(F 03. 02-83)

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
National Aviation University

APPROVED
Vice-Rector on Academic Activities
_____ A.Polukhin
"_____"_____2015 p

Quality Management System

COMPLEX TEST PACKAGE

Subject _____Foreign Language_____
(title of the subject)

Field of Study _____6. 050604 " Power Machine Building "_____
(for Bachelor degree – code and title of the field of study)

Index _____P1 – 6.050604- a/12 – 1.1.5_____
(curriculum index and number of the subject in the curriculum)

QMS CTP 12.01.02 (02) – 01 - 2015

Recommended by
the Scientific-Methodological-Editorial Board
of the Humanities Institute
Record № _____
of «_____»_____2015
Head of the SMEB
_____S.Yagodzinsky
(signature, name)

KYIV

(F 03.02 – 84)

National Aviation University

Humanities Institute
Department of Foreign Languages for Specific Purposes

AGREED
Director of the Institute
_____ A.Hudmanyan
(signature) (name)

«_____»_____2015

Complex Test Package
on the subject

_____"Foreign Language"_____
(title of the subject)

_____6.050604 " Power Machine Building "_____
(code and title of the field of study)

Complex Test Package reviewed by Aeroengines Department

Field of Study 6.050604 " Power Machine Building "

Record № _____ of "____" _____20___

Head of the Department for Major
6.050604 " Power Machine Building "

_____M. Kulyk
(signature) (name)

"____"_____20___

(F 03.02 – 85)

List of the academic staff developing the Complex Test Package

The Complex Test Package on the subject _____"Foreign Language"_____

for Field of Study ___6.050604 " Power Machine Building "_____
was developed by:

G.Maksymovich, senior lecturer_____ __1-30___ _____
(name, position, scientific degree, academic rank) (variant №) (signature)

The Complex Test Package was approved by
the Foreign Languages for Specific Purposes Department

Record № ____ of "____"_____20__

Head of the Department _____ O.Akmaldinova
(signature) (name)

(F 03. 02-86)

Expert Review
of the Complex Test Package

on the subject _____"Foreign Language"_____

Field of Study ____6.050604 " Power Machine Building "_____

The subject "Foreign language" is in the list of professionally oriented subjects that form the professional bachelors level of 6. 050604 " Power Machine Building " field of study. The complex test package consists of thirty variants. The complex tests are developed in accordance with course training program on the subject "Foreign Language", the field of study 6. 050604 " Power Machine Building". The tasks of the test allow verifying a wide range skills and knowledge of students: grammar and professional translation skills, the ability to express the own opinion in written form and to use professional or everyday English. The tasks embrace the main topics in computer science and engineering: "Hydrodynamics. Gas dynamics. Thermodynamics. Heat Engineering", "Hydraulics. Types of Engines". All complex test variants are equal. Each complex test variant consists of three tasks and covers all course training program material. The tasks are based on professional terms. They are oriented on bachelor degree training requirements to the field of study 6. 050604 " Power Machine Building ".

The complex test package is oriented on rather high level of foreign language among the specialists with bachelor degree. Assessment criteria and the list of reference literature are well founded.

In general, the complex test package is composed according to the defined requirements. They are capable of providing high quality verification of students' skills and knowledge on the subject "Foreign Language", the field of study 6.050604 " Power Machine Building ".

Head of the Aeroengines
Department _____ M. Kulyk _____
(date)

(F 03.02 – 87)

ASSESSMENT CRITERIA
for the Complex Test
on the subject «Foreign Language»

The level of undergraduate (graduate) students' professional knowledge and skills shown in the Complex Test on the subject Foreign Language is assessed by a 12-grade scale (Table 1).

Table 1

Full and correct answer	Maximum total score	Assignment 1	Assignment 2	Assignment 3
Assignments 1-30	12	5	4	3

Correspondence between Grades for certain assignments of the Complex Test and the National Scale is shown in Table 2.

Table 2

Grades			National Scale
Assignment 1	Assignment 2	Assignment 3	
5	4	3	Excellent
4	3	2.5	Good
3	2	2	Satisfactory
Below 3	Below 2	Below 2	Poor

Correspondence between Total Grades for the Complex Test assignments and the National Scale is shown in Table 3.

Table 3

Correspondence between Grades for the Complex Test assignments and the National Scale

Grades	National Scale	Assessment criteria
11-12	Excellent	EXCELLENT – excellent performance with insignificant shortcomings
10	Good	VERY GOOD – performance above the average standard with a few mistakes
9		GOOD – good performance altogether with a certain number of significant mistakes
8	Satisfactory	SATISFACTORY – fair but with significant shortcomings
7		SUFFICIENT – performance meets the minimum criteria
Below 7	Poor	FAIL – some more work required before the credit can be awarded

senior lecturer _____ G.Maksymovich _____

(position of the staff member who developed the Test) (signature) (name) (date)

(F 03. 02-88)

List of reference literature
that may be used during the Complex Test performance

1. Hornby A.S., Oxford Advanced Learner's Dictionary of Current English. Oxford University Press, 2000.
2. Англо-русский словарь по гражданской авиации/ В.П. Марасанов. – М. : Скорпион-Россия, 1996. – 560с.

senior lecturer	_____	G.Maksymovich	_____
(position of the staff member who developed the Test)	(signature)	(name)	(date)

(F 03.02 – 89)

National Aviation University

Humanities Institute
Department of Foreign Languages for Specific Purposes

Field of Study ____6.050604 " Power Machine Building "_____

Subject _____"Foreign Language"_____

COMPLEX TEST

VARIANT № 1

1. *Give a written translation of the text.*

In physics fluid dynamics is a subdiscipline of fluid mechanics that deals with fluid flow. It is the natural science of fluids (liquids and gases) in motion. It has several subdisciplines itself, including aerodynamics (the study of air and other gases in motion) and hydrodynamics. Fluid dynamics has a wide range of applications, including calculating forces and moments on aircraft, determining the flow rate of petroleum through pipelines, predicting weather, understanding nebulae in interstellar space and modeling fission weapon detonation. Some of its principles are even used in traffic engineering, where traffic is treated as a continuous fluid.

2. *Make 5 types of questions to the sentence.*

Fluid dynamics is the natural science of fluids in motion.

3. *Translate the sentences into English.*

1. Всі рідини можуть стискатися до певного об'єму.
2. Зміна температури і тиску веде до зміни щільності рідини.
3. Подібно до газу рідина приймає форму посудини, але, як тверде тіло, має опір.
4. Чим більша швидкість потоку рідини, тим вищий динамічний тиск.
5. Зміна температури і тиску веде до зміни щільності рідини.
1. Рідинний потік рухається швидше у вузькому місці.

Head of the Department

_____O.Akmaldinova
(signature) (name)
"____"_____20___

(F 03.02 – 89)

National Aviation University

Humanities Institute
Department of Foreign Languages for Specific Purposes

Field of Study 6. 050604 " Power Machine Building "

Subject "Foreign Language"

COMPLEX TEST

VARIANT № 2

1. *Give a written translation of the text.*

As a noun in the English language, gas is one of three classical states of matter. Near absolute zero, a substance exists as a solid. As heat is added to this substance it melts into liquid at its melting point, boils into gas at its boiling point, and if heated high enough would enter a plasma state in which the electrons are so energized that they leave their parent atoms from within the gas. A pure gas may be made up of individual atoms (like neon), elemental molecules made from one type of atom (e.g. oxygen), or compound molecules made from a variety of atoms (e.g. carbon dioxide). A gas mixture would contain a variety of pure gases like the air we breathe. What distinguishes a gas from liquids and solids is the vast separation of gas molecules.

2. *Make 5 types of questions to the sentence.*

Near absolute zero, a substance exists as a solid.

3. *Translate the sentences into English.*

1.Рідинний потік рухається швидше у вузькому місці.
2. Матерія має три основні стани: газоподібний, рідкий і твердий.
3. Чим більша швидкість потоку рідини, тим вищий динамічний тиск.
4. Повітря, яким ми дихаємо, є сумішшю газів.
5. Вода кипить при температурі t 100º, перетворюючись на пару.

Head of the Department

O.Akmaldinova
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"____" _____20___

(F 03.02 – 89)

National Aviation University

Humanities Institute
Department of Foreign Languages for Specific Purposes

Field of Study 6. 050604 " Power Machine Building "

Subject "Foreign Language"

COMPLEX TEST

VARIANT № 3

1. *Give a written translation of the text.*

Like gas, liquid is able to flow and take the shape of a container, but like a solid, it resists compression. Unlike gas, a liquid does not disperse to fill every space of a container, and maintains a fairly constant density. A distinctive property of a liquid state is surface tension, leading to wetting phenomenon. The density of liquid is usually close to that of a solid, and much higher than in gas. Therefore, liquid and solid are both termed condensed matter. On the other hand, as liquids and gases share the ability to flow, they are both called fluids.

The essential difference between the liquid and solid state is therefore not the magnitude of the intermolecular force under which the molecule vibrates - but rather the amplitude of the motion.

2. *Make 5 types of questions to the sentence.*

A distinctive property of a liquid state is surface tension.

3. *Translate the sentences into English.*

1. Матерія має три основні стани: газоподібний, рідкий і твердий.
2. Всі рідини можуть стискатися до певного об'єму.
3. Зміна температури і тиску веде до зміни щільності рідини.
4. Чим більша швидкість потоку рідини, тим вищий динамічний тиск.
5. Повітря, яким ми дихаємо, є сумішшю газів.

Head of the Department

O.Akmaldinova
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"____"_____20___

(F 03.02 –89)

National Aviation University

Humanities Institute
Department of Foreign Languages for Specific Purposes

Field of Study ____6. 050604 " Power Machine Building "_____

Subject _____"Foreign Language"_____

COMPLEX TEST

VARIANT № 4

1. *Give a written translation of the text.*

Fluid dynamics is a subdiscipline of fluid mechanics that deals with fluid flow. It is the natural science of fluids (liquids and gases) in motion. It has several subdisciplines itself, including aerodynamics (the study of air and other gases in motion) and hydrodynamics.

The foundational axioms of fluid dynamics are the conservation laws, specifically, conservation of mass, conservation of linear momentum (also known as Newton's Second Law of Motion), and conservation of energy (also known as the First Law of Thermodynamics). They are based on classical mechanics and are modified in quantum mechanics and general relativity.

2. *Make 5 types of questions to the sentence.*

The foundational axioms of fluid dynamics are the conservation laws.

3. *Translate the sentences into English.*

1. Чим більша швидкість потоку рідини, тим вищий динамічний тиск.
2. Зміна температури і тиску веде до зміни щільності рідини.
3. Повітря, яким ми дихаємо, є сумішшю газів.
4. Всі рідини можуть стискатися до певного об'єму.
5. Подібно до газу рідина приймає форму посудини, але, як тверде тіло, має опір.

Head of the Department

_____O.Akmaldinova
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"____"_____20___

(F 03.02 –89)

National Aviation University

Humanities Institute
Department of Foreign Languages for Specific Purposes

Field of Study ____6. 050604 " Power Machine Building "_____

Subject _____"Foreign Language"_____

COMPLEX TEST

VARIANT № 5

1. *Give a written translation of the text.*

A fluid, in contrast to a solid, is a substance that can flow. Fluids conform to the boundaries of any container in which we put them. They do so because a fluid is a substance that flows because it cannot withstand a shearing stress. It can, however, exert a force in the direction perpendicular to its surface. Some materials, such as pitch, take a long time to conform to the boundaries of a container, but they do so eventually; thus, we classify them as fluids.

You may wonder why we lump liquids and gases together and call them fluids. After all, liquid water is as different from steam as it is from ice. Actually, it is not. Ice, like other crystalline solids, has its constituent atoms organized in a fairly rigid three-dimensional array called a crystalline lattice. In neither steam nor liquid water, however, is there any such orderly long-range arrangement.

2. *Make 5 types of questions to the sentence.*

We call liquids and gases fluids.

3. *Translate the sentences into English.*

1. Повітря, яким ми дихаємо, є сумішшю газів.
2. Зміна температури і тиску веде до зміни щільності рідини.
3. Подібно до газу рідина приймає форму посудини, але, як тверде тіло, має опір.
4. Вода кипить при температурі t 100º, перетворюючись на пару.
5. Матерія має три основні стани: газоподібний, рідкий і твердий.

Head of the Department

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(F 03.02 –89)

National Aviation University

Humanities Institute
Department of Foreign Languages for Specific Purposes

Field of Study ____6. 050604 " Power Machine Building "_____

Subject _____"Foreign Language"_____

COMPLEX TEST

VARIANT № 6

1. *Give a written translation of the text.*

Motion of any fluid is subjected to unbalanced forces or stresses. The motion continues as long as unbalanced forces are applied. Arhcimedes and Pascal contributed greatly to what became known as fluid statics, but the father of fluid mechanics was the Swiss mathematician and physicist Daniel Bernoulli. He concluded that pressure and velocity are inversely related – in other words, as one increases, the other decreases. According to Bernoulli's principle, the greater the velocity of flow in a fluid, the greater the dynamic pressure and the less the static pressure. In other words, slower-moving fluid exerts greater pressure than faster-moving fluid. Laminar flow, sometimes known as streamline flow, occurs when fluid flows in parallel layers, with no disruption. It is the opposite of turbulent flow.

2. *Make 5 types of questions to the sentence.*

Motion of any fluid is subjected to unbalanced forces or stresses.

3. *Translate the sentences into English.*

1. Подібно до газу рідина приймає форму посудини, але, як тверде тіло, має опір.
2. Чим більша швидкість потоку рідини, тим вищий динамічний тиск.
3. Вода кипить при температурі t 100º, перетворюючись на пару.
4. Зміна температури і тиску веде до зміни щільності рідини.
5. Матерія має три основні стани: газоподібний, рідкий і твердий.

Head of the Department

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(F 03.02 – 89)

National Aviation University

Humanities Institute
Department of Foreign Languages for Specific Purposes

Field of Study ____6. 050604 " Power Machine Building "_____

Subject _____"Foreign Language"_____

COMPLEX TEST

VARIANT № 7

1. *Give a written translation of the text.*

The foundational axioms of fluid dynamics are the conservation laws, specifically, conservation of mass, conservation of linear momentum (also known as Newton's Second Law of Motion), and conservation of energy (also known as the First Law of Thermodynamics). They are based on classical mechanics and are modified in quantum mechanics and general relativity.

Fluid dynamics has a wide range of applications, including calculating forces and moments on aircraft, determining the flow rate of petroleum through pipelines, predicting weather, understanding nebulae in interstellar space and modeling fission weapon detonation. Some of its principles are even used in traffic engineering, where traffic is treated as a continuous fluid.

2. *Make 5 types of questions to the sentence.*

The father of fluid mechanics was the Swiss mathematician and physicist Daniel Bernoulli.

3. *Translate the sentences into English.*

1. Зміна температури і тиску веде до зміни щільності рідини.
2. Подібно до газу рідина приймає форму посудини, але, як тверде тіло, має опір.
3. Матерія має три основні стани: газоподібний, рідкий і твердий.
4. Всі рідини можуть стискатися до певного об'єму.
5. Вода кипить при температурі t 100º, перетворюючись на пару.

Head of the Department

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"____"_____20___

(F 03.02 – 89)

National Aviation University

Humanities Institute
Department of Foreign Languages for Specific Purposes

Field of Study ____6.050604 " Power Machine Building "_____

Subject _____"Foreign Language"_____

COMPLEX TEST

VARIANT № 8

1. *Give a written translation of the text.*

Any fluid at rest exerts pressure – what Bernoulli called "static pressure" – on its container. As the fluid begins to move, however, a portion of the static pressure is converted to what Bernoulli called dynamic pressure, or the pressure of movement. According to Bernoulli's principle, the greater the velocity of flow in a fluid, the greater the dynamic pressure and the less the static pressure. In other words, slower-moving fluid exerts greater pressure than faster-moving fluid. As fluid moves from a wider pipe to a narrower one, the volume of the fluid that moves a given distance in a given time period does not change. But since the width of the narrower pipe is smaller, the fluid must move faster,that is, with greater dynamic pressure.

2. *Make 5 types of questions to the sentence.*

Any fluid at rest exerts pressure.

3. *Translate the sentences into English.*

1. Подібно до газу рідина приймає форму посудини, але, як тверде тіло, має опір.
2. Вода кипить при температурі t 100º, перетворюючись на пару.
3. Матерія має три основні стани: газоподібний, рідкий і твердий.
4. Зміна температури і тиску веде до зміни щільності рідини.
5. Повітря, яким ми дихаємо, є сумішшю газів.

Head of the Department

_____O.Akmaldinova
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"____"_____20___

(F 03.02 – 89)

National Aviation University

Humanities Institute
Department of Foreign Languages for Specific Purposes

Field of Study ____6. 050604 " Power Machine Building "_____

Subject _____"Foreign Language"_____

COMPLEX TEST

VARIANT № 9

1. *Give a written translation of the text.*

Gas is one of three classical states of matter. Near absolute zero, a substance exists as a solid. As heat is added to this substance it melts into liquid at its melting point, boils into gas at its boiling point, and if heated high enough would enter a plasma state. Like gas, liquid is able to flow and take the shape of a container, but like a solid, it resists compression. Unlike gas, a liquid does not disperse to fill every space of a container, and maintains a fairly constant density.

A distinctive property of a liquid state is surface tension, leading to wetting phenomenon. The density of liquid is usually close to that of a solid, and much higher than in gas. Therefore, liquid and solid are both termed condensed matter. On the other hand, as liquids and gases share the ability to flow, they are both called fluids.

2. *Make 5 types of questions to the sentence.*

Near absolute zero, a substance exists as a solid.

3. *Translate the sentences into English.*

1.Чим більша швидкість потоку рідини, тим вищий динамічний тиск.
2. Матерія має три основні стани: газоподібний, рідкий і твердий.
3. Вода кипить при температурі t 100º, перетворюючись на пару.
4. Матерія має три основні стани: газоподібний, рідкий і твердий.
5. Всі рідини можуть стискатися до певного об'єму.

Head of the Department

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(F 03.02 – 89)

National Aviation University

Humanities Institute
Department of Foreign Languages for Specific Purposes

Field of Study ____6. 050604 " Power Machine Building "_____

Subject _____"Foreign Language"_____

COMPLEX TEST

VARIANT № 10

1. *Give a written translation of the text.*

In physics energy is often defined as the ability to do work or generate heat. There are several different forms of energy, kinetic, potential, thermal, gravitational, sound energy, light energy, elastic, electromagnetic, chemical and nuclear. While one form of energy may be transformed to another, the total energy remains the same. This principle, the conservation of energy, was first postulated in the early 19th century. The concept of energy and its transformations is useful in explaining and predicting most natural phenomena. Energy transformations are characterized by various kinds of potential energy which can be transformed to more active types of energy such as kinetic or radiant energy.

2. *Make 5 types of questions to the sentence.*

The principle of energy conservation was first postulated in the early 19th century.

3. *Translate the sentences into English.*

1. Зміна температури і тиску веде до зміни щільності рідини.
2. Вода кипить при температурі t 100º, перетворюючись на пару.
3. Матерія має три основні стани: газоподібний, рідкий і твердий.
4. Всі рідини можуть стискатися до певного об'єму.
5. Чим більша швидкість потоку рідини, тим вищий динамічний тиск.

Head of the Department

_____O.Akmaldinova
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(F 03.02 – 89)

National Aviation University

Humanities Institute
Department of Foreign Languages for Specific Purposes

Field of Study 6. 050604 " Power Machine Building "

Subject "Foreign Language"

COMPLEX TEST

VARIANT № 11

1. *Give a written translation of the text.*

In thermodynamics, interactions between large ensembles of objects are studied and categorized. Heat means 'energy in transit' and dynamics relates to 'movement'. Thermodynamics studies the movement of energy and how energy instills movement. In physics energy is often defined as the ability to do work or generate heat. There are several different forms of energy, kinetic, potential, thermal, gravitational, sound energy, light energy, elastic, electromagnetic, chemical and nuclear.

Historically, thermodynamics developed out of need to increase the efficiency of first steam engines. The results of thermodynamics are essential for other fields of physics, chemistry, aerospace engineering, mechanical engineering, biology and materials science.

2. *Make 5 types of questions to the sentence.*

Thermodynamics studies the movement of energy.

3. *Translate the sentences into English.*

1. При переході енергії з однієї форми у іншу, загальна кількість енергії залишається у системі сталою.
2. Матерія має три основні стани: газоподібний, рідкий і твердий.
3. Всі рідини можуть стискатися до певного об'єму.
4. Зміна температури і тиску веде до зміни щільності рідини.
5. Чим більша швидкість потоку рідини, тим вищий динамічний тиск.

Head of the Department

O.Akmaldinova
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National Aviation University

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Field of Study 6. 050604 " Power Machine Building "

Subject "Foreign Language"

COMPLEX TEST

VARIANT № 12

1. *Give a written translation of the text.*

There are several different forms of energy, kinetic, potential, thermal, gravitational, sound energy, light energy, elastic, electromagnetic, chemical and nuclear. While one form of energy may be transformed to another, the total energy remains the same. Energy transformations are characterized by various kinds of potential energy which can be transformed to more active types of energy such as kinetic or radiant energy. In thermodynamics, interactions between large ensembles of objects are studied and categorized. Heat means 'energy in transit' and dynamics relates to 'movement'. Thermodynamics studies the movement of energy and how energy instills movement. Historically, thermodynamics developed out of need to increase the efficiency of first steam engines.

2. *Make 5 types of questions to the sentence.*

Energy transformations are characterized by various kinds of potential energy .

3. *Translate the sentences into English.*

1. Закон збереження енергії вперше було сформульовано на початку 19 століття.
2. У фізиці визначають два види енергії: потенційну і кінетичну.
3. Згідно закону термодинаміки будь-яка робота може бути перетворена у теплову енергію.
4. Енергія існує у різних формах.
5. При переході енергії з однієї форми у іншу, загальна кількість енергії залишається у системі сталою.

Head of the Department

O.Akmaldinova
(signature) (name)
"____" _____20___

(F 03.02 –89)

National Aviation University

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Field of Study 6. 050604 " Power Machine Building "

Subject "Foreign Language"

COMPLEX TEST

VARIANT № 13

1. *Give a written translation of the text.*

In thermodynamics, there are four laws of very general validity. Zeroth law of thermodynamics states, if two thermodynamic systems are separately in thermal equilibrium with a third one, they are also in thermal equilibrium with each other. It is assumed in every measurement of temperature. A system in thermal equilibrium is a system whose macroscopic properties (like pressure, temperature, volume, etc.) are not changing in time. The first law of thermodynamics basically states that a thermodynamic system can store or hold energy and that this internal energy is conserved. The simplest formulation of the second law is: heat cannot flow spontaneously from a lower-temperature material to a higher-temperature material.

2. *Make 5 types of questions to the sentence.*

A thermodynamic system can store or hold energy.

3. *Translate the sentences into English.*

1. Закон збереження енергії констатує, що енергія переходить з однієї форми в іншу.
2. У циліндричній трубі статичний тиск діє перпендикулярно до поверхні, а динамічний тиск - паралельно.
3. При переході енергії з однієї форми у іншу, загальна кількість енергії залишається у системі сталою.
4. Згідно закону термодинаміки будь-яка робота може бути перетворена у теплову енергію.
5. Життя будь-якого організму повністю залежить від зовнішнього джерела енергії.

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Subject "Foreign Language"

COMPLEX TEST

VARIANT № 14

1. *Give a written translation of the text.*

Heat is a form of energy. Heat energy moves in three ways: conduction, convection, radiation. Conduction occurs when energy is passed directly from one item to another. Convection is the movement of gases or liquids from a cooler spot to a warmer spot. Radiation is the final form of movement of heat energy. The sun's light and heat cannot reach us by conduction or convection because space is almost completely empty. There is nothing to transfer the energy from the sun to the Earth. The sun's rays travel in straight lines and are called heat rays. When rays move that way, it is called radiation. When sunlight hits the Earth, its radiation is absorbed or reflected. Darker surfaces absorb more radiation and lighter surfaces reflect the radiation.

2. *Make 5 types of questions to the sentence.*

The sun's rays travel in straight lines .

3. *Translate the sentences into English.*

1. Тиск рідини і швидкість руху рідини обернено пропорційні.
2. Закон збереження енергії констатує, що енергія не може бути створена або знищена, вона тільки переходить з однієї форми в іншу.
3.У фізиці визначають два види енергії: потенційну і кінетичну.
4. Закон збереження енергії вперше було сформульовано на початку 19 століття.
5. Вчені працюють над вивченням різних форм енергії: хімічної, електричної, механічної, ядерної та інших.

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COMPLEX TEST

VARIANT № 15

1. *Give a written translation of the text.*

Energy can be found in a number of different forms. It can be chemical energy, electrical energy, heat (thermal) energy, light (radiant energy), mechanical energy and nuclear energy. Energy is measured in many ways. One of the basic measuring blocks is called a Btu. This stands for British thermal unit . Btu is the amount of heat energy it takes to raise the temperature of one pound of water by one degree Fahrenheit, at sea level. Energy also can be measured in joules. A thousand joules is equal to a British thermal unit. The term 'joule' is named after an English scientist James Prescott Joule . He discovered that heat is a type of energy. Around the world, scientists measure energy in joules rather than Btus.

2. *Make 5 types of questions to the sentence.*

The term 'joule' is named after an English scientist James Prescott Joule .

3. *Translate the sentences into English.*

1. При переході енергії з однієї форми у іншу, загальна кількість енергії залишається у системі сталою.
2. Закон збереження енергії констатує, що енергія не може бути створена або знищена, вона тільки переходить з однієї форми в іншу.
3. У фізиці визначають два види енергії: потенційну і кінетичну.
4. Одну форму енергії можна трансформувати в іншу за допомогою певних пристроїв.
5. Тиск рідини і швидкість руху рідини обернено пропорційні.

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COMPLEX TEST

VARIANT № 16

1. *Give a written translation of the text.*

The direction of energy transformations (what kind of energy is transformed to what other kind) is often described by entropy (equal energy spread among all available degrees of freedom).

Energy can be exchanged between physical systems as heat or work. Entropy can be defined for any system. A system is composed of particles, whose average motions define its properties. Properties can be combined to express internal energy and thermodynamic potentials. So, thermodynamics describes how systems respond to changes in their surroundings. This can be applied to a wide variety of topics in science and engineering. The results of thermodynamics are essential for other fields of physics, chemistry, aerospace engineering, mechanical engineering, biology and materials science.

2. *Make 5 types of questions to the sentence.*

The direction of energy transformations is often described by entropy.

3. *Translate the sentences into English.*

1. Енергія існує у різних формах.
2. При переході енергії з однієї форми у іншу, загальна кількість енергії залишається у системі сталою.
3. Закон збереження енергії вперше було сформульовано на початку 19 століття.
4. У фізиці визначають два види енергії: потенційну і кінетичну.
5. Згідно закону термодинаміки будь-яка робота може бути перетворена у теплову енергію.

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COMPLEX TEST

VARIANT № 17

1. *Give a written translation of the text.*

A system in thermal equilibrium is a system whose macroscopic properties (like pressure, temperature, volume, etc.) are not changing in time. The first law of thermodynamics basically states that a thermodynamic system can store or hold energy and that this internal energy is conserved. The simplest formulation of the second law is: heat cannot flow spontaneously from a lower-temperature material to a higher-temperature material. The third law of thermodynamics is about absolute zero temperature. As a system asymptotically approaches the temperature of absolute zero, all processes virtually cease and the entropy of the system asymptotically approaches a minimum value. It is impossible to reach the temperature of absolute zero by any finite number of processes.

2. *Make 5 types of questions to the sentence.*

A thermodynamic system can store or hold energy.

3. *Translate the sentences into English.*

1. Згідно закону термодинаміки будь-яка робота може бути перетворена у теплову енергію.
2. Життя будь-якого організму повністю залежить від зовнішнього джерела енергії.
3. Вчені працюють над вивченням різних форм енергії: хімічної, електричної, механічної, ядерної та інших.
4. Закон збереження енергії констатує, що енергія не може бути створена або знищена, вона тільки переходить з однієї форми в іншу.
5. У фізиці визначають два види енергії: потенційну і кінетичну.

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COMPLEX TEST

VARIANT № 18

1. *Give a written translation of the text.*

A heat exchanger is a device built for efficient heat transfer from one medium to another. Heat exchangers are widely used in space heating, refrigeration, air conditioning, power plants, chemical plants, petrochemical plants, petroleum refineries, and natural gas processing. One common example of a heat exchanger is the radiator in a car, in which the heat source, being a hot engine-cooling fluid, water, transfers heat to air flowing through the radiator. Heat exchangers may be classified according to their flow arrangement. In parallel-flow heat exchangers the two fluids enter the exchanger at the same end, and travel in parallel to one another to the other side. In counter-flow heat exchangers the fluids enter the exchanger from opposite ends. In a cross-flow heat exchanger the fluids travel roughly perpendicular to one another through the exchanger.

2. *Make 5 types of questions to the sentence.*

Heat exchangers may be classified according to their flow arrangement.

3. *Translate the sentences into English.*

1. Закон збереження енергії констатує, що енергія переходить з однієї форми в іншу.
2. У фізиці визначають два види енергії: потенційну і кінетичну.
3. При переході енергії з однієї форми у іншу, загальна кількість енергії залишається у системі сталою.
4. Теплообмінники широко використовуються як у промисловості, так і в домашньому господарстві.
5. Тиск рідини і швидкість руху рідини обернено пропорційні – якщо тиск зростає, швидкість зменшується.

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COMPLEX TEST

VARIANT № 19

1. *Give a written translation of the text.*

In commercial aircraft heat exchangers are used to take heat from the engine oil system to heat cold fuel. This improves fuel efficiency, as well as reduces the possibility of water freezing. Heat exchangers can be used either to heat a liquid to evaporate (or boil) it or to cool a vapour and condense it to a liquid. In chemical plants and refineries heat exchangers are used to heat incoming fluid in distillation towers. Heating and power plants which have steam-driven turbines commonly use heat exchangers to boil water into steam. Heat exchangers or similar for producing steam from water are often called boilers or steam generators. In the nuclear power plants special large heat exchanger passes heat from the primary (reactor plant) system to the secondary (steam plant) system, producing steam from water.

2. *Make 5 types of questions to the sentence.*

Tubular heat exchangers consist of a series of tubes.

3. *Translate the sentences into English.*

1. У фізиці визначають два види енергії: потенційну і кінетичну.
2. Згідно закону термодинаміки будь-яка робота може бути перетворена у теплову енергію.
3. Теплообмінники широко використовуються як у промисловості, так і в домашньому господарстві.
4. Конструкція теплообмінника визначається типом рідини .
5. При переході енергії з однієї форми у іншу, загальна кількість енергії залишається у системі сталою.

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COMPLEX TEST

VARIANT № 20

1. *Give a written translation of the text.*

Hydraulics is a division of the science of fluid mechanics which includes the study of liquids and their physical characteristics, both at rest and in motion. The type of hydraulics applied to aircraft and other aerospace-vehicle systems is called power hydraulics because it involves the application of power through the medium of hydraulics. Among the uses of hydraulic systems in aerospace-vehicle components are the operation of landing gear doors, flight controls, brakes, and a wide variety of other devices requiring high power, quick action, and/or accurate control. A basic principle of hydraulics is expressed in Pascal's law formulated by Blaise Pascal in the seventeenth century. This law states that a confined hydraulic fluid exerts equal pressure at every point and in every direction in the fluid.

2. *Make 5 types of questions to the sentence.*

Hydraulics includes the study of liquids and their physical characteristics.

3. *Translate the sentences into English.*

1. Об'єм рідини залишається незмінним навіть при дуже високому тиску.
2. Підвищення температури призводить до розширення рідини.
3. Закон, сформульований Паскалем, є діючим тільки за умови, що сила тяжіння не враховується.
4. При збільшенні потоку рідини збільшується ефект тертя.
5. Закон збереження енергії говорить, що енергія ані з'являється, ані зникає, вона переходить з однієї форми в іншу.

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COMPLEX TEST

VARIANT № 21

1. *Give a written translation of the text.*

When liquids are in motion, certain dynamic characteristics must be taken into consideration. One of the principal factors in liquid motion is friction. Friction exists between the molecules of the liquid and between the liquid and the pipe through which it is flowing. The effects of friction increase as the velocity of liquid flow increases. Friction in a moving liquid produces heat, and this heat represents a loss of energy in a hydraulic system. According to the law of conservation of energy, which states that energy can neither be created nor destroyed, energy converted to heat must be subtracted from the total energy of the moving liquid. Hence, if a hydraulic pump is discharging hydraulic fluid the power available for useful work is reduced.

2. *Make 5 types of questions to the sentence.*

One of the principal factors in liquid motion is friction.

3. *Translate the sentences into English.*

1. Розділ науки, яка займається вивченням фізичних властивостей рідини, називається гідравлікою.
2. Закон, сформульований Паскалем, є діючим тільки за умови, що сила тяжіння не враховується.
3. Об'єм рідини залишається незмінним навіть при дуже високому тиску.
4. Об'єм циліндра, вздовж якого рухається поршень, дорівнює площі днища циліндра, помноженій на його довжину.
5. Підвищення температури призводить до розширення рідини.

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COMPLEX TEST

VARIANT № 22

1. *Give a written translation of the text.*

In general, and for practical purposes, liquids are regarded as being incompressible. This means that the volume of a given quantity of a liquid will remain constant even though it is subjected to high pressure. Because of this characteristic, it is easy to determine the volume of hydraulic fluid required to move a piston through its operating range.

Hydraulic fluids and other liquids expand as temperature increases; hence, safeguards must be provided in hydraulic systems to allow for the expansion and contraction of fluids as temperature changes. Devices to provide the necessary protection are called thermal relief valves.

2. *Make 5 types of questions to the sentence.*

A basic principle of hydraulics is expressed in Pascal's law.

3. *Translate the sentences into English.*

1. Об'єм циліндра, вздовж якого рухається поршень, дорівнює площі днища циліндра, помноженій на його довжину.
2. Розділ науки, яка займається вивченням фізичних властивостей рідини, називається гідравлікою.
3. Закон, сформульований Паскалем, є діючим тільки за умови, що сила тяжіння не враховується.
4. Об'єм рідини залишається незмінним навіть при дуже високому тиску.
5. Підвищення температури призводить до розширення рідини.

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COMPLEX TEST

VARIANT № 23

1. *Give a written translation of the text.*

The word hydraulics is based on the Greek word for water and originally meant the study of the physical behavior of water at rest and in motion. Today the meaning has been expanded to include the physical behavior of all liquids, including hydraulic fluids. So hydraulics is the science of fluid mechanics. Hydraulic fluids make possible the transmission of pressure and energy. One of the most important properties of any hydraulic fluid is its viscosity. Viscosity is internal resistance to flow. Hydraulic fluids act as a lubricating medium, thereby reducing the friction between moving parts and carrying away some of the heat.

The type of hydraulics applied to aircraft is called power hydraulics, because it involves the application of power through the medium of hydraulics.

2. *Make 5 types of questions to the sentence.*

Hydraulic fluids make possible the transmission of pressure and energy.

3. *Translate the sentences into English.*

1. Об'єм рідини залишається незмінним навіть при дуже високому тиску.
2. Об'єм циліндра, вздовж якого рухається поршень, дорівнює площі днища циліндра, помноженій на його довжину.
3. Підвищення температури призводить до розширення рідини.
4. Закон, сформульований Паскалем, є діючим тільки за умови, що сила тяжіння не враховується.
5. При збільшенні потоку рідини збільшується ефект тертя.

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COMPLEX TEST

VARIANT № 24

1. *Give a written translation of the text.*

The type of hydraulics applied to aircraft is called power hydraulics, because it involves the application of power through the medium of hydraulics. Hydraulic and pneumatic systems in aircraft provide a means for the operation of large aircraft components which could not be operated satisfactorily with human power alone.

The operation of the landing gear, wing flaps, speed, thrust reversers, wheel brakes, and flight control surfaces is accomplished with hydraulic power systems. Pneumatic systems are used in some aircraft designs to perform the same type of operations performed by hydraulic systems. However, the majority of aircraft that have pneumatic systems use them only as backup systems for the operation of hydraulic components when the hydraulic system has failed.

2. *Make 5 types of questions to the sentence.*

Pneumatic systems are used in some aircraft designs.

3. *Translate the sentences into English.*

1. Гідравлічна та пневматична системи у літаку забезпечують роботу великих частин літака.
2. Однією з найбільш важливих властивостей будь-якої гідравлічної рідини є її в'язкість.
3. Селекторний клапан слугує для того, щоб направляти потік рідини.
4. Проста гідравлічна система потребує джерело гідравлічної сили.
5.Регулятор тиску або клапан скидання тиску необхідний для того, щоб скидати тиск, коли поршень добігатиме кінця свого руху.

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COMPLEX TEST

VARIANT № 25

1. *Give a written translation of the text.*

Hydraulic systems combine the advantages of light weight, ease of installation, simplification of inspection and minimum maintenance requirements. Each hydraulic system has a minimum number of components, and some type of hydraulic fluid. There are three principal types of hydraulic fluids: vegetable-base fluids, mineral-base fluids, and fire-resistant fluids.

Basically, a simple hydraulic system requires a source of hydraulic power (the pump); pipes to carry the hydraulic fluid from one point to another; a valve mechanism to control the flow and direction of the hydraulic fluid, a device for converting the fluid power to movement (actuating cylinder or hydraulic motor); and a reservoir to store the hydraulic fluid.

2. *Make 5 types of questions to the sentence.*

A simple hydraulic system requires a source of hydraulic power.

3. *Translate the sentences into English.*

1. Підвищення температури призводить до розширення рідини.
2. Закон, сформульований Паскалем, є діючим тільки за умови, що сила тяжіння не враховується.
3. При збільшенні потоку рідини збільшується ефект тертя.
4. Гідравлічна та пневматична системи у літаку забезпечують роботу великих частин літака.
5. Однією з найбільш важливих властивостей будь-якої гідравлічної рідини є її в'язкість.

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COMPLEX TEST

VARIANT № 26

1. *Give a written translation of the text.*

Hydraulic fluids make possible the transmission of pressure and energy. They also act as a lubricating medium, thereby reducing the friction between moving parts and carrying away some of the heat.

There are three principal types of hydraulic fluids: vegetable-base fluids, mineral base fluids, and fire-resistant fluids. Vegetable-base fluids are still used in some brake systems but are not generally found in hydraulic-power systems.

Mineral-base fluids are used in many systems, especially where the fire hazard is comparatively low. Mineral-base fluids are less corrosive and less damaging to certain parts than other types of fluid. Great care must be taken to see that the units installed in the hydraulic system are of the type designed for fire-resistant fluid.

2. *Make 5 types of questions to the sentence.*

Hydraulic fluids make possible the transmission of pressure and energy.

3. *Translate the sentences into English.*

1. Однією з найбільш важливих властивостей будь-якої гідравлічної рідини є її в'язкість.
2. Селекторний клапан слугує для того, щоб направляти потік рідини.
3. Проста гідравлічна система потребує джерело гідравлічної сили.
4. Регулятор тиску або клапан скидання тиску необхідний для того, щоб скидати тиск, коли поршень добігатиме кінця свого руху.
5. Літаки використовують насоси з приводом від двигуна і насоси електромотора.

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VARIANT № 27

1. *Give a written translation of the text.*

Using the pumps the hydraulic system provides hydraulic power for flight controls, the landing gear, nose gear steering, brakes, flaps, spoilers, thrust reversers. The hydraulic system includes filters. The filter is a screening or straining device used to clean the hydraulic fluid. The selector valve serves to direct the flow of fluid. The check valves allow to flow fluid in one direction only. The relief valve is a safety valve installed in the system to bypass fluid through the valve back to the reservoir in case excessive pressure. The pressure regulator maintains the system operating pressure within a predetermined range. The purpose of the pressure gage is to measure the pressure in the system. The accumulator in the hydraulic system acts as a shock absorber by maintaining an even pressure in the system.

2. *Make 5 types of questions to the sentence.*

Aircraft use engine-driven pumps and electric motor pumps.

3. *Translate the sentences into English.*

1. Підвищення температури призводить до розширення рідини.
2. Закон, сформульований Паскалем, є діючим тільки за умови, що сила тяжіння не враховується.
3. Однією з найбільш важливих властивостей будь-якої гідравлічної рідини є її в'язкість.
4. Селекторний клапан слугує для того, щоб направляти потік рідини.
5. Проста гідравлічна система потребує джерело гідравлічної сили.

Head of the Department

O.Akmaldinova
(signature) (name)
"____" _____20___

(F 03.02 – 89)

National Aviation University

Humanities Institute
Department of Foreign Languages for Specific Purposes

Field of Study ____6. 050604 " Power Machine Building "_____

Subject _____"Foreign Language"_____

COMPLEX TEST

VARIANT № 28

1. *Give a written translation of the text.*

Basically any aircraft hydraulic system consists of a reservoir or tank to hold a supply of hydraulic fluid, a pump to provide a flow of fluid under pressure, tubing to transmit fluid under pressure, a selector valve to direct the flow of fluid, an actuating unit to convert the fluid pressure into useful work. The hydraulic fluid flows from the reservoir through the pump to the selector valve. With the selector valve on the left side the fluid under pressure would flow through the valve to the right-hand valve of the cylinder. The fluid pressure then forces the piston to the left and at the same time the fluid which is on the left of the piston is forced out, up through the selector valve and to the reservoir. When the selector valve is moved to the right-hand side, the fluid from the pump then flows to the left side of the cylinder, thus reversing the process.

2. *Make 5 types of questions to the sentence.*

A selector valve is used to direct the flow of fluid.

3. *Translate the sentences into English.*

1. Проста гідравлічна система потребує джерело гідравлічної сили.
2. Регулятор тиску або клапан скидання тиску необхідний для того, щоб скидати тиск, коли поршень добігатиме кінця свого руху.
3. Літаки використовують насоси з приводом від двигуна і насоси електромотора.
4. Закон, сформульований Паскалем, є діючим тільки за умови, що сила тяжіння не враховується.
5. При збільшенні потоку рідини збільшується ефект тертя.

Head of the Department

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Field of Study ____6. 050604 " Power Machine Building "_____

Subject _____"Foreign Language"_____

COMPLEX TEST

VARIANT № 29

1. *Give a written translation of the text.*

Internal-combustion engines are the most broadly applied and widely used power-generating devices currently in existence. Examples include gasoline engines, diesel engines, gas-turbine engines, and rocket-propulsion systems.

Internal-combustion engines are divided into two groups: continuous-combustion engines and intermittent-combustion engines. The continuous-combustion engine is characterized by a steady flow of fuel and oxidizer into the engine. A stable flame is maintained within the engine (e.g., jet engine). The intermittent-combustion engine is characterized by periodic ignition of air and fuel and is commonly referred to as a reciprocating engine. Discrete volumes of air and fuel are processed in a cyclic manner. Gasoline piston engines and diesel engines are examples of this second group.

2. *Make 5 types of questions to the sentence.*

Internal-combustion engines deliver an excellent power-to-weight ratio.

3. *Translate the sentences into English.*

1. Згоряння палива відбувається в камері згоряння завдяки окиснику, яким є повітря.
2. Рухомі компоненти двигуна, такі як поршень або лопатки турбіни, генерують корисну механічну енергію.
3. Фільтр – це фільтруючий пристрій, що використовується для очищення гідравлічної рідини.
4. Проста гідравлічна система потребує джерело гідравлічної сили.
5. Двигуни внутрішнього згоряння працюють на енергоємному паливі, яким частіше за все є бензин.

Head of the Department

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(F 03.02 – 89)

National Aviation University

Humanities Institute
Department of Foreign Languages for Specific Purposes

Field of Study ____6. 050604 " Power Machine Building "_____

Subject _____"Foreign Language"_____

COMPLEX TEST

VARIANT № 30

1. *Give a written translation of the text.*

The internal combustion engine is an engine in which the combustion of a fuel (generally, fossil fuel) occurs with an oxidizer (usually air) in a combustion chamber. In an internal combustion engine, the expansion of the high temperature and pressure gases, which are produced by the combustion, directly applies force to a movable component of the engine, such as the piston or turbine blades, and, by moving it over a distance, generates useful mechanical energy. The term internal combustion engine usually refers to engines in which combustion is intermittent, such as the more familiar four-stroke and two-stroke piston engines. A second class of internal combustion engines includes continuous combustion gas turbines, jet engines and most rocket engines.

2. *Make 5 types of questions to the sentence.*

The internal combustion engine is quite different from external combustion engines, such as steam engines.

3. *Translate the sentences into English.*

1. Літаки використовують насоси з приводом від двигуна і насоси електромотора.
2. Закон, сформульований Паскалем, є діючим тільки за умови, що сила тяжіння не враховується.
3. Підвищення температури призводить до розширення рідини.
4. Закон, сформульований Паскалем, є діючим тільки за умови, що сила тяжіння не враховується.
5. Згоряння палива відбувається в камері згоряння завдяки окиснику, яким є повітря.

Head of the Department

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(F 03.02 – 90)

National Aviation University

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COMPLEX TEST

on the subject _____Foreign Language_____

Student's name _____ year of study ___ academic group № _____

Institute _____Aerospace Institute_____

Department _____Aeroengines Department_____

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