

11th Science Lesson 1 Questions in English

1] Nature of Physical World and Measurement

1. What is root word of science mean?

- a) To measure
- b) To know**
- c) To teach
- d) To lease

Explanation

The word '**science**' has its root in the Latin verb scientia, **meaning "to know"**. In Tamil language, it is Ariviyal meaning 'knowing the truth'.

2. Which of the following are involved in systematic organisation of knowing science?

- 1) Observation
- 2) Experimentation
- 3) Logical reasoning
- a) 1, 2
- b) 1, 3
- c) 2, 3
- d) All the above**

Explanation

Science is the systematic organization of knowledge gained through **observation, experimentation and logical reasoning**.

3. Which of the following knowledge of science deals with non-living things?

- 1) Physics
- 2) Botany
- 3) Zoology
- 4) Chemistry
- a) 1, 2
- b) 1, 3
- c) 1, 4**
- d) 2, 3

Explanation

The knowledge of **science dealing with non-living things is physical science (Physics and Chemistry)**, and that dealing with living things is biological science (Botany, Zoology etc.).

4. When was the word science coined?

- a) 17th century
- b) 19th century**
- c) 14th century
- d) 16th century

Explanation

Curiosity-driven observations of natural happenings was the origin of science. The word 'science' was **coined only in the 19th century**.

5. _____ was the earlier name given to science

- a) Natural philosophy**
- b) Natural physiology
- c) Natural Psychology
- d) Natural philanthropy

Explanation

Natural philosophy was the **earlier name given to science**, when ancient civilization knew and practised astronomy, chemistry, human physiology and agriculture.

6. Who is the oldest forerunner of scientific advancements, from astronomy to medicine?

- a) Indians
- b) Egyptians**
- c) Mongolians
- d) Chinese

Explanation

One of the oldest forerunners of scientific advancements, from astronomy to medicine, were the **Egyptians**.

7. Indus Valley Civilization took place in_____

- a) 3300 – 1300 BCE**
- b) 3200 – 1200 BCE
- c) 3300 – 1300 AD
- d) 3200 – 1200 AD

Explanation

Scientific and mathematical excellence in India dates back to prehistoric human activity in the **Indus Valley Civilization (3300 – 1300 BCE)**.

8. Which Article of Indian constitution says it is duty of every citizen of India to develop scientific temper, humanism?

- a) 51A
- b) 50
- c) 45A
- d) 45

Explanation

According to **part IV Article 51A (h) of Indian Constitution** "It shall be the duty of every citizen of India to develop scientific temper, humanism and spirit of inquiry and reform". This is the aim of our Science Education.

9. Which of the following are involved in scientific method?

- 1) Systematic observation
 - 2) Controlled experimentation
 - 3) Mathematical modelling
- a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Any scientific method involves the following general features:

- Systematic observation
- Controlled experimentation
- Qualitative and quantitative reasoning
- Mathematical modelling
- Prediction and verification or falsification of theories

10. Assertion(A): When one end of the rod is heated, heat is felt at the other end.

Reason(R): In metals heat gets transferred from one end to another

- a) Both (A) and (R) are correct, but (R) does not explain (A)
- b) Both (A) and (R) are wrong
- c) **Both (A) and (R) are correct and (R) explains (A)**
- d) (A) is Correct and (R) is wrong

Explanation

Consider a metallic rod being heated. When one end of the rod is heated, heat is felt at the other end. Heat gets transferred from one end to another.

11. The name Physics was introduced by_____

- a) Einstein
- b) Galileo
- c) Newton
- d) **Aristotle**

Explanation

The **name Physics was introduced by Aristotle** in the year 350 BC. Today's modern science and technology is an offshoot of the understanding of nature.

12. What does the Greek word "Fusis" mean?

- a) **Nature**
- b) Artificial
- c) Work
- d) Manual

Explanation

The **word 'physics' is derived from the Greek word "Fusis", meaning nature.** The study of nature and natural phenomena is dealt with in physics. Hence physics is considered as the most basic of all sciences.

13. How many approaches are there in studying physics?

- a) 3
- b) 4
- c) **2**
- d) 5

Explanation

Unification and Reductionism are the **two approaches in studying physics.** Attempting to explain diverse physical phenomena with a few concepts and laws is unification.

14. Which of the following can be explained by Newton's universal law of gravitation?

- 1) Motion of freely falling bodies towards the Earth
 - 2) Motion of planets around the Sun
 - 3) Motion of the Moon around the Earth
- a) 1, 2
 - b) **1, 3**

- c) 2, 3
- d) **All the above**

Explanation

Newton's universal law of gravitation explains the **motion of freely falling bodies towards the Earth**, motion of **planets around the Sun**, motion of the Moon around the Earth, thus unifying the fundamental forces of nature.

15. Which of the following is a macroscopic property?

- a) Entropy
- b) Temperature
- c) Pressure
- d) **All the above**

Explanation

An attempt to explain a macroscopic system in terms of its microscopic constituents is reductionism. For example, thermodynamics was developed to explain **macroscopic properties like temperature, entropy, etc., of bulk systems**.

16. Which of the following statement is correct?

- 1) Physics as a fundamental science helps to uncover the laws of nature
 - 2) The language of its expression is mathematics
- a) 1 alone
 - b) 2 alone
 - c) **1, 2**
 - d) None

Explanation

Physics as a fundamental science helps to **uncover the laws of nature**. The **language of its expression is mathematics**. In ancient times, humans lived with nature – their lifestyles were integrated with nature. They could understand the signals from the movement of the Stars and other celestial bodies.

17. Which of the following were the 1st disciplines to be developed?

- 1) Astronomy
 - 2) Dynamics
 - 3) Mathematics
 - 4) Optics
- a) 1, 2
 - b) 2 alone

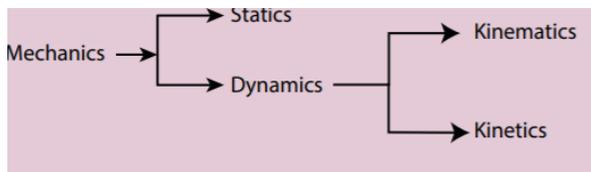
- c) 1, 3
- d) 2, 3, 4

Explanation

They could understand the signals from the movement of the Stars and other celestial bodies. They could determine the time to sow and reap by watching the sky. Thus, **astronomy and mathematics were the first disciplines to be developed.**

18. Under which of the following kinematics and kinetics come?

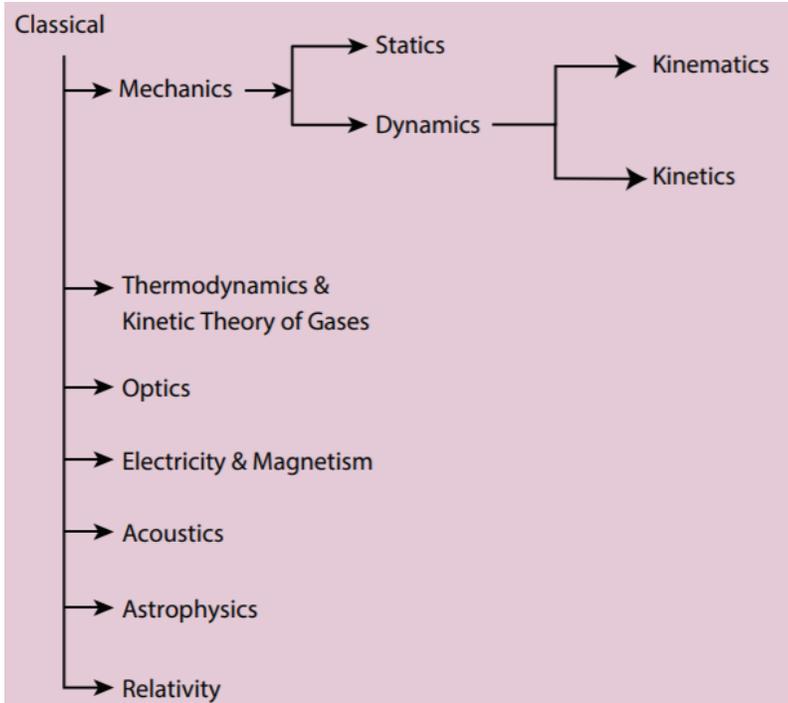
- a) Relativity
- b) Optics
- c) Acoustics
- d) **Mechanics**

Explanation

19. Which of the following does not come under classical physics?

- a) Relativity
- b) **Nuclear**
- c) Optics
- d) Thermodynamics

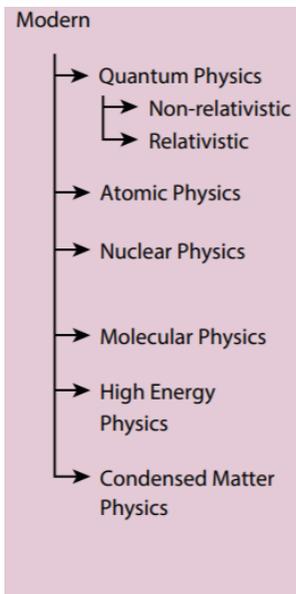
Explanation



20. Relativistic and Non – relativistic comes under_____ physics

- a) Atomic
- b) Nuclear
- c) Molecular
- d) **Quantum**

Explanation



21. Match the following

- | | |
|------------------------|---|
| I. Classical mechanics | 1. The study of the relationship between heat and other forms of energy |
| II. Optics | 2. The study of forces acting on bodies whether at rest or in motion |
| III. Thermodynamics | 3. The study of light |
- a) 2, 3, 1
b) 2, 1, 3
c) 1, 3, 2
d) 3, 1, 2

Explanation

1. **Classical mechanics** - The **study of forces acting on bodies** whether at rest or in motion
2. **Thermodynamics** - The study of the **relationship between heat and other forms of energy**
3. **Optics** - The **study of light**

22. Match the following

- | | |
|-------------------|--|
| i. Acoustics | 1. Study of the physics of astronomical bodies |
| ii. Relativity | 2. The study of the production and propagation of sound waves |
| iii. Astrophysics | 3. One of the branches of theoretical physics which deals with the relationship between space, time and energy |
- a) 1, 2, 3
b) 2, 3, 1
c) 2, 1, 3
d) 3, 1, 2

Explanation

- Electricity and magnetism - The study of electricity and magnetism and their mutual relationship
- Acoustics - The **study of the production and propagation of sound waves**
- Astrophysics - The branch of physics which deals with the study of the physics of astronomical bodies
- Relativity - One of the branches of theoretical physics which deals with the relationship between space, time and energy particularly with objects moving in different ways.

23. Match the following:

- | | |
|----------------------|---|
| i. Quantum mechanics | 1. The study of the nature of the particles |
| ii. Atomic physics | 2. The study of the discrete nature of phenomena at the atomic and subatomic levels |
| iii. Nuclear physics | 3. The branch of physics which deals with the |

- iv. High energy physics
- a) 2, 1, 4, 3
b) 2, 4, 3, 1
 c) 1, 2, 4, 3
 d) 4, 1, 2, 3
4. The branch of physics which deals with the structure and properties of the atom

Explanation

Modern Physics	Refers to the concepts in physics that have surfaced since the beginning of the 20 th century.
1. *Quantum mechanics	The study of the discrete nature of phenomena at the atomic and subatomic levels
2. Atomic physics	The branch of physics which deals with the structure and properties of the atom
3. Nuclear physics	The branch of physics which deals with the structure, properties and reaction of the nuclei of atoms.
4. Condensed matter physics	The study of the properties of condensed materials (solids, liquids and those intermediate between them and dense gas). It branches into various sub-divisions including developing fields such as nano science, photonics etc. It covers the basics of materials science, which aims at developing new material with better properties for promising applications.
5. High energy physics	The study of the nature of the particles.

24. Assertion(A): Magnetism was accidentally observed but the reason for this strange behavior of magnets were later analysed theoretically

Reason(R): Discoveries in physics are of two types; accidental discoveries and well-analysed research outcome in the laboratory

- a) Both (A) and (R) are correct, but (R) does not explain (A)
 b) Both (A) and (R) are wrong
c) Both (A) and (R) are correct and (R) explains (A)
 d) (A) is Correct and (R) is wrong

Explanation

Discoveries in physics are of two types; **accidental discoveries and well-analysed research** outcome in the laboratory based on intuitive thinking and prediction. For example, **magnetism was**
Learning Leads To Ruling

accidentally observed but the reason for this strange behaviour of magnets was later analysed theoretically.

25. Who experimentally proved Albert Einstein, $E=mc^2$?

- 1) Cockcroft
- 2) Newton
- 3) Walton
 - a) 2 alone
 - b) 1, 2
 - c) **1, 3**
 - d) 2, 3

Explanation

The famous equation of Albert Einstein, $E=mc^2$ was a theoretical prediction in 1905 and **experimentally proved in 1932 by Cockcroft and Walton.**

26. Which of the following statement is correct?

- 1) The pharmaceutical industry uses this technique very effectively to design new drugs.
- 2) Bio compatible materials for organ replacement are predicted using quantum prescriptions of physics before fabrication.
 - a) 1 alone
 - b) 2 alone
 - c) **1, 2**
 - d) None

Explanation

Theoretical predictions aided with recent simulation and computation procedures are widely used to identify the most suited materials for robust applications. The pharmaceutical industry uses this technique very effectively to design new drugs. **Bio compatible materials for organ replacement are predicted using quantum prescriptions of physics before fabrication.** Thus, experiments and theory work hand in hand complimenting one another.

27. Which of the following statement is incorrect?

- 1) Physics has a huge scope as it covers a tremendous range of magnitude of various physical quantities
- 2) It deals with systems of very large magnitude as in astronomical phenomena as well as those with very small magnitude involving electrons and protons
 - a) 1 alone
 - b) 2 alone
 - c) **1, 2**

d) None

Explanation

Physics has a huge scope as it covers a tremendous range of magnitude of various physical quantities (length, mass, time, energy etc). It deals with systems of very large magnitude as in astronomical phenomena as well as those with very small magnitude involving electrons and protons.

28. What is the range of astronomical scales to microscopic scales?

- a) 10^{18} to 10^{-22}
- b) 10^8 to 10^{-22}
- c) 10^{18} to 10^{-12}
- d) 10^{18} to 10^{-2}

Explanation

Physics has a huge scope as it covers a tremendous range of magnitude of various physical quantities (length, mass, time, energy etc). Range of time scales: **astronomical scales to microscopic scales, 10^{18} s to 10^{-22} s.**

29. What is the mass of electron?

- a) 9.11×10^{-31} kg
- b) 8.11×10^{-31} kg
- c) 19.11×10^{-31} kg
- d) 12.11×10^{-31} kg

Explanation

Range of masses: from heavenly bodies to electron, 10^{55} kg (mass of known observable universe) to 10^{-31} kg (mass of an electron) [**the actual mass of an electron is 9.11×10^{-31} kg**].

30. Which of the following statement is correct?

- 1) The study of physics is not only educative but also exciting in many ways.
 - 2) The most interesting part is the designing of useful devices based on the physical laws.
 - 3) Carrying out new challenging experiments to unfold the secrets of nature and in verifying or falsifying the existing theories.
- a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

The study of physics is not only educative but also exciting in many ways.

- A small number of basic concepts and laws can explain diverse physical phenomena.
- The most interesting part is the designing of useful devices based on the physical laws.
- Carrying out new challenging experiments to unfold the secrets of nature and in verifying or falsifying the existing theories.

31. Which of the following statement is incorrect?

- 1) Technology is the application of the principles of physics for practical purposes.
- 2) The application of knowledge for practical purposes in various fields to invent and produce useful products or to solve problems is known as technology
 - a) 1 alone
 - b) 2 alone
 - c) 1, 2
 - d) **None**

Explanation

Technology is the application of the principles of physics for practical purposes. The application of knowledge for practical purposes in various fields to **invent and produce useful products or to solve problems is known as technology**. Thus, physics and technology can both together impact our society directly or indirectly.

32. Which have comprehensively changed the thinking and living style of human beings?

- 1) Microelectronics
- 2) Launching of satellite into space
- 3) Lasers
- 4) Superconductivity
 - a) 1, 2, 4
 - b) 2, 3, 4
 - c) **1, 3, 4**
 - d) All the above

Explanation

Microelectronics, lasers, computers, superconductivity and nuclear energy have comprehensively changed the thinking and living style of human beings.

33. Which of the following basics led to the discovery of wireless communication technology?

- 1) Superconductivity
- 2) Electricity
- 3) Magnetism
 - a) 1, 2

- b) 1, 3
- c) **2, 3**
- d) 3 alone

Explanation

Basic laws of electricity and magnetism led to the **discovery of wireless communication technology** which has shrunk the world with effective communication over large distances.

34. Which of the following studies in physics led to enabled researchers in chemistry to arrange elements in the periodic table?

- a) Structure of atom
- b) X-ray diffraction
- c) Radioactivity
- d) **All the above**

Explanation

In physics, we study **the structure of atom, radioactivity, X-ray diffraction** etc. Such studies have enabled researchers in chemistry to arrange elements in the periodic table on the basis of their atomic numbers

35. Which of the following statement is correct?

- 1) Biological studies are impossible without a microscope designed using physics principles]
- 2) Radio-isotopes are used in radiotherapy for the cure of cancer and other diseases.
 - a) 1 alone
 - b) 2 alone
 - c) **1, 2**
 - d) None

Explanation

Biological studies are impossible without a microscope designed using physics principles. Radio-isotopes are used in radiotherapy for the cure of cancer and other diseases. In recent years, biological processes are being studied from the physics point of view.

36. Which of the following statement is correct?

- 1) The invention of the electron microscope has made it possible to see even the structure of a cell.
- 2) Gamma rays are used for diagnostic purposes.
- 3) X-ray and neutron diffraction techniques have helped us to understand the structure of nucleic acids, which help to control vital life processes

- a) 1, 2
- b) 1, 3**
- c) 2, 3
- d) All the above

Explanation

The invention of the electron microscope has made it possible to see even the structure of a cell. X-ray and neutron diffraction techniques have helped us to understand the structure of nucleic acids, which help to control vital life processes. **X-rays are used for diagnostic purposes.**

37. Physics is a_____ science

- a) Qualitative
- b) Quantitative**
- c) Both a and b
- d) None

Explanation

Physics in relation to mathematics: **Physics is a quantitative science.** It is most closely related to mathematics as a tool for its development.

38. Which of the following statement is correct?

- 1) Astronomical telescopes are used to study the motion of planets and other heavenly bodies in the sky
 - 2) Radio telescopes have enabled the astronomers to observe distant points of the universe.
- a) 1 alone
 - b) 2 alone
 - c) 1, 2**
 - d) None

Explanation

Astronomical telescopes are used to study the motion of planets and other heavenly bodies in the sky. Radio telescopes have enabled the astronomers to observe distant points of the universe. Studies of the universe are done using physical principles

39. Which of the following ages can be estimated using radioactivity?

- a) Rocks
- b) Fossils
- c) Age of earth
- d) All the above**

Explanation

Diffraction techniques helps to study the crystal structure of various rocks. **Radioactivity is used to estimate the age of rocks, fossils and the age of the Earth.**

40. Which of the following parameters can be measured by physics and chemistry in oceanography?

- 1) Temperature
- 2) Gas fluxes
- 3) Current speed
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Oceanographers seek to understand the physical and chemical processes of the oceans. They measure parameters such as **temperature, salinity, current speed, gas fluxes, chemical components.**

41. Which of the following statement is correct?

- 1) All psychological interactions can be derived from a physical process.
- 2) The movements of neurotransmitters are governed by the physical properties of diffusion and molecular motion
- 3) The functioning of our brain is related to our underlying dualism
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

All psychological interactions can be derived from a physical process. The movements of neurotransmitters are governed by the physical properties of diffusion and molecular motion. The functioning of our brain is related to our underlying dualism.

42. Which of the following statement is correct?

- 1) Nature teaches true science with physics as an efficient tool.
- 2) Science and technology should be used in a balanced manner so that they do not become weapons to destroy nature which taught us science
- 3) Global warming and other negative impacts of technology need to be checked.
 - a) 1, 2
 - b) 2, 3

- c) 1, 3
- d) All the above

Explanation

Nature teaches true science with physics as an efficient tool. **Science and technology should be used in a balanced manner so that they do not become weapons to destroy nature which taught us science.** Global warming and other negative impacts of technology need to be checked. Safe science with moderate and appropriate use of technology is the need of this century.