution?
2 Is light pollution an unavoidable or inevitable side-effect of urban development and growth?
3 What are some light pollution prevention methods that can be adopted?

Text 2. Environmental Issues: Light Pollution

Light pollution is excess light created by us humans. It causes ill-health, clouds stars in cities and interferes with astronomical observatories, wastes energy and brings ecosystems to disarray.

It can be divided into: (a) annoying light that breaks into a natural or low light setting and (b) excessive light that breaks into the indoors bringing a lot of worker discomfort and ill- health.

This is a side-effect of industrial civilization and comes from the lighting on the exteriors and interiors of buildings, advertising, commercial properties, offices, factories, streetlights, and lit stadia.

Types of Light Pollution:

Light pollution is due to many problems caused due to annoying use of artificial light. These include light trespass, over-illumination, glare, clutter, and sky glow.

- ***Light trespass***: This occurs when unwelcome light from outside enters one's home or property e.g. by shining a torch on your fence. This disturbs your sleep or blocks your view and causes an obstacle for amateur astronomers.
- ***Over-illumination:*** This is an excessive use of light on residential, commercial and industrial grounds, raising energy bills. It is due to not using timers or sensors to control the putting out of lights or an incorrectly designed workplace where more light is given than needed, among others. This problem can be corrected by using inexpensive lighting.
- ***Glare:*** When there is an excess of contrast between dark and light areas in one's field of view, glare results. When such light is shone into the eyes of pedestrians and drivers at night, their night vision can be obstructed since the human eye cannot adjust to such vast brightness differences. If this is experienced on roads, accidents are certain.
- ***Clutter:*** Excessive groupings of lights are usually called clutter since they cause a lot of confusion, and distract one's attention and cause accidents. If street lights are badly designed or if neon signs are bold and bright, clutter develops and can cause accidents.
- ***Sky glow:*** This refers to the glow effect that you can see over populated areas. Sky glow can be either natural or human-made. When natural, it has five sources sunlight reflected from the moon and earth; light air glow in the upper atmosphere; sunlight reflected from interplanetary dust; starlight strewn across the atmosphere; and background light from faint stars and nebulae.

When electric lighting brightens the sky, it is emitted upward by luminaires or reflected from the ground and is scattered by dust and gas molecules in the atmosphere to produce a glowing background. This effect is dependent on weather conditions, amount of dust and gas in the atmosphere, quantum of light directed skyward, and the direction from which it is viewed.

Effects of Light Pollution

Wastes energy: It does not give useful illumination if the light does not fall on the right target. It is also wasted when more light is given off than necessary.

Clouds on the night sky: City folk can't see anything except the moon and stars in the night sky. In fact, they cannot see a host of objects which are in the whiteout zone that can span large stretches.

Injures our health: Excessive light can cause many headaches, worker fatigue, stress decrease in sexual function, and increase in blood pressure.

Governments should do all they can to minimize the ill-effects of light pollution.

2.2 Reading Comprehension.

1 What is one of the side effects of industrial civilization?
2 What types of light pollution does the use of artificial light cause?
3 What are the most common effects of light pollution?

3 VOCABULARY

3.1 Match *1) – 5)* on the left to *a) –e)* on the right. Then complete the table. Use a dictionary to help you, if necessary.

			verb	*noun*	*adjective*
1	непродуктивно расходовать, терять	**a**	bias		
2	смещать, отклонять	**b**	waste		
3	имитировать, моделировать;	**c**	obviate		
4	избегать, избавляться	**d**	shed		
5	распространять, излучать	**e**	emulate		

1-…; 2-…; 3-…; 4-…; 5-…

3.2 Match the word combinations from Text 1 and Text 2 to the relevant translations into your native language.

1	critical component	**a**	неблагоприятные, отрицательные компоненты
2	adverse components	**b**	определяющая, основная составная часть
3	lighting standards	**c**	пользователи помещением
4	building occupants	**d**	нормы освещения
5	load shedding	**e**	световое загрязнение
6	light pollution	**f**	моделирование нагрузки
7	commercial properties	**g**	нарушение правил пользования светом, злоупотребление светом
8	light trespass	**h**	технические свойства
9	lit stadia	**i**	освещенные беговые дорожки

1-…; 2-…; 3-…; 4-…; 5-…; 6-…; 7-…; 8-…; 9-…

3.3 Use the words in brackets to complete the sentences. Add the necessary suffix or prefix if required and put the word in the correct form.

1 You can't park here, you're _____ my driveway. (OBSTRUCT)
2 The product is not yet _____ available. (COMMERCIALISE)
3 Much to our _____ , they decided not to come after all. (ANNOY)
4 This new evidence _____ the need for any further enquiries. (OBVIATE)
5 To avoid attracting _____ attention he kept his voice down. (WELCOME)

3.4 Complete the following paragraph with words given below. Then translate it into your native language.

energy system way light outdoor power devices daylight occupants windows

Daylighting is the controlled admission of natural (**1**) _____ direct sunlight and diffuse skylight—into a building to reduce electric lighting and saving (**2**)_____. By providing a direct link to the dynamic and perpetually evolving patterns of (**3**) _____ illumination, daylighting helps create a visually stimulating and productive environment for building (**4**)_____ , while reducing as much as one-third of total building energy costs.

A daylighting (**5**)_____ is comprised not just of daylight apertures, such as skylights and (**6**)_____ , but is coupled with a daylight-responsive lighting control system. When there is adequate ambient lighting provided from (**7**)_____ alone, this system has the capability to reduce electric lighting (**8**)_____ . Further, the fenestration, or location of windows in a building, must be designed in such a (**9**)_____ as to avoid the admittance of direct sun on task surfaces or into occupants' eyes. Alternatively, suitable glare remediation (1**0**)_____ such as blinds or shades must be made available.

3.5 Choose and tick (✓) the suggested measures according to the particular tasks.

		Reducing Excess Lighting	***Energy saving Opportunities in Lighting Systems***
1	Use task lighting	_____	_____
2	Use the most energy efficiency lamps whenever possible	_____	_____
3	Remove a number of lamps to reduce general illumination level	_____	_____
4	Use daylighting to the fullest extent possible	_____	_____
5	Reduce general lighting level by controlled dimming without sacrificing the symmetry of the lighting fixture pattern	_____	_____
6	Use energy efficient ballast	_____	_____
7	Undertake regular maintenance programme of replacing lamps, cleaning luminaires, replacing defective components and cleaning surrounding surfaces	_____	_____

4 LANGUAGE REVIEW

Modal verbs to express request, possibility, permission.

- Request (*can/could-will/would/may/might*)
- Possibility (*can- could, may-might*)
- Permission (*can/could-may/might*)

4.1 Make requests for things and substances.

a slice of toast ***some coffee*** ***a piece of apple pie***
an orange ***some fruit*** ***a portion of chicken***

1 *Can I have a sandwich, please?*
2 _____
3 _____
4 _____
5 _____
6 _____

4.2 Make requests for the following situations. You want someone to …

1 dial a number for you. *Will/would you dial a number for me, please?*
2 hold the door open for you. _____
3 translate a letter for you._____
4 deliever some flowers for you. _____

4.3 Use the proper modal verbs to ask for or give permission.

1 "_____ I use your mobile phone?" "Sure, you _____ - go ahead."
2 " _____ I use your password?" "No, I'm afraid you can't."
3 " _____ I come back later?" "No, I don't think that'll be possible."
4 " _____ I sit here?"
5 " _____ I borrow the car this weekend?"
6 " _____ pass me that catalogue?"
7 "You _____ check the exchange rate first."
8 "She _____ switch on the air conditioning ."
9 "You _____ give her a lift into town."
10 "He _____ let me know if it really necessary."

4.4 Make appropriate sentences from this table using *can* to express possibility.

Learning a foreign language				hard work
Entertaining overseas customers		occasionally		good fun
Being in charge of a new project		sometimes		challenging
Setting up in business	can	often	be	a waste of time
Negotiating a contact				painful
				boring

4.5 Read the following story and list the missed opportunities using *could have.*

As a young man Peter Metro was a gifted musician who once had a record in the top 20. But he decided to abandon music and study ocean engineering at Florida Atlantic University instead. After four years there he graduated and was offered a research post in the faculty. But by that time he had decided he wanted to see the world and spent a year travelling Europe. In Italy he happened to meet the film director Robert Bellini who offered him a role in his latest film, but he turned it down because he had just accepted a job with a small firm specializing in the construction of racing catamarans. One day the famous skipper Chris Dickson asked him to sail with him during the Admiral's Cup but Peter decided not to because he was too busy.

4.6 a) Complete a conversation between Tim Broker, his Managing Director M. Money and a Personal Assistant. Choose from the words given below.

b) Underline and define the functions of modal verbs. Then reproduce the dialogues in groups of three.

complete	***conference***	***idea***	***convenient***	***suit***
lunch	***noon***	***assistant***	***appointment***	***forward***

T.Broker: I think it would be a good (**1**) _____ if we met to discuss this further.
M.Money: Yes, I agree. Just see my Personal Assistant for an appointment.
T.Broker: I'd like to make an (**2**) _____ to see Mr Money, please.
P. A. : I'll just have a look in his diary. What day would (**3**) _____ you?
T.Broker: Might I suggest Tuesday morning?
P. A. : I'm sorry. He already has an appointment in the morning. Would some time in the afternoon be (**4**) _____ ?
T.Broker: Yes, I could manage early in the afternoon…
Mr Money, would you like to meet for (**5**) _____ ?
M.Money: Yes. I would like that… I'm sorry, I would have loved to but I can't make it on the Tuesday. Let's try on Wednesday – Are you free on Wednesday?
T.Broker: I'm afraid I'm at a (**6**) _____ all day. Would Thursday suit you?
M.Money: That suits me fine, I think, I'll just check with my (**7**)_____ …
T.Broker: Where would be the most convenient for you?
M.Money: We could meet at a bank at about (**8**) _____ , and there is a very good Italian restaurant just round the corner.
T.Broker: That sounds perfect. I'll have time to sort out the figures and bring along a (**9**) _____ file with me.
M. Money: I look (**10**) _____ to seeing you on Thursday, then. Goodbye.
T.Broker: Thank you, goodbye.

5 SKILLS

Thomas Edison's light bulb has been lighting the world for more than a century, but its predominance is beginning to fade.

A new era of lighting is dawning, designed to meet the needs of a power-hungry and resource-challenged 21st century. There have never been so many options for illuminating the indoors.

As prices drop for alternative lighting in the coming years, consumer options will proliferate. Today's technological innovations make Edison's work look like the stuff of a middle-school science fair. Compact fluorescents are looking lovelier, white LEDs last a decade, organic LEDs make ceilings and countertops glow, and fiber-optic tubes can pipe true sunshine from roof to cellar.

Surf the Internet to find out pros and cons of the most common lighting fixtures to be used for lighting in the 21st century.

This is the site as one of many others to be used for reference:
http://news.cnet.com/FAQ-21st-century-guide-to-indoor-lighting/2100-11392_3-6186790.html

Task: Make a presentation in front of the class.

UNIT 8

1 LEAD-IN

1 Are you sure that being a lighting engineer is the best career for you?
2 What special circumstances make lighting engineers especially necessary?
3 What is the relationship between a builder, architect or electrician and a lighting engineer?

2 READING

Text 1. Lighting Engineer

A job as a lighting engineer falls under the broader career category of electrical engineers.

A lighting engineer works with lighting systems to design the best system for a given application, considering needs, safety issues, and limitations. These members of the engineering community can work in lab environments to develop the next generation of illumination products, or in the field to design, install, and maintain lighting. The work typically requires an engineering degree and experience in the field.

Some responsibilities of a lighting engineer can take place in research and development facilities. Engineers can design new types of bulbs and fixtures, as well as better lighting systems. They discuss topics like safety, energy efficiency, and quality. Engineers can also develop products for various applications, like full spectrum lighting to make a home feel warmer, versus very bright lighting for roadwork at night where the primary goal is high illumination.

Specialty lighting can be another concern of lighting engineers in the lab. Many environments need cool lighting for safety to prevent fires and explosions, and this kind of work is the provenance of lighting engineers. Other projects in development can include waterproof systems, high energy systems, and so forth for various applications. A lighting engineer can design and test prototypes in the lab to develop specifications and recommendations for the use of particular products.

Outside the lab, a lighting engineer participates in the design of lighting systems from billboards to office buildings. When buildings, bridges, and other major projects are in development, a lighting engineer offers input and recommendations. Engineers also help with street lighting, safety lighting, and similar concerns, as well as light displays like seasonal decorations on downtown buildings. Any time lighting needs are large or complex, it may be necessary to bring in a professional.

Lighting engineers also troubleshoot systems, make repairs, and handle maintenance. This position requires a thorough knowledge of lighting systems and the various norms involved in their construction to allow an engineer to understand another person's work and accurately maintain systems that may be old and constructed according to outdated norms. Retrofitting of existing systems can also be a part of the job, as it may be periodically necessary to overhaul and replace lighting that does not function or poses a safety hazard. Travel may be required to visit job sites, as well as the ability to work at great heights while inspecting systems and developing recommendations, even if work crews are performing the physical labour.

2.1 Reading Comprehension.

1 What should a lighting engineer consider while designing a lighting system?
2 What are the main topics for discussion while designing a new lighting system?
3 What engineering and specialized skills are necessary for a lighting engineer?

Text 2. Shedding Light on the Subject: Illumination Engineering and Design for Multi-Discipline Engineering Students Abroad

Educating engineers and architects in Illumination Engineering and related subjects has become a very important field and a very satisfying and rewarding one. Main reasons include the need to significantly conserve lighting energy and meet government regulations while supplying appropriate light levels and achieving aesthetical requirements. The proliferation of new lamps, luminaires and lighting controllers many of which are “energy savers” also helps a trend to seek help from lighting engineers when designing new commercial and residential buildings. That trend is believed to continue and grow as benefits become attractive and new government conservation regulations take effect. To make things even better one notices that Engineering and Science students in most disciplines make excellent candidates for Illumination Engineers because of their background and teaching them can move ahead at a brisk pace and be a rewarding experience nevertheless.

The need to create a steady flow of new professionals with knowledge of lighting has become clear as need to conserve a lighting energy became a concern of the governments in some countries. With the estimated amount of the energy consumption due to lighting, there are many numerous opportunities to save energy

and thus resources. Moreover, lighting has until the recent past been taken for granted as a matter of aesthetic and not an energy consumption issue; lighting in both industrial, commercial and residential applications is inefficient and wasteful leaving a lot of room for significantly improved energy efficiency. Putting in place new government regulations without availing the public of the proper education and expertise has long been recognized to be an ineffective way to go. Nowadays the governments recognize such needs for educating professionals in the field and develop and launch programmes in colleges and universities to master the courses which include Introduction to Illumination, Lighting Control/Design, Luminaire Design and Manufacturing, Lamp Design and Manufacturing.

2.2 Reading Comprehension.

1 What are the main reasons for educating professionals in the field of illumination?

2 What applications has lighting been inefficient and wasteful in until recently?

3 What subjects are recommended to master according to the design for multi-discipline engineering students?

3 VOCABULARY

3.1 Match the word combinations from Text 1 to the relevant translations into your native language.

1	research and development facilities	**a**	место работы
2	retrofitting of existing systems	**b**	бригада рабочих или технического обслуживания
3	thorough knowledge	**c**	вопросы безопасности
4	waterproof systems	**d**	устаревшие стандарты
5	outdated norms	**e**	водонепроницаемые системы
6	safety issues	**f**	основательные знания
7	work crew	**g**	модернизация/модификация существующих систем
8	job site	**h**	условия для проведения исследований и разработок

1-…; 2-…; 3-…; 4-…; 5-…; 6-…; 7-…; 8-…

3.2 Match a verb to a noun from Text 1 to make a *verb+noun* combination about lighting engineer work.

	verb		***noun***
1	to develop	**a**	input and recommendations
2	to offer	**b**	specifications
3	to troubleshoot	**c**	systems
4	to overhaul	**d**	systems
5	to maintain	**e**	lighting
6	to pose	**f**	a safety hazard

1-…; 2-…; 3-…; 4-…; 5-…; 6-…

3.3 Complete phrases from A and B to specify duties, responsibilities and possibilities of a lighting engineer. Options are possible.

	A		B
1	is responsible for	**a**	various lighting or engineering code specifications and standards
2	understands	**b**	installing the different kinds of lighting equipment in many different environments
3	completes programmes and courses	**c**	drawings for the installation of lighting systems in accordance with client's specifications and municipal codes
4	prepares	**d**	to earn a specific degree in engineering
5	ensures	**e**	installation of lighting systems
6	directs	**f**	conformance with engineering specifications and compliance with electrical codes
7	studies	**g**	according to the type or location of a system
8	designs	**h**	lighting requirements of a client
9	communicates	**i**	to develop new applications, ideas, relationships, systems or products
10	thinks creatively	**j**	with supervisors, co-workers by telephone, e-mail or in person

1-…; 2-…; 3-…; 4-…; 5-…; 6-…; 7-…; 8-…; 9-…; 10-…

3.4 Choose and underline the correct words.

Hiring Process Information for an Interview
at The United Illuminating Company

A successful utility industry business with a focus on (**1**) ***powered/power*** generation, The United Illuminating Company interviews a vast (**2**) ***assortment/ assorting*** of individuals to find worthy candidates to staff entry-level and (**3**) ***professional/ profession*** opportunities. The United Illuminating (**4**) ***hiring/hire*** process may result in numerous rounds of 1:1, group, or telephone interviews. To (**5**) ***receiving/receive*** hiring consideration, The United Illuminating Company (**6**) ***interviewees/interviewers*** may need to submit to background checks and drug (**7**) ***testing/test***, depending on position desired. United (**8**) ***Illuminating/Illuminated*** interview questions cover several areas, such as work experience, behavior, customer service skills, and education.

To impress hiring (**9**) ***managing/managers*** when attending a United Illuminating Company job interview, dress (**10**) ***professional/professionally***. Answer all job interview questions honestly and (**11**) ***conveying/convey*** knowledge of utility operations as (**12**) ***well/when*** as industry trends and rules during the United Illuminating hiring process. Make eye contact with every (**13**) ***interview/interviewer*** and remain (**14**) ***focusing/focused*** throughout The United Illuminating Co interview process. United Illuminating human resources (**15**) ***personnel/personal*** may withhold hiring decisions during the job interview process. Contact a hiring manager a few

days after the last The United Illuminating Company interview to learn of intent to hire.

3.5 Complete the paragraph with correct alternatives.

The (**1**)_____ of the Illuminating Engineering Society in England in 1909 gave a great stimulus there to the (**2**)_____ of illumination. A body with similar aims had existed in the United States since 1906. Illuminating engineering (**3**)_____ have also been formed in Germany (1912) and in Japan (1918). These (**4**)_____ include in their programme the study of illuminants, the influence of light on the (**5**)_____ , the measurement of light and illumination, and (**6**)_____ applications of light. A notable step has been the formation, on the (**7**)_____ of the British Illuminating Engineering Society, of the International Illumination Commission, with (**8**)_____ committees in all the chief countries. Work was in abeyance during the World War but has since been resumed. (**9**)_____ on a common (**10**)_____ of light (the " International Candle") has been attained in Great Britain, France and the United States. In Germany the Hefner candle* (equal to 0,9 " international" candle) is still used.

* - *named after F. von Hefner- Alteneck (1845–1904), German electrical engineer*

1	**a**	foundation	**b**	fabrication	**c**	formation
2	**a**	research	**b**	study	**c**	school
3	**a**	societies	**b**	groops	**c**	teams
4	**a**	forms	**b**	companies	**c**	bodies
5	**a**	body	**b**	eye	**c**	voice
6	**a**	practical	**b**	extensive	**c**	progressive
7	**a**	request	**b**	desire	**c**	proposal
8	**a**	natural	**b**	national	**c**	numerous
9	**a**	Agreement	**b**	Advice	**c**	Demand
10	**a**	amount	**b**	value	**c**	unit

4 LANGUAGE REVIEW

Modal verbs to express advice, offer, suggestion, criticism.

- Advice (*should/ought//must*)
- Offer (*shall-can-could*)
- Suggestion (*shall-can-could*)
- Criticism (*should-ought*)

4.1 Fill in *shall* or *will.*

1 **A:** ...*Shall...* I help you with the washing-up?
B: No, I can manage by myself.
2 **A:** _____ we have pizza for dinner tonight?
B: I'd rather have steak

3 **A:** _____ you carry this for me, please?
B: Certainly. It looks heavy.
4 **A:** What _____ we buy for Bob's birthday?
B: I think he'd like a book.
5 **A:** _____ you answer the phone, please?
B: Of course.
6 **A:** Where _____ we sit in the classroom?
B: Next to the window.
7 **A:** _____ you take the rubbish outside for me, please?
B: Yes, in a minute.
8 **A:** _____ we have a barbecue next weekend?
B: Yes, if the weather's fine.
9 **A:** _____ you babysit for me tonight?
B: I'm sorry, but I can't.
10 **A:** _____ we try this new recipe tonight?
B: Yes. We've got all the ingredients

4.2 Read the situations and complete the sentences with *should/shouldn't, ought to/ought not to* and the correct tense of the infinitive to criticize your own actions or someone else's.

1 Your friend didn't see a film on TV last night. You saw it and it was very good. You ...*should/ought to have seen...* (***see***) the film
2 Liz bought an expensive jacket yesterday and now she hasn't got enough money for the rest of the week. She _____ (***buy***) such an expensive jacket.
3 Your sister eats a lot of junk food which is bad for her health. You _____ (***eat***) so much junk food.
4 Mr Jackson had a stiff back. He lifted some heavy boxes and now his back is worse. He _____ (***lift***) those heavy boxes
5 I always drive too fast. Yesterday, I was arrested for speeding. I _____ (***drive)*** more slowly.
6 Sally is clumsy. She is always breaking things. She _____ (***be***) more careful.
7 I didn't do his homework. The teacher punished me. I _____ (***do***) my homework.
8 Amy borrowed her brother's car without asking. He was very angry. She _____ (***borrow***) his car without asking.

4.3 Underline the correct word(s) in bold to express advice.

1 **A**: I found a briefcase on the train.
B: You ***can/should*** take it to the police station as soon as possible.
2 **A:** Sorry I'm late again.
B: You ***should/might*** wear a watch.
3 **A**: We ***should/must*** go out for a meal this evening at last!
B: Oh, yes. That would be nice.

4 **A:** You ***could/must*** use your telephone to inform me immediately.
B: Yes, of course.

5 **A**: You ***must/should*** go shopping this evening. We haven't got any of food.
B: All right. I'll do it just now.

6 **A:** Helen will be here by now.
B: You ***ought to/can*** do your best to appeal her.

4.4 Complete the dialogue with the expressions of offers and suggestions. Then reproduce the dialogue with the group mate.

Do you need any help	***Shell I hold the door open***	***I'll give you***
Would you like me	***We must get together***	

A: It's bee wonderful seeing you (**1**) _____ some time.
B: Yes, that'd be very nice.
A: (**2**) _____ with your baggage?
B: No, thanks. I can manage.
A: Are you sure? (**3**) _____ for you?
B: Yes, please.
A: (**4**) _____ to call a taxi?
B: No, thanks. I'll walk. It's not far.
A: No, you can't possibly. Your cases are heavy (**5**) _____ a lift. It won't take me two minutes to get the car.
B: Well, thank you very much. It's really very kind of you.
A: Not at all. It's my pleasure.

4.5 George is visiting Fernando in Sao Paulo. Complete the dialogue with the phrases from the list below. Reproduce the dialogue in pairs.

~~Let me~~	***would you like to***	***I don't mind***
shall we	***would you like me to***	***of course***
I should	***do you mind***	***of course not***
would you like	***would you mind***	***I'd appreciate that***

Fernando: Please, come in. (**1**) *Let me* take your coat. It's good to see you!
George: It's very nice to be here in Sao Paulo. Thank you so much for your invitation to come and see your company. It was very kind.
Fernando: Not at all. It's my pleasure. (**2**) _____ some coffee? Or mineral water perhaps?
George: I'd prefer mineral water, please.
Fernando: Still or sparkling?
George: Oh, (**3**) _____ , either would be fine. (**4**) _____ if I just make a quick call – I didn't get a chance earlier.
Fernando: (**5**) _____ . Go right ahead.

George: Oh, there's no signal. Never mind. Um, you have a wonderful building here. It looks really impressive from the outside.

Fernando: It's very new – we only moved in last year. It's designed by one of our most famous architects, Cesar Pelli. (**6**) _____ show you around later?

George: Thanks. (**7**) _____ .

Fernando: Now then, (**8**) _____ get down to business? (**9**) _____ _____ telling me a little about your interest in our market? What exactly are your long-term objectives here in Brazil?

George: Er, perhaps (**10**) _____ begin by explaining a little about the history of our company. I have a short presentation on my laptop. (**11**) _____ see it?

Fernando: (**12**) _____ .

5 SKILLS

Write as many interview questions as possible for the President and principal designer of *WEStar Illumination, LLC*. Use the facts from his profile.

William (Bill) Smith established Westar Illumination in 2003 after working 11 years for Sallie Mae and eight years as a principal at Willow Garden Design. He currently serves as the President and principle designer of WEStar Illumination **.** It was while studying landscape design at the U.S. Department of Agriculture under Joel Lerner (Author of the Green Scene column in the Washington Post), that he saw a landscape lighting demonstration that inspired him to establish his own landscape lighting company. Landscape lighting has provided him the opportunity to use his hands and to express his creativity in an exciting and growing field.

Mr. Smith has studied at The Landscape Lighting Institute, led by Janet Lennox Moyer, the author of "The Landscape Lighting Book," the definitive text for the landscape lighting industry. He is the first landscape lighting designer in the Northern Virginia and Washington, DC Metropolitan area to be certified by the Association of Outdoor Lighting Professionals (AOLP) as a Certified Low Voltage Lighting Technician (CLVLT). He received his Bachelors of Science Degree in Commerce from the University of Virginia in Charlottesville, VA; and a Master's Degree in Business Administration, and Masters in Information Management from Marymount University in Arlington, Virginia. He has served as a Certified Public Accountant. He is an active member of several lighting and design organizations including, the Association of Outdoor Lighting Professional (AOLP), the American Lighting Association (ALA), the International Dark-Sky Association (IDA), and the American Society of Landscape Architects (ASLA).

APPENDIX 1. Order of Adjectives

deter-miners	opinion adjectives	fact adjectives						
like *a, my, some*	like *nice, lovely* etc.	**size**	**age**	**shape**	**colour**	**origin**	**material**	**application**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**

APPENDIX 2. Functions of Modal Verbs

Expressing ability

a Terry is twenty years old. He ***can*** drive a car. (*present*)
b When he was ten, he ***could/was able to*** ride a bicycle.(*past repeated action*)
c Paula ***was able*** to climb to the top of the mountain.
(*managed to do; past single action*)

Expressing lack of ability

a Sue ***can't*** dance. (*present*)
b He ***couldn't/wasn't able to*** play chess when he was younger.
(*past repeated action*)
c She ***couldn't/wasn't able to*** finish the book. (*past single action)*

Expressing obligation/duty/necessity

a You ***must*** attend the meeting. (*You are obliged to/You have to/You need to/It is necessary.)*
b I ***must*** attend the meeting. (*I have decided.)*
c I ***have to*** attend the meeting. (*Someone else has decided*.)
d We ***ought to/should*** respect the elderly. (*less strong than must*)
e ***Need*** I ***buy*** her a present? (*Is it necessary?)*

Expressing absence of necessity

a She ***does't need to/doesn't have to/needn't*** do the shopping. I'll do it later.
(*It isn't necessary.)*
b She ***didn't need to/didn't have to*** do the shopping as I had already done it.
(*It wasn't necessary for her to do it.)*
c She ***needn't have done*** the shopping. (*It wasn't necessary for her to do the shopping, but she did.)*

Expressing prohibition

You ***mustn't/can't*** be late for work. (*it's forbidden/you aren't allowed to /it's against the rules/law)*

Expressing certainty

a He ***must*** be at home. (*positive; I'm sure he is.)*
b He ***can't*** be sleeping. (*negative; I'm sure he isn't*.)

Expressing probability

He ***ought to/should*** be in now. (*He is probably in.)*

Expressing possibility

a It ***can*** get very hot in July. *(it is theoretically possible*)
b We ***could/may/might*** be a little late. (*it is possible)*
c He ***could/might have been*** injured. (*but he wasn't*)

Asking for permission

a ***Can*** I ask you a question, please? (*informal*)
b ***Could*** I ask you a question, please? (*more polite*)
c ***May/Might*** I ask you a question, please? (*formal*)

Giving/Refusing permission

a You ***can*** park your car here. (*informal*)
b You ***may*** park your car in this area. (*formal – usually written*)
c You ***can't/mustn't*** use this phone. (*informal*)
d You ***may not*** use this phone. (*formal - usually written*)

Talking about permission

a All students ***can/are allowed*** to use the library. (*regulation*)
b I ***could/was allowed*** to go out alone when I was 18. (*general permission*)
c I ***was allowed*** to go out out alone last night.
(*permission for one particular action*)

Making requests

a ***Can /Will*** you explain this to me? (*informal*)
b ***Could/Would*** you explain this to me? (*more polite*)
c ***Can*** I have some water? (*informal*)
d ***Could/May*** I have some water? *(formal*)
e ***Might*** I have some water? (*very formal*)

Making offers

a I'***ll*** help you with your essay. (*I'm willing to help you.)*
b ***Shall/Can/Could*** I carry this bag for you?
(*Would you like I me to/Do you want me to do it?)*

Making suggestions

a ***Shall*** we visit Grandma this weekend? (*Why don't we....?/How*
b We ***can/could*** go toa concert tonight. *about....?'/What… about?)*
c Where ***shall*** we go? (*What is your suggestion?)*

Giving advice

a You ***ought to/should*** study harder. (*I advise you to.*)
b You ***must*** study harder. (*I strongly advise you to.)*

Expressing criticism

You ***ought to/should*** have been more careful. (*It would have been better if you had been more careful*.)

APPENDIX 3. Word Formation

● ● Prefixes are syllables which we add before certain words to form new words. The meaning of the new word depends on the prefix that has been used.

anti-	-	against	e.g. antisocial
bi-	-	two	e.g. biannual
co-	-	with	e.g. co-driver
ex-	-	previous, former	e.g. ex-husband
inter-	-	between	e.g. international
mis-	-	done wrongly or badly	e.g. misbehave
mono-	-	one	e.g. monorail
multi-	-	many	e.g. multinational
non-	-	not	e.g. non-fiction
out-	-	more, better	e.g. outnumber
over-	-	(done) to a great extent	e.g. overwork
post-	-	after	e.g. postdate
pre-	-	before	e.g. prehistoric
pro-	-	in favour of	e.g. pro-government
re-	-	again	e.g. redecorate
semi-	-	half	e.g. semi-final
sub-	-	under, less	e.g. submarine
super-	-	big, more	e.g. superhuman
trans-	-	(travel) from one side, group etc to another	e.g. transcontinental
under-	-	not enough	e.g. undercooked

● The prefixes below are used to express opposite meanings.

de-		e.g. defrost, decompose
dis-		e.g. dishonest, dislike
in-		e.g. indirect, independent
BUT	before ***l***	e.g. illogical
	before ***m, p***	e.g. immoral, impractical
	before ***r***	e.g. irresponsible **but:** unreliable, unreasonable
non-		e.g. non-smoker, non-stop
un-		e.g. unacceptable, unemployed

● ● **Suffixes are syllables which we add to the end of certain words to form new words.**

● **Nouns referring to people**

verb + ***er/or/ar***	e.g. teach - teacher, sail - sailor, beg - beggar
noun/verb/adjective + ***ist***	e.g. motor - motorist, tour - tourist, national - nationalist
verb + ***ant/ent***	e.g. contest - contestant, study - student
noun + ***an/ian***	e.g. republic - republican, library - librarian
verb + ***ee*** (passive meaning).	e.g. train - trainee

● **Nouns formed from verbs**

-age	e.g. pack - package
-al	e.g. refuse - refusal
-ance	e.g. accept - acceptance
-ation	e.g. realise - realisation
-ence	e.g. differ - difference
-ion	e.g. revise - revision
-ment	e.g. enjoy - enjoyment
-sion	e.g. comprehend -comprehension
-sis	(verbs ending in -d/-t) e.g. hypnotise - hypnosis
-tion	(e.g. prescribe - prescription

● **Nouns formed from adjectives**

-ance	e.g. important – importance
-cy	e.g. vacant - vacancy
-ence	e.g. competent - competence
-tion (ness)	e.g. desolate - desolation -ness
-ness	e.g. lonely - loneliness
-ity	e.g. formal - formality
-ty	e.g. loyal - loyalty
-y	e.g. modest - modesty

● **Adjectives formed from nouns**

-ous	e.g. fame - famous
-al	e.g. addition - additional
-ic	e.g. hero - heroic
-ive	e.g. expense - expensive
-ful (with)	e.g. care careful
-less (without)	e.g. care - careless
-y	e.g. health - healthy
-ly	e.g. friend - friendly

● **Adjectives formed from verbs**

-able	e.g. like - likeable
-ible	e.g. defend - defensible

-ive	e.g. conclude - conclusive

● **Verbs formed from adjectives**

-en	e.g. light - lighten
-ise	e.g. legal – legalise

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