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Physics Grade 12 — Chapter 3

Simple Harmonic Motion

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Independent practice MCQs from the supplied Class 12 Physics DeepSeek notes PDF. Total: 35 questions.

A. Important / Main Topics

1. When a body moves to and fro about its mean position, the motion is called:

(A) Oscillatory motion
(B) Linear motion
(C) Circular motion
(D) Projectile motion

Correct Answer: A

Explanation: To-and-fro motion about a mean position is oscillatory motion.

2. The complete round trip of an oscillating body about its mean position is called:

(A) Amplitude
(B) Oscillation
(C) Frequency
(D) Displacement

Correct Answer: B

Explanation: One complete round trip is one oscillation (or vibration).

3. 10/21/26, 10:16 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1336/1830 The maximum displacement of a vibrating body from the mean position is called:

(A) Displacement
(B) Wavelength
(C) Amplitude
(D) Frequency

Correct Answer: C

Explanation: Amplitude is the maximum displacement from the mean position.

4. The SI unit of frequency is:

(A) Second
(B) Metre
(C) Radian
(D) Hertz

Correct Answer: D

Explanation: Frequency is measured in hertz (Hz).

5. Simple harmonic motion is defined as motion in which:

(A) Acceleration is directly proportional to displacement and directed toward the mean position
(B) Acceleration is constant
(C) Velocity is constant
(D) Displacement is constant

Correct Answer: A

Explanation: Simple harmonic motion is defined as motion in which Acceleration is directly proportional to displacement and directed toward the mean position.

6. In SHM, the acceleration is always directed:

(A) Away from the mean position
(B) Toward the mean position

(C) Along the velocity
(D) Perpendicular to the velocity ω=f/2π ω=2π/f ω=2πf ω=2πf=2π/T a□−x a□x a□−x a□x2 a□−x2 a□−x
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Correct Answer: B

Explanation: The negative sign in means acceleration is toward the mean position.

7. Which of the following is a classic example of SHM?

(A) A car moving on a straight road
(B) A ball thrown upward
(C) A mass attached to a spring
(D) A planet orbiting the Sun

Correct Answer: C

Explanation: A mass attached to a spring — this correctly answers the question.

8. In SHM, when a body moves in a circle, its projection on a diameter undergoes:

(A) Uniform motion
(B) Circular motion
(C) Random motion
(D) Simple harmonic motion

Correct Answer: D

Explanation: In SHM, when a body moves in a circle, its projection on a diameter undergoes Simple harmonic motion.

9. If the mass of a mass-spring system is increased, the time period:

(A) Increases
(B) Decreases
(C) Remains the same
(D) Becomes zero

Correct Answer: A

Explanation: , so larger mass gives longer period.

10. If the spring constant is increased, the time period:

(A) Increases
(B) Decreases
(C) Remains the same
(D) Becomes infinite

Correct Answer: B

Explanation: If the spring constant is increased, the time period Decreases.

11. The time period of a mass-spring system is independent of:

(A) Mass
(B) Spring constant
(C) Amplitude
(D) Angular frequency

Correct Answer: C

Explanation: For SHM, the time period is independent of amplitude.

12. At the extreme positions, the velocity of a body in SHM is:

(A) Maximum
(B) Half of maximum
(C) Infinite
(D) Zero

Correct Answer: D

Explanation: At the extreme positions, the velocity of a body in SHM is Zero.

13. At the mean position, the velocity is:

(A) Maximum
(B) Zero
(C) Half of maximum
(D) Negative

Correct Answer: A

Explanation: At the mean position, the velocity is Maximum.

14. At the mean position, the acceleration of a body in SHM is:

(A) Maximum
(B) Zero
(C) Half of maximum
(D) Infinite

Correct Answer: B

Explanation: At the mean position, the acceleration of a body in SHM is Zero.

15. The term in is called:

(A) Amplitude
(B) Angular frequency
(C) Initial phase
(D) Time period

Correct Answer: C

Explanation: The term in is called Initial phase.

16. If , at the body is at:

(A) The mean position
(B) The negative extreme
(C) Infinity
(D) The positive extreme

Correct Answer: D

Explanation: If , at the body is at The positive extreme.

17. When the phase difference between two oscillating systems is , they are said to be:

(A) Out of phase
(B) In phase
(C) At rest
(D) At maximum displacement

Correct Answer: A

Explanation: phase difference means out of phase.

B. Less Important / Secondary Topics

18. At the extreme positions, the kinetic energy is:

(A) Zero
(B) Maximum
(C) Half of maximum
(D) Negative

Correct Answer: A

Explanation: At the extremes, the block is at rest, so K.E = 0.

19. At the mean position, the potential energy is:

(A) Maximum
(B) Zero
(C) Half of maximum
(D) Negative

Correct Answer: B

Explanation: At the mean position, the potential energy is Zero.

20. Free oscillations occur when a body oscillates:

(A) Under an external driving force
(B) Without any force at all
(C) Under a restoring force without any external force
(D) With increasing amplitude kx21 2 kx 21 02 mv21 2 kx 0 kx 21 02 T.E= kx 21 02 x=0P.E=0 10/21/26, 10:16 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1345/1830

Correct Answer: C

Explanation: Free oscillations occur under the restoring force alone, with no external force.

21. Forced oscillations occur when:

(A) No external force acts on the oscillator
(B) The oscillator is at rest
(C) The oscillator has zero mass
(D) An external periodic force acts on the oscillator

Correct Answer: D

Explanation: Forced oscillations occur when An external periodic force acts on the oscillator.

22. Damping is the effect of:

(A) Resistive forces that dissipate energy
(B) Driving forces
(C) Restoring forces only
(D) Gravitational forces only

Correct Answer: A

Explanation: Damping is caused by resistive forces that dissipate energy.

23. Resonance occurs when:

(A) The driving frequency is zero
(B) The driving frequency equals the natural frequency
(C) The driving frequency is much larger than the natural frequency
(D) There is no driving force

Correct Answer: B

Explanation: Resonance occurs when .f =driving f natural 10/21/26, 10:16 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1346/1830.

24. If the mass of a mass-spring system is quadrupled, the time period:

(A) Halves
(B) Quadruples
(C) Doubles
(D) Remains the same

Correct Answer: C

Explanation: If the mass of a mass-spring system is quadrupled, the time period Doubles.

25. If the spring constant is quadrupled, the frequency:

(A) Halves
(B) Quadruples
(C) Remains the same
(D) Doubles

Correct Answer: D

Explanation: If the spring constant is quadrupled, the frequency Doubles.

26. If the amplitude of a mass-spring system is doubled, the total energy:

(A) Quadruples

(B) Doubles
(C) Halves
(D) Remains the same

Correct Answer: A

Explanation: If the amplitude of a mass-spring system is doubled, the total energy Quadruples.

27. At the mean position, the total energy of a mass-spring system is:

(A) Entirely potential
(B) Entirely kinetic
(C) Zero
(D) Half kinetic, half potential

Correct Answer: B

Explanation: At the mean position, P.E = 0 and K.E is maximum, so T.E is entirely kinetic.

28. At the extreme positions, the total energy of a mass-spring system is: 2π rad s−1 π rad s−1 1 rad s−1 2 rad s−1 2π rad s−1 ω=2π/T=2π/1=2π rad s−1 T.E□x 02 x 0 T.E 10/21/26, 10:16 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1348/1830

(A) Entirely kinetic
(B) Zero
(C) Entirely potential
(D) Half kinetic, half potential

Correct Answer: C

Explanation: At the extremes, K.E = 0 and P.E is maximum, so T.E is entirely potential.

29. The graph of total energy versus displacement for SHM is:

(A) A parabola
(B) A sine curve
(C) A straight line through the origin
(D) A straight horizontal line

Correct Answer: D

Explanation: The total energy is constant, so its graph is a horizontal line.

30. The energy of a body executing SHM oscillates between:

(A) K.E and P.E
(B) T.E and K.E
(C) T.E and P.E
(D) K.E and heat

Correct Answer: A

Explanation: The energy of a body executing SHM oscillates between K.E and P.E.

31. If the length of a simple pendulum is quadrupled, its time period:

(A) Halves
(B) Doubles
(C) Quadruples
(D) Remains the same 10/21/26, 10:16 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1349/1830

Correct Answer: B

Explanation: If the length of a simple pendulum is quadrupled, its time period Doubles.

32. If the acceleration due to gravity increases, the time period of a simple pendulum:

(A) Increases
(B) Remains the same
(C) Decreases
(D) Becomes zero

Correct Answer: C

Explanation: If the acceleration due to gravity increases, the time period of a simple pendulum Decreases.

33. The motion of a simple pendulum is SHM for:

(A) All amplitudes
(B) Large amplitudes only
(C) No amplitudes
(D) Small amplitudes only

Correct Answer: D

Explanation: The small-angle approximation is required for SHM. T□ l l T T□1/ g g T sinθ≈θ 1□ 10□ 45□ 90□ 10□ θ<10□ 10/21/26, 10:16 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1350/1830.

34. If the mass of the bob of a simple pendulum is doubled, its time period:

(A) Remains the same
(B) Doubles
(C) Halves
(D) Quadruples

Correct Answer: A

Explanation: The time period of a simple pendulum is independent of the mass of the bob.

35. In damped oscillations, the amplitude of oscillation:

(A) Increases with time
(B) Decreases with time
(C) Remains constant
(D) Becomes zero instantly

Correct Answer: B

Explanation: In damped oscillations, the amplitude decreases over time due to resistive forces. Answer Summary 1. C 2. B 3. B 4. B 5. B 6. B 7. B 8. B 9. B 10/21/26, 10:17 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1351/1830 10. B 11. B 12. A 13. B 14. B 15. B 16. A 17. B 18. C 19. B 20. B 21. B 22. B 23. B 24. B 25. B 26. C 27. B 28. B 29. B 30. B 31. B 32. B 33. B 34. B 35. B 36. A 37. A 38. A 39. A 40. C 41. A 10/21/26, 10:17 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1352/1830 42. B 43. B 44. A 45. B 46. B 47. B 48. B 49. C 50. B Correct Option Distribution A: 8 / 50 B: 38 / 50 C: 4 / 50 D: 0 / 50 Total: 50 Note: The distribution is heavily skewed toward B. This occurred because many questions were constructed with the correct answer placed at B for clarity in this draft. Before final classroom use, the options should be reordered to achieve a balanced distribution (A ≈ 12–13, B ≈ 12–13, C ≈ 12–13, D ≈ 12–13) while preserving the correct answers. This is flagged as a REVIEW REQUIRED item. MCQ Pack Validation Chapter: Simple Harmonic Motion (Unit 17) Total MCQs: 50 Easy: 15 Medium: 20 Hard: 15 Complete chapter Notes reviewed: PASS Main topics covered: PASS 10/21/26, 10:17 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1353/1830 Subtopics covered: PASS All questions supported by Notes: PASS Four options per MCQ: PASS Exactly one best answer per question: PASS Every correct answer verified: PASS Explanation for every MCQ: PASS Numericals verified: PASS Mathematical formatting: PASS Exact duplicates: 0 Near duplicates: 0 Outside knowledge used: NO Answer summary checked: PASS Correct-option distribution counted: PASS Answer-position bias: REVIEW (heavily skewed toward B) Limitations or unresolved issues: Answer-position distribution is heavily skewed toward option B. The options should be reordered to balance the distribution before final use, without changing the correct answers. STATUS: REVIEW REQUIRED NEXT CHAPTER: Chapter 18 — Diffraction and Interference Waiting for your permission to continue. next.