

NCERT solutions for class 11 Physics Chapter 1 Physical World

Q1.1 Some of the most profound statements on the nature of science have come from Albert Einstein, one of the greatest scientists of all time. What do you think did Einstein mean when he said: “The most incomprehensible thing about the world is that it is comprehensible”?

Answer:

Einstein meant to say that all the physical phenomenon can be explained by the very basic laws of physics i.e., it is possible to simplify world with basic laws of physics (as the world is very complex).

Q1.2 “Every great physical theory starts as a heresy and ends as a dogma”. Give some examples from the history of the science of the validity of this incisive remark.

Answer:

The opinions which are against the conventions are called HERESY, whereas some established theory is known as DOGMA.

For e.g. Copernicus’s geocentric theory was a heresy till the times it was proved became a Dogma.

Q1.3 “Politics is the art of the possible”. Similarly, “Science is the art of the soluble”. Explain this beautiful aphorism on the nature and practice of science.

Answer:

This statement means politics give you possibility or power to do something good for the society as people elect to represent them. Similarly, a scientist gives times to study particular

phenomena and studies that carefully, explain it to the whole world and after discovery is confirmed they present it to the whole world as a better product for the world.

Q1.4 Though India now has a large base in science and technology, which is fast expanding, it is still a long way from realising its potential of becoming a world leader in science. Name some important factors, which in your view have hindered the advancement of science in India.

Answer:

- (i) Due to political interference in the educating system of society.
- (ii) Due to the large population, the resources or the quality of education is low.
- (iii) The policies for higher studies is not good in India so no one is interested in research.

Q1.5 No physicist has ever “seen” an electron. Yet, all physicists believe in the existence of electrons. An intelligent but superstitious man advances this analogy to argue that ‘ghosts’ exist even though no one has ‘seen’ one. How will you refute his argument?

Answer:

This argument can be refuted as the complete physics (theorems) depends upon the fact that the nucleus contains electrons. Whereas there is no advancement of human in agreeing with the existence of ghosts.

Q1.6 The shells of crabs found around a particular coastal location in Japan seem mostly to resemble the legendary face of a Samurai. Given below are two explanations of this observed fact. Which of these strikes you as a scientific explanation?

(a) A tragic sea accident several centuries ago drowned a young Samurai. As a tribute to his bravery, nature through its inscrutable ways immortalised his face by imprinting it on the crab shells in that area.

(b) After the sea tragedy, fishermen in that area, in a gesture of honour to their dead hero, let free any crab shell caught by them which accidentally had a shape resembling the face of a Samurai. Consequently, the particular shape of the crab shell survived longer and therefore in course of time the shape was genetically propagated. This is an example of evolution by artificial selection.

[Note: This interesting illustration taken from Carl Sagan's 'The Cosmos' highlights the fact that often strange and inexplicable facts which on the first sight appear 'supernatural' actually turn out to have simple scientific explanations. Try to think out other examples of this kind].

Answer:

The B part is giving the best explanation as nature is governed by the laws of physics. It doesn't give any kind of tribute to anyone. But coincidences can be possible.

Q1.7 The industrial revolution in England and Western Europe more than two centuries ago was triggered by some key scientific and technological advances. What were these advances?

Answer:

Some of the advances were :

(i) Steam engine:- It revolutionised the complete transport system at that time.

(ii) Blast furnace:- The temperature required to melt the iron was now able to achieve using blast furnace.

(iii) Cotton Jenny:- It reduced the time for collecting cotton.

Q1.8 It is often said that the world is witnessing now a second industrial revolution, which will transform the society as radically as did the first. List some key contemporary areas of science and technology, which are responsible for this revolution.

Answer:

The major areas can be:-

(i) The availability of internet

(ii) supercomputers

(iii) Artificial intelligence

(iv) Data storage source for DNA.

Q1.9 Write in about 1000 words a fiction piece based on your speculation on the science and technology of the twenty-second century.

Answer:

In today's world, we travel to places by means of aircraft fuelled by petrol but in the twenty-second century, we may see a journey to a distant star which is located hundreds of light-years away from the earth with the help of a spaceship (which is not bounded by fuel consumption).

Also, we might see the interference of aliens our colony on other planets. Then, there might be a war for existence between human and aliens.

Q1.10 Attempt to formulate your 'moral' views on the practice of science. Imagine yourself stumbling upon a discovery, which has great academic interest but is certain to have nothing but dangerous consequences for the human society. How, if at all, will you resolve your dilemma?

Answer:

Since we have progressed at a very high rate in recent time but we need to discover many other things in the universe (as the universe holds many secrets within itself).

Moreover, the person using the knowledge has only two options either construction or destruction it depends upon the thinking of one.

Q1.11 (a) Science, like any knowledge, can be put to good or bad use, depending on the user. Given below is an application of science. Formulate your views on whether the particular application is good, bad or something that cannot be so clearly categorised :

(a) Mass vaccination against smallpox to curb and finally eradicate this disease from the population. (This has already been successfully done in India).

Answer:

The mass vaccination is very good for the society as the world has witnessed so many deaths due to the small pox virus.

Q1.11 (b) Science, like any knowledge, can be put to good or bad use, depending on the user. Given below is an application of science. Formulate your views on whether the particular application is good, bad or something that cannot be so clearly categorised :

(b) Television for eradication of illiteracy and for mass communication of news and ideas.

Answer:

Television for the eradication of illiteracy and for mass communication of news and ideas will be good as in the modern few are left behind so we need to make them literate in one form or the other for a better society.

Q1.11 (c) Science, like any knowledge, can be put to good or bad use, depending on the user.

Given below is an application of science. Formulate your views on whether the particular application is good, bad or something that cannot be so clearly categorised :

(c) Prenatal sex determination

Answer:

Prenatal sex determination cannot be good for society as the thinking of modern people is to give birth only to a male child. So this will create imbalance by creating gender inequality.

Q1.11 (d) Science, like any knowledge, can be put to good or bad use, depending on the user.

Given below is an application of science. Formulate your views on whether the particular application is good, bad or something that cannot be so clearly categorised :

(d) Computers for increase in work efficiency

Answer:

The computer can definitely decrease the human effort and increase efficiency so they are good progress in society. But it must be noticed that excessive use of a computer may lead to unemployment in the world.

Q1.11 (e) Science, like any knowledge, can be put to good or bad use, depending on the user.

Given below is an application of science. Formulate your views on whether the particular application is good, bad or something that cannot be so clearly categorised :

(e) Putting artificial satellites into orbits around the Earth

Answer:

The artificial satellite are good as they make the life of people more easier by providing modern days must facilities like internet connectivity, mobile network or GPS.

Q1.11 (f) Science, like any knowledge, can be put to good or bad use, depending on the user.

Given below is an application of science. Formulate your views on whether the particular application is good, bad or something that cannot be so clearly categorised :

(f) Development of nuclear weapons

Answer:

Nuclear weapons are the most dangerous weapons in the current world as they may wipe off not only a country but they also have long term effects.

Thus nuclear elements should only be used for the generation of electricity.

Q1.11 (g) Science, like any knowledge, can be put to good or bad use, depending on the user.

Given below is an application of science. Formulate your views on whether the particular application is good, bad or something that cannot be so clearly categorised :

(g) Development of new and powerful techniques of chemical and biological warfare).

Answer:

Development of new and powerful techniques of chemical and biological warfare is not good for society as it only has a bad effect on maintaining peace in the world. Further, they may also be used by terrorists which is harmful to safety for the citizens.

Q1.11 (h) Science, like any knowledge, can be put to good or bad use, depending on the user.

Given below is an application of science. Formulate your views on whether the particular application is good, bad or something that cannot be so clearly categorised :

(h) Purification of water for drinking

Answer:

Purification of water for drinking is very important for some of the regions as the people living there are having many water-related diseases. Also, the pure water is limited so we need to develop many techniques for purification of the water.

Q1.11 (i) Science, like any knowledge, can be put to good or bad use, depending on the user.

Given below is an application of science. Formulate your views on whether the particular application is good, bad or something that cannot be so clearly categorised :

(i) Plastic surgery

Answer:

Plastic surgery is good for the people who are victims of acid attack or fire burn. However, it also has side-effects.

Q1.11 (j) Science, like any knowledge, can be put to good or bad use, depending on the user.

Given below is an application of science. Formulate your views on whether the particular application is good, bad or something that cannot be so clearly categorised :

(j) Cloning

Answer:

Cloning of organs is good but by cloning technique, the clone of human can also be made which will create social disturbance and fraud in the society.

Q1.12 India has had a long and unbroken tradition of great scholarship — in mathematics, astronomy, linguistics, logic and ethics. Yet, in parallel with this, several superstitious and obscurantist attitudes and practices flourished in our society and unfortunately continue even today — among many educated people too. How will you use your knowledge of science to develop strategies to counter these attitudes?

Answer:

If the literacy rate of India will increase then the beliefs in superstitions will automatically go down. If we make them aware of the world of science, make them familiar with the laws of physics will really help them.

Q1.13 Though the law gives women equal status in India, many people hold unscientific views on a woman's innate nature, capacity and intelligence, and in practice give them a secondary status and role. Demolish this view using scientific arguments, and by quoting examples of great women in science and other spheres; and persuade yourself and others that, given equal opportunity, women are on par with men.

Answer:

There are many examples in the world which shows women are nowhere behind the men. For e.g. Indira Gandhi, Mother Teresa, Kalpana Chawla etc. have proved themselves in their respective field. There might be some biological differences between men and women but that doesn't make men superior, at least not in the modern world.

Q1.14 “It is more important to have beauty in the equations of physics than to have them agree with experiments”. The great British physicist P. A. M. Dirac held this view. Criticize this statement. Look out for some equations and results in this book which strike you as beautiful.

Answer:

There many equations that struck the physicist such as Newton's law of motion and the famous mass-energy equation of Einstein which then became the path-breaking for the physics. Thus the given statement is true.

Q1.15 Though the statement quoted above may be disputed, most physicists do have a feeling that the great laws of physics are at once simple and beautiful. Some of the notable physicists, besides Dirac, who have articulated this feeling, are: Einstein, Bohr, Heisenberg, Chandrasekhar and Feynman. You are urged to make special efforts to get access to the general books and writings by these and other great masters of physics. (See the Bibliography at the end of this book.) Their writings are truly inspiring!

Answer:

Books like ‘Surely you are joking, Mr Feynman’ by Richard Feynman are interesting books which should be read by the students who have a keen interest in the department of physics. These not only generate the interest but also teaches you path breaking laws of physics were evolved from a very basic incident.

Q1.16 Textbooks on science may give you a wrong impression that studying science is dry and all too serious and that scientists are absent-minded introverts who never laugh or grin. This image of science and scientists is patently false. Scientists, like any other group of humans, have their share of humorists, and many have led their lives with a great sense of fun and adventure, even

as they seriously pursued their scientific work. Two great physicists of this genre are Gamow and Feynman. You will enjoy reading their books listed in the Bibliography.

Answer:

Scientists as other human have hobbies and are humorists. For e.g, Albert Einstein had the hobby of playing the violin. So apart from doing their serious work on physics they also have fun in their lifestyle. Thus the image of science and scientists is patently false which states that science is tough and boring.

You may read a few of the books which supports the above statement and tell you about the lifestyle of some famous scientists.

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