



# PHYSICS

## BOOKS - MODERN PUBLISHERS

### PHYSICS (HINGLISH)

#### PHYSICAL WORLD

#### Conceptual Questions

1. Explain the scientific methods involved in deducing any scientific the theory .



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2. How do we know that Earth was not flat in early days ?



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3. How are microscopic domain and macroscopic domain in physics different from each other ?



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4. Name some key scientific and technological advances which led to first industrial revolution in England and Europe.



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5. How is angular momentum of a gaseous nebula contracting under its own gravity is conserved ?



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**6.** Compare the strengths of four fundamental forces.



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**7.** How is hypothesis different from a model ?



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**8.** There are many scientific models proposed and failed . The orpuscular theory is an

example of such case . The corpuscular theory given by Newton was later replaced by Huygen's wave theory of light . This was further replaced by Plank's quantum theory and finally by De-Broglie's hypothesis . Comment on the fact that despite failures in the above in the above theories, we stress on the study of all the above given theories .



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**Ncert File Ncert Textbook Exercises**

1. Some of the most profound statements on the nature of science have come from Albert Einstein, one of the greatest scientist 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"?



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2. 'Every great physical theory starts as a heresy and ends as a dogma'. Give some

examples from the history of science of the validity of this incisive remark.



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**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 .



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4. Though India now has 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 .



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5. No physicist has ever "seen" an electron, yet, all physicists believe in existence of electrons .

An intelligent but superstitious man advances this analog to argue that 'ghosts' exist even though no one has "seen" one . How will you refute his argument ?



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6. The shells of crabs found around a particular coastal location in Japan seem

mostly to resemble the legendary face of 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, fisherman 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 .]



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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 ?



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**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.



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**9.** Write in about 1000 words a fiction piece based on your speculation on the science and

technology of the twenty-second century .



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**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 ?



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

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

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

(c ) Prenatal sex determination

(d) Computers for increase in work efficiency

(e) Putting artificial satellites into orbits around the Earth

(f) Development of nuclear weapons

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

(h) Purification of water for drinking

(i) Plastic surgery

(f) Cloning





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**12.** India has had a long and unbroken tradition of great scholarship - in mathematics, astronomy, linguistics, logic ethics . Yet , in parallel with this, several superstitions and obscurantistic 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 ?



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**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.



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**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. Criticise this statement. Look out for some equations and results in this book which strike you as beautiful .



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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. these and other great masters of physics . Their writings are truly inspiring ?



**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.



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## Revision Exercises Very Short Answer Questions

1. What is the principle behind working of sonar ?



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2. What is the scientific principle behind production of ultra high magnetic fields ?



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3. Who discovered neutrons?



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4. Define Science.



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5. Define Physics .



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6. What do we mean by unification ?



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7. Explain the reduction as one of the principal thrusts in physics .





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8. Name the five branches of physics .



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9. What do we study in electromagnetism ?



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10. What is the role of physics in Astronomy ?



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**11.** What is the contribution of physics to our society ?



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**12.** What is the basic law behind the rocket launch ?



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**13.** Who discovered the principle of inertia ?



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**14.** Who discovered electron?



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**15.** Name the Indian physicist who gave the theory of inelastic scattering of light by molecules .



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**16.** Who proposed the theory of expanding universe ?



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**17.** Which among the fundamental forces is weakest in nature ?



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**18.** Define the gravitational force .



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**19.** What are electromagnetic forces .



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**20.** Arrange the fundamental forces in decreasing order of their magnitude of strength.



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21. Who is credited for the discovery of absolute temperature ?



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22. Define the law of conservation of energy .



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**23.** Define the law of conservation of angular momentum .



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**24.** What is law of conservation of charge ?



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**25.** Who received the Nobel prize for photo electricity ?



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## Revision Exercises Additional Questions

1. Computers work on the principal of

- A. Superconductivity
- B. Digital logic
- C. Magnetic confinement of plasma
- D. Electromagnetic induction

**Answer: B**





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2. Which of the following statements is correct regarding the strong nuclear forces ?

- A. It is a central force
- B. It is a conservative force
- C. It obeys the inverse square law
- D. It has shortest range

**Answer: D**



3. Which of the following statements is false regarding the gravitational force ?

- A. It is conservative force
- B. It is central force
- C. It obeys inverse square law
- D. It is the strongest force in nature

**Answer: D**



4. Which of the following concepts has no contributions by Einstein ?

A. General Theory of relativity

B. Photoelectric effect

C. Quantum model of hydrogen atom

D. Quantum theory

**Answer: C**



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5. Fusion test reactor (Tokamak) is based on

A. Interference

B. Photoelectric effect

C. Magnetic confinement of plasma

D. Motion of charged particles in electric  
and magnetic field

**Answer: C**



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## Revision Exercises Fill In The Blanks

1. The country of origin of Archimedes is .....



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2. The field particle of gravitational forces is known as .....



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3. . . . . Are based upon the controlled nuclear chain reaction .



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4. The basic principle behind the computers is . . . . .



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5. The country to which Niels Bohr belongs is .

.....



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6. The law of force between two charges is given by .....



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**Revision Exercises Short Answer Questions**

1. Name some basic scientific methods.



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2. Name the fundamental forces in nature.



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3. What is the role of physics in biological sciences ?



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4. How is physics and technology related /



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5. What the expression for (i) Newton's law gravitational force (ii) Coulomb's law .



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6. How can we say that charge is quantised ?





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7. Write a brief note on electromagnetic forces



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8. Give an example in support of law of conservation of momentum .



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9. Write a short note of Satyendranath Bose.



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10. Write about the life of C.V. Raman and his contribution towards science .



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11. Arrange all the fundamental forces in increasing order of their range .



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## Revision Exercises Long Answer Questions

1. What are the main features of gravitational force?



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2. Write a short note on different branches of physics .



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3. What are the fundamental forces ? Give example of each force .



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4. Write some salient features of electromagnetic forces .



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5. What are the important conservation laws in classical physics ? Explain them .



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6. How is physics related to other branches of science, i.e. chemistry , medicine, astronomy and mathematics ?



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