4 A few experiments have been made in this field of science.
5 Much study has already been given to space.
6 The appearance of data communication has opened a new epoch for communication.
7 Great advances have made astronomy a modern science.

*****

1 The new apparatus had already been installed when they began the experiment.
2 Many experiments had been made before the necessary results were got.
3 The results of the work were revealed after the data had been proved.
4 As it had been theoretically predicted high-energy alpha particles were registered.
5 When the reaction had been finished the temperature fell.

*****

1 I shall have prepared everything necessary when you come.
2 We shall have passed all our exams by the end of June.
3 The new device will have been tested before the chief engineer comes.
4 By the end of March the project will have been realized.

2 Mind Past Indefinite and Present Perfect.

1 a) I finished my work last week.
b) We have already finished our work.

2 a) Did you see the film yesterday?
b) Have you seen the film?

3 a) Where did you buy this book?
b) I have bought a new book in Moscow.

4 a) We finished our work at 3 o'clock.
b) We have finished our work by 3 o'clock.

3 Write down the answers to these questions.

1 Who has invented the radio?
2 What cities of our country have you visited?
3 Has electricity made a great contribution to radio communications?
4 Have you made any success in your research work?
5 Has this article dealt with electricity?

4 Write down questions like these.

Eg. They have tested the system. (*Who? What?*)
Who has tested the system? What have they tested?

1 He has used a new device in his experiment this month. *(What? When?)*
2 We have discussed the problem dealing with two types of electricity. *(What?)*
3 Pavel Yablochkov has greatly contributed to electronical engineering as well as Volta and Ampere. *(Who?)*
4 Not long ago I have read some English articles on my speciality. *(What? When?)*
5 Russian scientists played an important part in solving the problem of atmospheric electricity. *(Who? What?)*
6 Electric motors transform electric energy into mechanical energy. *(What?)*

5 Choose the correct form.

1 Scientists ... many secrets of nature.
   a) have discovered
   b) has discovered
   c) had discovered
2 He ... a very interesting job at the institute.
   a) had offered
   b) have offered
   c) was offered
3 Radar ... during World War II.
   a) constructed
   b) was constructed
   c) has been constructed
4 We ... this method since 1980.
   a) use
   b) have used
   c) will use
5 The title of the article ... .
   a) has changed
   b) had changed
   c) has been changed
6 Numerous attempts ... to prepare compounds of this type.
   a) had made
   b) have been made
   c) will be made
7 The electric current ... in the year 1800.
   a) was born
   b) has born
   c) has been born

8 The industrial application of the electric current ... to the technological progress.
   a) was contributed
   b) contributed
   c) had been contributed

6 Translate into Russian.

1 Transformers have found very wide practical applications.
2 Electric machines fall into two large classes.
3 Many people have had strong shocks from the electrical wires in a house.
4 The physical properties of plasma have been a problem since the discovery of that state of matter.
5 The distance from the Earth to the Moon has been very accurately measured by means of lasers.
6 The electric motor operates all electrical devices.
7 The fourth state of matter is known as plasma.
8 I worked at the plant last year and I have not been there since.

7 Translate into Russian.

1 arc light
2 carbon filament
3 daylight lamp
4 energy source
5 power distribution
6 energy production
7 space research
8 research program
9 space flight
10 light wave

8 Translate into Russian paying attention to the underlined words and phrases.

1 Edison wanted to find a wire that wouldn't <u>burn</u> or <u>melt</u> at high temperatures.
2 The lamp's <u>filament</u> is heated by the passage of electric current.
3 The carbon-filament lamp <u>could</u> operate at temperature of about 1900° C.
4 Today, <u>instead of</u> carbon filaments we use tungsten wires.
5 Lodygin was the first to discover the advantages of the metal wire filaments <u>in comparison with</u> other filaments.
6 An electric candle <u>consisted of</u> two carbon rods placed in parallel and separated by an insulating material.
7 The electric candle appeared in Russian streets in 1878.
8 Yablochkov's invention was a new and simple means of arc lighting.