

**Зразок практикуму з підготовки
до практичних занять**

ПРАКТИКУМ
Professional English. Concept of Energy. Mechanical Engineering
(О. М. Акмалдінова, Г.О. Максимович, Т. В. Шульга)

UNIT I. The Concept of Energy. Fluid and Thermodynamics.

Exercise 29. *Memorize the following words and word combinations to text 3.*

Fluid dynamics – гідрогазодинаміка
fluid mechanics – механіка рідин і газів
subdiscipline – підрозділ дисципліни
liquid – рідина
aerodynamics – аеродинаміка
gas dynamics – газодинаміка
hydrodynamics – гідродинаміка
application – застосування
calculating force – розрахункова сила
determine – визначати
flow rate – швидкість потоку

Exercise 30. *Read, translate and write a brief summary of text 3.*

Text 3. Fluid Dynamics

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.

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. 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.

Exercise 40. *Answer the questions on text 3.*

1. What is fluid dynamics? 2. What subdisciplines is fluid dynamics subdivided into? 3. How does a substance change its state? 4. What would a gas mixture contain? 5. What distinguishes a gas from liquids and solids? 6. What is a distinctive property of a liquid state? 7. Why are liquid and solid both termed condensed matter? 8. Why are liquids and gases both called fluids? 9. What are the foundational axioms of fluid dynamics? 10. What are they based on and modified in?

**Зразок практикуму з підготовки
до практичних занять**

ПРАКТИКУМ
Professional English. Concept of Energy. Mechanical Engineering
(О. М. Акмалдінова, Г.О. Максимович, Т. В. Шульга)

UNIT II. Hydraulics. Types of engines.
Gas compressor units and turbines.

Exercise 1. *Memorize the basic vocabulary to text 1.*

Hydraulics – гідравліка
hydraulics-based – (система) на основі гідравліки
cylinder – циліндр, валик, барабан
hydraulic fluid – гідросуміш
viscosity – в'язкість
resistance – опір
medium – 1. засіб; спосіб 2. середовище
lubricating medium – мастильний/змасувальний засіб
friction - тертя

Exercise 2. *Read and translate text 1.*

Text 1. Hydraulics And Its Basic Principle

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. At a very basic level, hydraulics is a mechanical function that operates through the force of liquid pressure. In hydraulics-based systems mechanical movement is produced by contained, pumped liquid, typically through cylinders moving pistons. Hydraulic fluids make possible the transmission of pressure and energy. One of the most important properties of any hydraulic fluid is its viscosity, which 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. 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. A basic principle of hydraulics is expressed in Pascal's law formulated 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. This is true under static conditions and when the force of gravity is not taken into consideration.

Exercise 9. *Answer the questions on text 1.*

1. What does hydraulics study? 2. What mechanical function does hydraulics imply at a basic level? 3. How is movement produced in hydraulics-based systems? 4. What is one of the most important properties of any hydraulic fluid? 5. Why are hydraulic fluids important as a lubricating medium? 6. Liquids are regarded as being incompressible, aren't they? What does it mean? 7. Who expressed a basic principle of hydraulics and when was it formulated? 8. What does Pascal's law state? 9. What characteristics of liquids are taken into consideration when they are in motion? 10. What does a simple hydraulic system require? 11. Why is a pressure regulator necessary between the pump and the valve? 12. Why is hydraulics applied to aerospace-vehicle systems called power hydraulics?