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PHYSICS

BOOKS - KUMAR PRAKASHAN KENDRA

PHYSICS (GUJRATI ENGLISH)

PHYSICAL WORLD

Section A Question Answers

1. About which phenomena occurred in the world humans have always been curious to

know ?

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2. Give meaning of word 'Science'. Discuss the contribution of countries in growth of science.

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3. Explain about 'Science' and 'Scientific' method.

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4. Explain the statement : "Science is always dynamic". with example.

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5. What happens when the existing theory is unable to explain new observation ? Give example.

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6. How did 'Quantum Mechanics' develop ?

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7. Explain the development of Atomic Model.

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8. Explain the meaning of word "Physics".

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9. Explain two principal thrusts in physics: 'Unification' and 'Reduction'.

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10. Give two domains of interest of physics and the phenomena included in it

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11. Which subjects are included in Classical Physics ?

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12. Explain in short the branch of physics : "Electrodynamics".

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13. Explain in short about 'Optics'.

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14. What is studied in Thermodynamics ?

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15. What is included in microscopic domain ?

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16. Which theory is presently accepted to understand the phenomena of microscopic domain ?

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17. Explain the range of functions of physics in terms of length, mass and time.

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18. What lies behind the phenomenal progress of physics in the last few centuries ?

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19. How a refined theory is formed in physics ? Explain with example.

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20. Explain the relation between physics, technology and society by example.

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21. Give some types of forces.

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22. Give reason behind the generation of restoring force in elastic spring.

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23. Give only the names of fundamental forces in the nature.

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24. Explain in short about fundamental force : "Gravitational force".

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25. Explain in short about electromagnetic force.

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26. Give difference between Gravitational and Electromagnetic force.

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27. Explain in short about strong nuclear force.

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28. Explain in short about weak nuclear force.

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29. What is unification of forces ?

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30. What are conserved physical quantities of nature ?

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31. Write law of conservation of mechanical energy. Write an example.

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32. How energy is conserved when the air resistance is considered during the free fall of the stone ?

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33. Give information about the law of conservation of mass.

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34. Give information about chemical reaction.

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35. Write the equation of Einstein of relation between mass and energy. Where this principle is used ?

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36. Explain the importance of laws of conservation to solve the complex problems.

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37. Which law gives the permission for laws of nature with respect to displacement ?

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38. Which law is obtained due to isotropy of space?

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Section A Special Information Higher Order Thinking Skills Hots

1. Which secret form of nature is responsible behind the existence of law of conservation of different physical quantities ?

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2. Which are the conservation laws in physics ? Write them.

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Section B Textual Exercise

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" ?

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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 a large base in science and technology, which is fast expanding, it is still a long way from releasing 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 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 refuse 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 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).

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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 categorized :

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

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12. 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 categorized :

Television for eradication of illiteracy and for mass communication of news and ideas.

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13. 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 categorized :

Prenatal sex determination

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14. 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

categorized :

Computers for increase in work efficiency

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15. 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 categorized :

Putting artificial satellites into orbits around the Earth

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16. 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

categorized :

Development of nuclear weapons

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17. 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 categorized :

Development of new and powerful techniques of chemical and biological warfare.

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18. 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

categorized :

Purification of water for drinking

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19. 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

categorized :

Plastic surgery

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20. 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

categorized :

Cloning

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21. 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 obscurantists 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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22. 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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23. "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.

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24. 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!


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25. Textbooks on science may give you a wrong impression that studying science is dry and all too serious and that scientists are absentminded 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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Section C Objective Questions

1. From which Latin word, the word 'Science' is originated ?

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2. Give meaning of Sanskrit word "Vigyan" and Arabic word "Ilm'.

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3. What is the basic objective of science ?

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4. What is Science ?

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5. Which scientist gave heliocentric theory ?

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6. Which shape of planetary orbits represented by Nicholas Copernicus ?

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7. Who introduced'antiparticle' first theoretically?

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8. What is positron ?

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9. Which phenomenon's properly cannot be explained by wave nature of light ?

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10. On basis of which observations Rutherford gave atomic model ?

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11. Give meaning of word 'PHYSICS.

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12. From which word of 'Sanskrit' "Bhautik Vigyan" word is derived ?

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13. Which are the two main thrusts of physics ?

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14. What is included in thermodynamics ?

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15. Give two main domains of physics.

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16. What are included in macroscopic domain ?

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17. What are included in microscopic domain ?

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18. What is included in electrodynamics ?

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19. What is studied in optics ?

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20. On basis of which theories the wireless communication technology is developed ?

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21. On basis of which theory the nuclear power reactors and nuclear weapons are working ?

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22. Give range of length scale in physics.

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23. Give range of mass scale in physics.

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24. Give range of time scale in physics.

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25. Give the law of gravitation of Newton.

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26. Give responsible quantity for gravitational force.

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27. What is electromagnetic force ?

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28. What is strong nuclear force ?

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29. Which phenomenon is occurred during weak nuclear force ?

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30. Which particles are emitted during β-decay ?

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31. What is the range of weak nuclear force ?

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32. Write the law of conservation of mechanical energy

Watch Video Solution

33. Write the equation of Einstein of relation between mass and energy.

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34. Write the law of conservation of energy.

Watch Video Solution

35. Write the law of conservation of electric charge.

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36. Write the law of conservation of linear momentum.

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37. Write the law of conservation of angular momentum.

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38. How many times the value of gravitational acceleration on Moon is lesser than the value on Earth ?

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39. What is unification of forces ?

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40. What is the range of masses we study in physics ?

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Section D Multiple Choice Questions Mcqs

1. From given fundamental forces ..... is strongest force and .. is weakest force.

A. Electromagnetic force, gravitational force

B. Strong nuclear force, weak nuclear force

C. Strong nuclear force, gravitational force

D. Strong nuclear force, electromagnetic force

Answer: C

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2. Neutrons and protons are thought of as being made of a fundamental particle called

A. Positrons

B. Electrons

C. Quarks

D. Neutrino

Answer: C

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3. Physics developed techniques of achieving very low temperatures which results in the development of new branch called .....

A. Cryogenics

B. Mechanics

C. Electro dynamics

D. Optics

Answer: A

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4. From given fundamental force which is the longest distance force ?

A. Weak nuclear force

B. Strong nuclear force

C. Gravitational force

D. None of these

Answer: C

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5. The factor (ratio of length scales in physics) of length of galaxies and radius of nucleus is .....

A. 10^{-40}

B. 10^{-50}

C. 10^{40}

D. 10^{10}

Answer: C

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6. The range of time scale about obtained ..... Can be obtained by dividing length scale by the speed of light.

A. 10^{-18} to 10^{22} s

B. 10^{-14} s to 10^{26} s

C. 10^{-22} s to 10^{18}s

D. 10^{-26} s to 10^{14}

Answer: C

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7. ..... branch of physics studied the change in internal energy entropy of the system.

A. Kinematics

B. Thermodynamics

C. Electronics

D. Optics

Answer: B

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8. The efficiency of heat engines and refrigerators, the direction of physical and chemical process, etc., are also studied in ...

A. Nature Science

B. Cryogenics

C. Galaxies

D. Thermodynamics

Answer: D

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9. The scope of Physics on the length scale is from very small length of ..... to ..... range.

A. 10^{-15}m to 10^{20}m

B. 10^{-14}m to 10^{26}m

C. 10^{-14}m to 10^{48}m

D. 10^{-15}m to 10^{40}m

Answer: B

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Section E Questions From Module

1. ..... state of substance at very high temperature has generated hope of energy source for mankind.

A. Solid

B. Liquid

C. Gaseous

D. Plasma

Answer: D

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2. Which branch of physics depends on Newtonian laws of motion and law of gravitation ?

A. Optics

B. Thermodynamics

C. Mechanics

D. Electrics

Answer: C

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3. Great scientist ..... gave the real idea about force for the first time.

A. Aristotle

B. Newton

C. Pascal

D. Einstein

Answer: B

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4. Electric force between two protons is ..... times greater than gravitational force.

A. 10^{36}

B. 10^{16}

C. 10^{-19}

D. 10^{-16}

Answer: A

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5. According to Coulomb's law force between two charges q_1 and q_2 at 'r' distance apart....

A. $F \propto \frac{q_1 q_2}{r}$

B. $F \propto \frac{q_1 q_2}{r^2}$

C. $F \propto \left(\frac{q_1 q_2}{r}\right)^2$

D. $F \propto \frac{q_1 + q_2}{r^2}$

Answer: B

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6. If weak nuclear force, gravitational force and electromagnetic force are respectively W, G and E, then

A. $E > W > G$

B. $W > E > G$

C. $G > W > E$

D. $E > W > G$

Answer: A

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7. Space is homogeneous. Which law of conservation is the result of this ?

A. Law of conservation of energy

B. Law of conservation of charge

C. Law of conservation of linear momentum

D. Law of conservation of angular momentum

Answer: D

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8. Time is homogeneous. Which law of conservation is the result of this ?

A. Law of conservation of energy

B. Law of conservation of charge

C. Law of conservation of linear momentum

D. Law of conservation of angular momentum

Answer: A

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9. ..... is related to the electric and magnetic phenomena connected with electric charge and magnetic body.

A. Thermodynamics

B. Dynamics

C. Electricity

D. Electrodynamics

Answer: D

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