**Контрольное задание**

**вариант 1**

**TEXT 1**

**Задание 1. Письменный перевод текста**

**atomic physics**

Atomic physics is the scientific study of the structure of the atom, its energy states, and its interactions with other particles and with electric and magnetic fields. Atomic physics has proved to be a spectacularly successful application of quantum mechanics, which is one of the cornerstones of modern physics.

The notion that matter is made of fundamental building blocks dates to the ancient Greeks, who speculated that earth, air, fire, and water might form the basic elements from which the physical world is constructed. They also developed various schools of thought about the ultimate nature of matter. Perhaps the most remarkable was the atomist school founded by the ancient Greeks Leucippus of Miletus and Democritus of Thrace about 440 BC. For purely philosophical reasons, and without benefit of experimental evidence, they developed the notion that matter consists of indivisible and indestructible atoms. The atoms are in ceaseless motion through the surrounding void and collide with one another like billiard balls, much like the modern kinetic theory of gases. However, the necessity for a void (or vacuum) between the atoms raised new questions that could not be easily answered. For this reason, the atomist picture was rejected by Aristotle and the Athenian school in favour of the notion that matter is continuous. The idea nevertheless persisted, and it reappeared 400 years later in the writings of the Roman poet Lucretius, in his work *De rerum natura (On the Nature of Things)*.

The internal structure of the atom, however, became clear only in the early 20th century with the work of the British physicist Ernest Rutherford and his students. Until Rutherford’s efforts, a popular model of the atom had been the so-called “plum-pudding” model, advocated by the English physicist Joseph John Thomson, which held that each atom consists of a number of electrons (plums) embedded in a gel of positive charge (pudding); the total negative charge of the electrons exactly balances the total positive charge, yielding an atom that is electrically neutral. Rutherford conducted a series of scattering experiments that challenged Thomson’s model. Rutherford observed that when a beam of alpha particles (which are now known to be helium nuclei) struck a thin gold foil, some of the particles were deflected backward. Such large deflections were inconsistent with the plum-pudding model.

**TEXT 2**

**Задание 2. Устный пересказ текста (на родном или английском языке)**

**laser**

Laser is a device that stimulates atoms or molecules to emit light at particular wavelengths and amplifies that light, typically producing a very narrow beam of radiation. The emission generally covers an extremely limited range of visible, infrared, or ultraviolet wavelengths. Many different types of lasers have been developed, with highly varied characteristics. Laser is an acronym for “light amplification by the stimulated emission of radiation.”

*Energy levels and stimulated emissions*

Laser emission is shaped by the rules of quantum mechanics, which limit atoms and molecules to having discrete amounts of stored energy that depend on the nature of the atom or molecule. The lowest energy level for an individual atom occurs when its electrons are all in the nearest possible orbits to its nucleus (see electronic configuration). This condition is called the ground state. When one or more of an atom’s electrons have absorbed energy, they can move to outer orbits, and the atom is then referred to as being “excited.” Excited states are generally not stable; as electrons drop from higher-energy to lower-energy levels, they emit the extra energy as light.

Einstein recognized that this emission could be produced in two ways. Usually, discrete packets of light known as photons are emitted spontaneously, without outside intervention. Alternatively, a passing photon could stimulate an atom or molecule to emit light – if the passing photon’s energy exactly matched the energy that an electron would release spontaneously when dropping to a lower-energy configuration. Which process dominates depends on the ratio of lower-energy to higher-energy configurations. Ordinarily, lower-energy configurations predominate. This means that a spontaneously emitted photon is more likely to be absorbed and raise an electron from a lower-energy configuration to a higher-energy configuration than to stimulate a higher-energy configuration to drop to a lower-energy configuration by emitting a second photon. As long as lower-energy states are more common, stimulated emission will die out.

**TEXT 3**

**Задание 3. Устный пересказ текста (строго на английском языке)**

**Monica Dickens**

Monica Enid Dickens (10 May 1915–25 December 1992) was an English writer, the great-granddaughter of Charles Dickens.

Known as "Monty" to her family and friends, she was born into an upper middle class London family to Henry Charles Dickens (1878–1966), a barrister, and Fanny (née Runge). She was the granddaughter of Sir Henry Fielding Dickens KC. Disillusioned with the world she was brought up in – she was expelled from St Paul's Girls' School in London before she was presented at court as a debutante – she decided to go into domestic service despite coming from the privileged class; her experiences as a cook and general servant would form the nucleus of her first book, One Pair Of Hands in 1939.

*One Pair Of Feet* (1942) recounted her work as a nurse, and subsequently she worked in an aircraft factory and on the Hertfordshire Express – a local newspaper in Hitchin; her experiences in the latter field of work inspired her 1951 book *My Turn to Make the Tea*.

Soon after this, she moved from her home in Hinxworth in Hertfordshire to the United States after marrying a United States Navy officer, Roy O. Stratton, who died in 1985. They adopted two daughters, Pamela and Prudence. The family lived in Washington, D.C. and Falmouth, Massachusetts and she continued to write, most of her books being set in Britain. She was also a regular columnist for the British women's magazine *Woman's Own* for twenty years.

Dickens had strong humanitarian interests which were manifested in her work with the National Society for the Prevention of Cruelty to Children (reflected in her 1953 book No More Meadows and her 1964 work Kate and Emma), the Royal Society for the Prevention of Cruelty to Animals (coming to the fore in her 1963 book Cobbler's Dream), and the Samaritans, the subject of her 1970 novel *The Listeners* – she helped to found the first American branch of the Samaritans in Massachusetts in 1974. From 1970 onwards she wrote a number of children's books; the Follyfoot series of books followed on from her earlier adult novel Cobbler's Dream, and were the basis of a children's TV series, also called *Follyfoot*, produced by Yorkshire Television for the UK's ITV network between 1971 and 1973 (and popular around the world for many years thereafter).

In 1978, Monica Dickens published her autobiography, An Open Book. In 1985 she returned to the UK after the death of her husband, and continued to write until her death on Christmas Day 1992, aged 77, her final book being published posthumously. She was also an occasional broadcaster for most of her writing career.

**Задание 4. Беседа по устной теме «My research»**