XL PHYSICS EXPECTATION QUESTIONS – 2024 PREPARED BY
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1. Write a note on triangulation method and radar method to measure larger distances.
2. Explain in detail the various types of errors
3. What do you mean by propagation of errors? Explain the propagation of error in addition and multiplication
4. Explain in detail the triangle law of addition.
5. Derive the kinematic equations of motion for constant acceleration
6. Derive the equations of motion for a particle (a) falling vertically (b) projected vertically
7. Derive the equation of motion, range and maximum height reached by the particle thrown at an oblique angle q with respect to the horizontal direction.
8. Prove the law of conservation of linear momentum. Use it to find the recoil velocity of a gun when a bullet is fire from it.
9. Explain the motion of blocks connected by a string in i) Vertical motion ii) Horizontal motion
10. Briefly explain the origin of friction. Show that in an inclined plane, angle of friction is equal to angle of repose
11. State Newton's three laws and discuss their significance.
12. Explain the similarities and differences of centripetal and centrifugal forces.
13. Calculate the centripetal acceleration of Moon towards the Earth
14. State and explain work energy principle. Mention any three examples for it.
15. Arrive at an expression for power and velocity. Give some examples for the same
16. Arrive at an expression for elastic collision in one dimension and discuss various cases.
17. What is inelastic collision? In which way it is different from elastic collision. Mention few examples in day to day life for inelastic collision
18. Explain with graphs the difference between work done by a constant force and by a variable force
19. State and prove parallel axis theorem.
20. State and prove perpendicular axis theorem
21. Discuss rolling on inclined plane and arrive at the expression for the acceleration.
22. Derive the expression for moment of inertia of a uniform disc about an axis passing through the centre and perpendicular to the plane
23. Derive the expression for moment of inertia of a rod about its centre and perpendicular to the rod
24. Explain why a cyclist bends while negotiating a curve road? Arrive at the expression for angle of bending for a given velocity
25. Derive the expression for moment of inertia of a uniform ring about an axispassing through the centre and perpendicular to the plane.

26. Explain the types of equilibrium withsuitable examples
27. Discuss conservation of angular momentum with example

28. Prove that at points near the surface of the Earth, the gravitational potential energy of the object is *U= mgh*
29. Derive an expression for escape speed
30. Explain the variation of g with latitude
31. Explain the variation of g with altitude
32. Explain the variation of g with depth from the Earth's surface
33. State Hooke's law and verify it with the help of an experiment.
34. Derive an equation for the total pressure at a depth 'h' below the liquid surface
35. Derive Poiseuille's formula for the volume of a liquid flowing per second through a pipe under streamlined flow
36. State and prove Bernoulli's theorem for a flow of incompressible, non-viscous, and streamlined flow of fluid.
37. Explain in detail the thermal expansion
38. Discuss various modes of heat transfer
39. Explain in detail Newton's law of cooling
40. Derive the expression for Carnot engine efficiency
41. Derive Mayer's relation for an ideal gas
42. Derive the work done in an adiabatic process
43. bExplain in detail the working of a refrigerator.
44. Write down the postulates of kinetic theory of gases.
45. Derive the expression of pressure exerted by the gas on the walls of the container.
46. Explain in detail the kinetic interpretation of temperature.
47. Derive the expression for mean free path of the gas.
48. Explain in detail the Maxwel Boltzmann distribution function
49. Derive the ratio of two specific heat capacities of monoatomic, diatomic and triatomic molecules
50. Explain in detail the four different types of oscillations
51. Discuss in detail the energy in simple harmonic motion
52. Discuss the simple pendulum in detail
53. Write down the difference between simple harmonic motion and angular simple harmonic motion.
54. What is meant by angular harmonic oscillation?. Compute the time period of angular harmonic oscillation
55. Describe Newton's formula for velocity of sound waves in air and also discuss the Laplace's correction.
56. Explain how overtones are produced in a (a) Closed organ pipe (b) Open organ pipe
57. How will you determine the velocity of sound using resonance air column apparatus?
58. Show that the velocity of a travelling wave produced in a string is $v = \sqrt{\dfrac{T}{\mu}}$
59. What is a sonometer?. Give its construction and working. Explain how to determine the frequency of tuning fork using sonometer.
60. Write short notes on intensity and loudness.