**MODULE 2 Part 2**

**READING**

**Ex.2 Read the text and choose the best title (A-G) for each paragraph (1-6). There is one title, which you do not need to use.**

(A) Atomic physics

(B) Science in Classical antiquity

(C) Mechanical devices

(D) Challenges nowadays

(E) What we can learn from physics

(F) Ideas that speeded up the industrial revolution

(G) Scientific revolution and the origin of modern physics

**Brief History of Physics**

(1) Why do things fall to the ground, not away from it? Why do the stars move? Why does the Sun come up in the east and go down in the west? These are all questions that physics can answer, and a lot more…

(2) In the beginning, people answered questions like these in philosophical or religious ways. A [Greek](http://en.wikipedia.org/wiki/Greeks) philosopher Aristotle (384 BC – 322 BC) developed his theory of five elements ([earth](http://en.wikipedia.org/wiki/Earth_(classical_element)), [water](http://en.wikipedia.org/wiki/Water_(classical_element)), [fire](http://en.wikipedia.org/wiki/Fire_(classical_element)), [air](http://en.wikipedia.org/wiki/Air_(classical_element)), and [aether](http://en.wikipedia.org/wiki/Aether)). \_\_\_ Archimedes (287 BC – 212 BC) discovered his principle of buoyancy. Ptolemy (90 – 168 AD), created an Earth-centered model of the Solar system (which **survived** for almost a thousand years).

(3) The works of Eastern scholars reached Europe in the 12th and 13th centuries. There were studies of planetary motion by Indian astronomers, the theories of light from Buddhist and Persian thinkers and especially the work of the Persian philosopher Nasir al-Din al-Tusi on the planetary system. **Eventually**, these ideas pushed Europe into a scientific revolution. [Copernicus](http://en.wikipedia.org/wiki/Nicolaus_Copernicus) explained the planetary motion in his Sun-centered system. Johannes Kepler formulated three laws of planetary motion. After [Galileo](http://en.wikipedia.org/wiki/Galileo_Galilei) had built one of the first telescopes, he **noticed** the phases of Venus and the four tiny moons of Jupiter, two things that **convinced** him in the Copernican system. \_\_\_\_\_\_\_\_

(4) The next great area of **investigation** was electricity and in the 19th century Michael Faraday first demonstrated an electromagnetic motor. Later, it was **improved** by James Clerk Maxwell, whose **equations** were also used to describe light. In proving Maxwell's equations, Heinrich Hertz discovered radio waves and Wilhelm von Röntgen, X-rays. Maxwell's work was also the starting point for Einstein's Theory of Relativity. At the same time, other scientists were working on thermodynamics, that is, the study of changes of heat in matter. \_\_\_\_ Röntgen's discovery of X-rays and the work of Pierre and Marie Curie on radioactivity led to the development of the science of nuclear physics.

(5) In the first half of the 20th century, developments in physics were **concerned** with the structure of atoms. The parts of the atom were identified – its nucleus, protons and electrons. \_\_\_\_\_\_\_ Also at that time, scientists such as Max Plank were looking at the relationship between matter and wave motion. The field of quantum mechanics, which explains not only how atomic particles move, but how the universe does, came into being.

(6) Since the 1970s, fundamental particle physics has **provided insights** into early universe [cosmology](http://en.wikipedia.org/wiki/Cosmology), particularly the “[Big Bang](http://en.wikipedia.org/wiki/Big_bang)” theory. However, starting from the 1990s, astronomical observations have also provided the need for new explanations of galactic stability (the problem of [dark matter](http://en.wikipedia.org/wiki/Dark_matter)), and [**accelerating** expansion of the universe](http://en.wikipedia.org/wiki/Accelerating_universe) (the problem of [dark energy](http://en.wikipedia.org/wiki/Dark_energy)).

**Ex.3 Some parts (a - d) have been taken out of the text. Where do they belong?**

a) Physicists such as Robert Boyle, James Prescott Joule and many others **set ou**t the theories that allow us today to make use of engines and other mechanical devices.

b) In this theory, the light elements (fire and air) had a natural tendency to move away from the center of the universe while the heavy elements (earth and water) had a natural tendency to move toward the center of the universe, thereby forming a spherical earth. Since the celestial bodies - that is, the [planets](http://en.wikipedia.org/wiki/Planet) and [stars](http://en.wikipedia.org/wiki/Star) - were seen to move in circles, he **concluded** that they were made of a fifth element, which he called aether.

c) Eventually in the 1940s, scientists in the USA were able to **split** a nucleus and the result was the world's first nuclear explosion.

d) In 1687, building on their work, Isaac Newton set out his Laws of Motion and modern physics was born. Moreover, Newton and Leibniz **independently** developed calculus (the branch of mathematics and the so-called language of physics).

**VOCABULARY**

**Ex.4 Study the definitions of the words from the text. Then do the exercises that follow.**

|  |  |
| --- | --- |
| **to accelerate**  **to concern**  **to conclude**  **to convince**  **equation**  **eventually**  **to improve**  **independently**  **insight**  **investigation**  **to notice**  **to provide**  **to set out**  **to split**  **to survive** | (v.) to begin to move more quickly  (v.) to relate to, be about, involve; to worry, to interest  concern (n.) - interest, business, worry  (v.) to decide; to finish; to say your last remark  (v.) to make smb to believe, to persuade  (n.) mathematical statement that two values are equal  (adv.) finally, in the end, after a lot of problems  (v.) to make or become better  (adv.) individually, free from outside control or help  (n.) sudden accurate and deep understanding of a problem  (n.) examination, inquiry, research  (v.) to see, catch sight of, observe  (v.) to give, supply, make available  (v.) to explain in a clear and organized way  (v.) to crash, divide; share  (v.) to continue to live or exist in spite of hardships |