

Competency Statements: Physics

Standard XI

Competency Statements

After studying the content in Textbook student ...

1. Distinguish between fundamental and derived quantities.
2. Distinguish between different system of units and their use.
3. Identify methods to be used for measuring lengths and distances of varying magnitudes.
4. Check correctness of physical equations using dimensional analysis.
5. Establish the relation between related physical quantities using dimensional analysis.
6. Find conversion factors between the units of the same physical quantity in two different sets of units.
7. Identify the different type of errors in measurement of physical quantities and estimate them.
8. Identify the order of magnitude of a given quantity and the significant figures in them.
9. Distinguish between scalar and vector quantities.
10. Perform addition, subtraction and multiplication (scalar and vector product) of vectors.
11. Determine the relative velocity between two objects.
12. Obtain derivatives and integrals of simple functions.
13. Obtain components of vectors.
14. Apply mathematical tools to analyze the physics problems.
15. Visualize motions in daily life under one, two and three dimensions.
16. Explain the necessity of Newton's first law of motion.
17. Categorize various forces of nature into four fundamental forces.
18. State various conservation principles and use these in daily life situations.
19. Derive expressions and evaluate work done by a constant force and variable force.
20. Organize/categorize the common principles between collisions and explosions.
21. Explain the necessity of defining impulse and apply it to collisions, etc.
22. Elaborate the limitations of Newton's laws of motion.
23. Elaborate different types of mechanical equilibria with suitable examples.
24. Apply the Kepler's laws of planetary motion to solar system.
25. Elaborate Newton's law of gravitation.
26. Calculate the values of acceleration due to gravity at any height above and depth below the earth's surface at any latitude.
27. Distinguish between different orbits of earth's satellite.
28. Explain low escape velocity varies from planet.
29. Explain weightlessness in satellites.
30. Explains the difference between elasticity and plasticity
31. Identify elastic limit for a given material.
32. Differentiate between different types of elasticity modules.
33. Judge the suitability of materials for specific applications in daily life appliances.
34. Identify the role of force of friction in daily life.
35. Differentiate between good and bad conductors of heat.
36. Relate underlying physics for use of specific materials for use in thermometers for specific applications.

37. Apply and relate various parameters related to wave motion.
38. Compare various types of waves with common features and distinguishing features.
39. Analytically relate the factors on which the speed of sound and speed of light depends.
40. Explain the essential factor to describe wave propagation and relate it with phase angle.
41. Apply the laws of reflection to light.
42. Mathematically describe Doppler Effect for sound waves.
43. Apply the laws of refraction to common phenomena in daily life like, a mirage, a rainbow.
44. Identify the defects in images obtained by mirrors and lenses, with their cause and ways of reducing or eliminating those.
45. Explain the construction and use of various optical instruments such as a microscope, a telescope, etc.
46. Relate dispersion of light with colour and apply it analytically with the help of prisms.
47. Describe dispersive power as a basic property of transparent materials and relate it with their refractive indices.
48. Analyze the time taken to receive an echo and calculate distance to the reflecting orbit.
49. Explain reverberation and acoustics.
50. Distinguish between conductors and insulators.
51. Apply coulomb's law and obtain the electric field due to a certain distribution of charges.
52. Define dipole, obtain the dipolar field.
53. Relate the drift of electrons in a conductor to resistivity
54. Calculate resistivity at various temperature.
55. Connect resistors in series and parallel combination.
56. Compare electric and magnetic fields.
57. Draw electric and magnetic lines of force.
58. Obtain magnetic parameters of the earth.
59. Solve numerical and analytical problems.
60. Explain the properties of an electromagnetic wave.
61. Distinguish between mechanical waves and electromagnetic waves.
62. Identify different types of electromagnetic radiations from γ - rays to radio waves.
63. Distinguish between different modes of propagation of E M waves through earth's atmosphere.
64. Identify different elements of a communication system.
65. Explain different types of modulation and identify the types of modulation need in given situation.
66. Distinguish between conductors, insulators and semiconductors based on band structure.
67. Explain the working of semiconductor devices.
68. Differentiate between p type and n type semiconductors and their uses.
69. Explain status of forward and reverse bias.

Competency Statements: Physics

Standard XII

Competency Statements

After studying the content in Textbook student ...

1. Understand UCM and its applications
2. Understands the concept of center of mass and find center of mass of any rigid body
3. Understand the torque and angular momentum
4. Calculate the moment of inertia of regular bodies about different axis of rotation using theorems of parallel and perpendicular axis
5. Apply the concept of torque and angular momentum
6. Solve rigid body notations about free axis
7. Understands the periodic motion as analogous motion to circular motion
8. Apply the force law in simple harmonic motion and derive the equation of SHM
9. Correlate relation of potential and kinetic energy in SHM
10. Differentiate between undamped, damped and forced oscillation
11. Apply superposition and obtain the progressive and stationary wave
12. Apply the concept of stationary wave to understand musical instruments
13. Designing toys based on rotational motion
14. Designing banking of roads
15. Analyzing circular motion in the world around
16. Understand the behavior of fluid and identify the streamline flow
17. Differentiate between viscous and non-viscous fluids
18. Understand the concept of surface tension and capillary action
19. Understand the behavior of gases on the basis of kinetic theory
20. Understand the equipartition theorem and the concept of specific heat
21. Understands the thermal equilibrium
22. Apply the laws of thermodynamics to solve heat engine problems
23. Elaborate about Controlling the flow of fluids in various pipes, measurements of pressure, viscosity, surface tension experimentally
24. Analyze the types of flows through pipes in industries
25. Measure temperature of gases , pressure
26. Suggest the maintenance of refrigerators
27. Operate different instruments e.g liquid gas plants
28. Analyzing wave motion in the practical world, provide valid explanation for various oscillatory phenomena observed in the world
29. Design musical instruments
30. Understand the concept of electric potential and equipotential surfaces
31. Understand the concept of dipole and electric field and potential due to electric dipole
32. Understand the concept of potential energy of system of charges and charge distribution
33. Understand the concept of displacement current
34. Understand the concept of dielectrics and polarization
35. Understand the concept of capacitor and capacitance
36. Correlate the use of capacitor as energy storage
37. Apply Kirchhoff's law to Solve Whetstone's bridge problems
38. Apply Ampere's laws to obtain the magnetic induction due to different types of current loops

39. Understand and apply the concept of dipole
40. Apply the concept of moving coil galvanometer
41. Understand the magnetic field due to earth
42. Understand the concept of magnetic potential
43. Understand the concept of superconductivity and its simple applications
44. Apply the concept of magnetic flux to electromagnetic induction (EMI)
45. Apply Faraday's law and Lenz's law
46. Obtain the relation for EMF with the help of EMI
47. Analyze the generation of alternating current (AC)
48. Identify the relationship between current and voltage by rotating vectors (Phasors)
49. Apply the AC details to solve the L-C-R Circuits
50. Elaborate the L-C-R Oscillations
51. Design circuits with components such as capacitors, inductors, etc.
52. Builds instruments such as AC Bridge, potentiometer, galvanometer, solenoids, etc.
53. Analyze the atomic spectra, hydrogen spectrum
54. Measure and analyze nuclear radiation activity
55. Explain the dual nature of rotational matter
56. Design and assemble a circuit for amplifier, Oscillator, dipole rectifier.