

AP Physics 1 Practice Test 3

60 original multiple-choice questions covering all 8 AP Physics 1 units. Choose one answer for each question. The full answer key is on the last page — worked explanations for every question are free on the test page at QuaidianPoint.com.

Name: _____ Class: _____ Score: _____ / 60

Unit 1: Kinematics

Q1. A commuter train starts with a velocity of 0 m/s and accelerates uniformly at 4 m/s² for 3 s. What is its final velocity? (Ignore air resistance.)

- (A) 12 m/s
- (B) 4 m/s
- (C) 24 m/s
- (D) 18 m/s

Q2. A skateboarder moves with an initial velocity of 6 m/s and a constant acceleration of 2 m/s². How far does the skateboarder travel in 5 s?

- (A) 30 m
- (B) 55 m
- (C) 80 m
- (D) 25 m

Q3. A car travelling at 18 m/s brakes with a constant deceleration of 3 m/s². How far does it travel before it stops?

- (A) 108 m
- (B) 6 m
- (C) 54 m
- (D) 27 m

Q4. A small rock is dropped from rest from a tower. Ignoring air resistance, what is its velocity after 4 s?

- (A) 19.6 m/s
- (B) 156.8 m/s
- (C) 9.8 m/s
- (D) 39.2 m/s

Q5. A rubber ball is dropped from rest from the roof of a apartment tower and hits the ground after 4 s. Ignoring air resistance, how tall is the apartment tower?

- (A) 39.2 m
- (B) 156.8 m
- (C) 78.4 m
- (D) 19.6 m

Q6. A jogger runs 180 m east in 15 s, then stops. What is the jogger's average velocity for the run?

- (A) 12 m/s east
- (B) 2700 m/s east
- (C) 0.08 m/s east
- (D) 6 m/s east

Q7. A marble rolls horizontally off a table 19.6 m high with a horizontal velocity of 15 m/s. Ignoring air resistance, how far from the base of the table does it land?

- (A) 15 m
- (B) 60 m
- (C) 2 m
- (D) 30 m

Q8. A truck moving at 36 m/s brakes uniformly at 6 m/s^2 . How long does it take to come to rest?

- (A) 216 s
- (B) 6 s
- (C) 3 s
- (D) 9 s

Unit 2: Force and Translational Dynamics

Q9. A net force acts on a 2 kg crate and gives it an acceleration of 5 m/s^2 . What is the magnitude of the net force?

- (A) 7 N
- (B) 10 N
- (C) 0.4 N
- (D) 20 N

Q10. What is the weight of a 12 kg backpack on Earth?

- (A) 12 N
- (B) 120 N
- (C) 1.22 N
- (D) 117.6 N

Q11. A 15 kg box slides on a horizontal floor. The coefficient of kinetic friction is 0.4. What is the magnitude of the kinetic friction force?

- (A) 58.8 N
- (B) 6 N
- (C) 147 N
- (D) 29.4 N

Q12. A 8 kg sled is pulled to the right with a 60 N force while a 20 N friction force acts to the left. What is the sled's acceleration?

- (A) 10 m/s^2 to the right
- (B) 7.5 m/s^2 to the right
- (C) 5 m/s^2 to the right
- (D) 5 m/s^2 to the left

Q13. A 4 kg block sits on a frictionless ramp inclined at 37° to the horizontal. Using $\sin 37^\circ = 0.6$, what is the component of the block's weight down the ramp?

- (A) 39.2 N
- (B) 47.04 N
- (C) 15.68 N
- (D) 23.52 N

Q14. A 50 kg person stands on a scale in an elevator that accelerates upward at 2 m/s^2 . What does the scale read, in newtons?

- (A) 490 N
- (B) 390 N
- (C) 590 N
- (D) 100 N

Q15. Two blocks of masses 2 kg and 3 kg are in contact on a frictionless table. A horizontal force of 20 N pushes the pair. What is the acceleration of the pair?

- (A) 10 m/s^2
- (B) 4 m/s^2
- (C) 6.67 m/s^2
- (D) 8 m/s^2

Q16. A 5 kg crate is pulled horizontally with a 50 N force. The coefficient of kinetic friction is 0.4. What is the crate's acceleration?

- (A) 6.08 m/s^2
- (B) 10 m/s^2
- (C) 3.92 m/s^2
- (D) 13.92 m/s^2

Unit 3: Work, Energy, and Power

Q17. A student pushes a box with a constant horizontal force of 40 N through a distance of 3 m. How much work is done by the push?

- (A) 120 J
- (B) 43 J
- (C) 13.33 J
- (D) 240 J

Q18. What is the kinetic energy of a 4 kg ball moving at 5 m/s?

- (A) 20 J
- (B) 100 J
- (C) 25 J
- (D) 50 J

Q19. A 5 kg cart starts from rest. A net work of 100 J is done on it. What is its final speed?

- (A) 20 m/s
- (B) 4.47 m/s
- (C) 6.32 m/s
- (D) 40 m/s

Q20. A 2 kg textbook is lifted 10 m above the floor. By how much does its gravitational potential energy increase?

- (A) 20 J
- (B) 196 J
- (C) 19.6 J
- (D) 98 J

Q21. A motor lifts a 10 kg load 5 m in 2 s at constant speed. What is the average power output of the motor?

- (A) 490 W
- (B) 980 W
- (C) 245 W
- (D) 122.5 W

Q22. A spring with spring constant 50 N/m is compressed 0.4 m from equilibrium. How much elastic potential energy is stored?

- (A) 20 J
- (B) 4 J
- (C) 8 J
- (D) 6 J

Q23. A ball is dropped from rest from a height of 10 m. Ignoring air resistance, what is its speed just before it hits the ground?

- (A) 14 m/s
- (B) 98 m/s
- (C) 9.9 m/s
- (D) 7 m/s

Q24. A tractor pulls a trailer with a constant force of 50 N while moving at a constant speed of 6 m/s. What power is delivered by the pulling force?

- (A) 8.33 W
- (B) 56 W
- (C) 600 W
- (D) 300 W

Unit 4: Linear Momentum

Q25. What is the magnitude of the momentum of a 2 kg bowling ball rolling at 9 m/s?

- (A) 18 kg·m/s
- (B) 11 kg·m/s
- (C) 162 kg·m/s
- (D) 9 kg·m/s

Q26. A constant force of 60 N acts on a puck for 0.2 s. What is the impulse delivered to the puck?

- (A) 300 N·s
- (B) 12 N·s
- (C) 60.2 N·s
- (D) 24 N·s

Q27. A 5 kg tennis ball changes velocity by 4 m/s during a 0.4 s contact with a racket. What is the average force exerted by the racket?

- (A) 20 N
- (B) 8 N
- (C) 50 N
- (D) 25 N

Q28. A 6 kg cart moving at 4 m/s collides with a stationary 4 kg cart and the two stick together. What is their common velocity after the collision? (Ignore friction.)

- (A) 4 m/s
- (B) 6 m/s
- (C) 4.8 m/s
- (D) 2.4 m/s

Q29. Two trolleys move in the same direction and stick together on collision. The first has mass 4 kg and velocity 5 m/s; the second has mass 1 kg and velocity 5 m/s. What is their velocity after the collision? (Ignore friction.)

- (A) 10 m/s
- (B) 7.5 m/s
- (C) 5 m/s
- (D) 3.75 m/s

Q30. Two skaters stand at rest on frictionless ice and push each other apart. The first skater has mass 40 kg and moves away at 3 m/s. The second skater has mass 20 kg. How fast does the second skater move?

- (A) 6 m/s
- (B) 3 m/s
- (C) 1.5 m/s
- (D) 12 m/s

Q31. A 0.4 kg rubber ball hits a wall at 5 m/s and rebounds at 5 m/s in the opposite direction. What is the magnitude of the change in the ball's momentum?

- (A) 2 kg·m/s
- (B) 0 kg·m/s
- (C) 6 kg·m/s
- (D) 4 kg·m/s

Q32. Two objects move in the same direction. One has mass 4 kg and velocity 2 m/s; the other has mass 1 kg and velocity 5 m/s. What is the total momentum of the system?

- (A) 8 kg·m/s
- (B) 13 kg·m/s
- (C) 5 kg·m/s
- (D) 18 kg·m/s

Unit 5: Torque and Rotational Dynamics

Q33. A wrench handle is 0.3 m long. A force of 60 N is applied perpendicular to the handle at its end. What is the torque about the bolt?

- (A) 200 N·m
- (B) 18 N·m
- (C) 60.3 N·m
- (D) 36 N·m

Q34. A force of 50 N is applied at a distance of 0.6 m from a pivot, at an angle of 53° to the lever arm. Using $\sin 53^\circ = 0.8$, what is the torque about the pivot?

- (A) 30 N·m
- (B) 12 N·m
- (C) 48 N·m
- (D) 24 N·m

Q35. A wheel starts with an angular velocity of 1 rad/s and undergoes a constant angular acceleration of 4 rad/s^2 . What is its angular velocity after 3 s?

- (A) 13 rad/s
- (B) 12 rad/s
- (C) 5 rad/s
- (D) 26 rad/s

Q36. A fan blade rotates with an initial angular velocity of 6 rad/s and a constant angular acceleration of 2 rad/s^2 . Through what angle does it turn in 2 s?

- (A) 12 rad
- (B) 20 rad
- (C) 16 rad
- (D) 4 rad

Q37. A 4 kg point mass is attached to a light rod 0.3 m from the rotation axis. What is its moment of inertia about that axis? (Treat the mass as a point mass.)

- (A) $1.2 \text{ kg}\cdot\text{m}^2$
- (B) $0.72 \text{ kg}\cdot\text{m}^2$
- (C) $4 \text{ kg}\cdot\text{m}^2$
- (D) $0.36 \text{ kg}\cdot\text{m}^2$

Q38. A net torque of 20 N·m acts on a wheel with a moment of inertia of $4 \text{ kg}\cdot\text{m}^2$. What is the wheel's angular acceleration?

- (A) 80 rad/s^2
- (B) 0.2 rad/s^2
- (C) 5 rad/s^2
- (D) 10 rad/s^2

Q39. A child of mass 20 kg sits 3 m from the pivot of a seesaw. A second child of mass 30 kg sits on the other side. Where must the second child sit for the seesaw to balance?

- (A) 3 m from the pivot
- (B) 2 m from the pivot
- (C) 4.5 m from the pivot
- (D) 4 m from the pivot

Unit 6: Energy and Momentum of Rotating Systems

Q40. A flywheel has a moment of inertia of $3 \text{ kg}\cdot\text{m}^2$ and rotates at 4 rad/s. What is its rotational kinetic energy?

- (A) 24 J
- (B) 12 J
- (C) 48 J
- (D) 36 J

Q41. What is the angular momentum of a spinning top with a moment of inertia of $5 \text{ kg}\cdot\text{m}^2$ and an angular velocity of 2 rad/s ?

- (A) $10 \text{ kg}\cdot\text{m}^2/\text{s}$
- (B) $7 \text{ kg}\cdot\text{m}^2/\text{s}$
- (C) $2.5 \text{ kg}\cdot\text{m}^2/\text{s}$
- (D) $20 \text{ kg}\cdot\text{m}^2/\text{s}$

Q42. An ice skater spins with a moment of inertia of $4 \text{ kg}\cdot\text{m}^2$ at 6 rad/s . She pulls her arms in, reducing her moment of inertia to $8 \text{ kg}\cdot\text{m}^2$. With no external torque, what is her new angular velocity?

- (A) 6 rad/s
- (B) 12 rad/s
- (C) 4.5 rad/s
- (D) 3 rad/s

Q43. A 1 kg ball moves in a circle of radius 0.5 m at a speed of 6 m/s . What is its angular momentum about the centre of the circle?

- (A) $6 \text{ kg}\cdot\text{m}^2/\text{s}$
- (B) $0.5 \text{ kg}\cdot\text{m}^2/\text{s}$
- (C) $3 \text{ kg}\cdot\text{m}^2/\text{s}$
- (D) $4.5 \text{ kg}\cdot\text{m}^2/\text{s}$

Q44. A wheel with a moment of inertia of $6 \text{ kg}\cdot\text{m}^2$ is accelerated from rest to 2 rad/s . How much rotational work was done on it?

- (A) 24 J
- (B) 12 J
- (C) 6 J
- (D) 18 J

Q45. A cylinder of mass 2 kg rolls without slipping at 4 m/s . Its radius is 0.4 m and its moment of inertia is $1 \text{ kg}\cdot\text{m}^2$. What is its total kinetic energy?

- (A) 16 J
- (B) 50 J
- (C) 66 J
- (D) 132 J

Q46. A disk with a moment of inertia of $2 \text{ kg}\cdot\text{m}^2$ slows from 8 rad/s to 4 rad/s . By how much does its angular momentum change in magnitude?

- (A) $16 \text{ kg}\cdot\text{m}^2/\text{s}$
- (B) $8 \text{ kg}\cdot\text{m}^2/\text{s}$
- (C) $4 \text{ kg}\cdot\text{m}^2/\text{s}$
- (D) $12 \text{ kg}\cdot\text{m}^2/\text{s}$

Unit 7: Oscillations

Q47. A mass of 2 kg hangs on a spring with spring constant 200 N/m . What is the period of its vertical oscillation?

- (A) 0.63 s
- (B) 62.83 s
- (C) 0.1 s
- (D) 1.26 s

Q48. A simple pendulum has a length of 4 m. What is its period for small oscillations on Earth? (Treat it as a simple pendulum.)

- (A) 9.83 s
- (B) 0.64 s
- (C) 8.03 s
- (D) 4.01 s

Q49. An oscillator completes one full cycle in 0.5 s. What is its frequency?

- (A) 2 Hz
- (B) 0.5 Hz
- (C) 12.57 Hz
- (D) 4 Hz

Q50. A block in simple harmonic motion oscillates with frequency 3 Hz and amplitude 0.05 m. What is its maximum speed?

- (A) 18.85 m/s
- (B) 0.94 m/s
- (C) 0.15 m/s
- (D) 1.88 m/s

Q51. A spring-mass system has spring constant 400 N/m and oscillates with amplitude 0.1 m. What is its total mechanical energy?

- (A) 40 J
- (B) 4 J
- (C) 2 J
- (D) 3 J

Q52. A simple pendulum in a university lab on Earth has a period of 1 s. What is its length? (Treat it as a simple pendulum.)

- (A) 9.8 m
- (B) 0.1 m
- (C) 0.5 m
- (D) 0.25 m

Q53. A 4 kg mass oscillates on a spring with a period of 1 s. What is the spring constant?

- (A) 4 N/m
- (B) 78.96 N/m
- (C) 157.91 N/m
- (D) 236.87 N/m

Unit 8: Fluids

Q54. A metal block has a mass of 100 kg and a volume of 0.1 m^3 . What is its density?

- (A) 1000 kg/m^3
- (B) 10 kg/m^3
- (C) 0 kg/m^3
- (D) 500 kg/m^3

Q55. A force of 100 N is spread evenly over an area of 0.25 m^2 . What is the pressure exerted?

- (A) 25 Pa
- (B) 0 Pa
- (C) 800 Pa
- (D) 400 Pa

Q56. What is the gauge pressure at a depth of 5 m in a liquid of density 800 kg/m^3 ?

- (A) 4000 Pa
- (B) 39200 Pa
- (C) 7840 Pa
- (D) 19600 Pa

Q57. A diver is 20 m below the surface of water (density 1000 kg/m^3). Taking atmospheric pressure as 101,000 Pa, what is the absolute pressure on the diver?

- (A) 196000 Pa
- (B) 297000 Pa
- (C) 101000 Pa
- (D) 594000 Pa

Q58. A block displaces 0.1 m^3 of liquid of density 800 kg/m^3 when fully submerged. What is the buoyant force on the block?

- (A) 80 N
- (B) 0.98 N
- (C) 392 N
- (D) 784 N

Q59. Water flows through a pipe of cross-sectional area 0.05 m^2 at 1 m/s. The pipe narrows to an area of 0.01 m^2 . What is the water speed in the narrow section? (Assume incompressible flow.)

- (A) 5 m/s
- (B) 0.2 m/s
- (C) 1 m/s
- (D) 10 m/s

Q60. Water flows through a hose of cross-sectional area 0.01 m^2 at 4 m/s. What is the volume flow rate?

- (A) $0 \text{ m}^3/\text{s}$
- (B) $4 \text{ m}^3/\text{s}$
- (C) $0.02 \text{ m}^3/\text{s}$
- (D) $0.04 \text{ m}^3/\text{s}$

Answer Key

Q1: A	Q11: A	Q21: C	Q31: D	Q41: A	Q51: C
Q2: B	Q12: C	Q22: B	Q32: B	Q42: D	Q52: D
Q3: C	Q13: D	Q23: A	Q33: B	Q43: C	Q53: C
Q4: D	Q14: C	Q24: D	Q34: D	Q44: B	Q54: A

Q5: C	Q15: B	Q25: A	Q35: A	Q45: C	Q55: D
Q6: A	Q16: A	Q26: B	Q36: C	Q46: B	Q56: B
Q7: D	Q17: A	Q27: C	Q37: D	Q47: A	Q57: B
Q8: B	Q18: D	Q28: D	Q38: C	Q48: D	Q58: D
Q9: B	Q19: C	Q29: C	Q39: B	Q49: A	Q59: A
Q10: D	Q20: B	Q30: A	Q40: A	Q50: B	Q60: C

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