

HOTS Questions

Q.1. Is physics more of a philosophy or more of a mathematical science?

Ans. Physics is not a purely abstract science devoid of philosophy. Physicists are natural philosophers and Einstein is an example to quote. So, Philosophy has provided back-bone to Physics.

Q.2. Has imagination any role in physics?

Ans. One of the definition of physics says that “It is the science based on imagination and inspection”. Thus, imagination plays an important role in physics.

Q.3. Is science based on the speaking terms with humanities?

Ans. Yes, there is deep relation between the development of humanity on account of science. Many socioeconomic, political and ethical problems are being tackled and solved by Science. Science has greatly helped in developing the art and culture. Many musical instruments have been developed due to various theories in the physics. The steam engine is inseparable from the industrial revolution which had great impact on the human civilization.

Q.4. The physicists think at a level for higher than a normal individual. Explain.

Ans. For everyone to become a leader in his field, he has to think for higher level than an ordinary person. This is more so far, the case of physicists as the technological development meant for uplifting the living condition of mankind is highly dependent on the farsightedness of the physicists in particular. He must think at a level which is philosophical and mathematically quantifying so that they can visualize the requirement of the people in quite advance.

Q.5. Physics is an exciting subject. Comment.

Ans. The study of physics is exciting in many ways e.g.,

(i) Journey to the moon is controlled from the ground.

(ii) Lasers and their ever-increasing applications.

(iii) Live transmission of events thousands of kilometers away on the T.V.

(iv) The speed and memory of the fifth generation of computers.

(v) Study of various types of forces in nature.

(vi) Technological advances in health science.

(vii) Use of robots is quite exciting.

(viii) Telephone calls over long distance and so on. Thus, physics is exciting not only to the scientists but also to a lay man, children, women etc. All the musical instruments, toy guns, toy trains etc. all are constructed using simple principles of physics like collision, potential energy etc. Today the situation is that even our thought process and social values are affected by physics. Thus, it is quite amazing.

Q.5. How is physics related to other sciences?

Ans. Physics is so important branch of science that without the knowledge of physics, other branches of science cannot make any progress. This can be seen from the following:

(i) Physics in relation to Mathematics: The theories and concepts of physics lead to the development of various mathematical tools like differential equations, equations of motion etc.

(ii) Physics in relation to chemistry: The concept of interaction between various particles leads to understand the bonding in the chemical structure of a substance. The concept of X-ray diffraction and radioactivity has helped to distinguish between the various solids and to modify the periodic table.

(iii) Physics in relation to Biology: The concept of pressure and its measurement has helped us to know the blood pressure of a human being, which in turn is helpful to know the working of heart. The discovery of X-rays has made it possible to diagnose the various diseases in the body and fracture in bones. The optical and electron microscopes are helpful in the studies of various organisms. Skin disease and cancer can be cured with the help of high energy radiation like X-rays, ultraviolet rays.

(iv) Physics in relation to Geology: The internal structure of various rocks can be known with the study of crystal structure. Age of rocks and fossils can be known easily with the help of radioactivity, i.e., with the help of carbon dating.

(v) Physics in relation to Astronomy—Optical telescope has made it possible to study the motion of various planets and satellites in our solar system. Radio telescope has helped to study the structure of our galaxy and to discover pulsars and quasars (heavenly bodies having star like structure). Pulsars are rapidly rotating neutron stars. Doppler effect predicted the expansion of universe. Kepler's laws are responsible to understand the nature of management of the planets around the sun.

(vi) Physics in relation to Meteorology: The variation of pressure with temperature leads to forecast the weather.

(vii) Physics in relation to Seismology: The movement of earth's crust and the types of waves produced help us in studying the earthquake and its effect.