

AP Physics 1 Practice Test 11

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 cyclist travels 120 m in 8 s at a steady pace. What is the average speed?

- (A) 15 m/s
- (B) 30 m/s
- (C) 7.5 m/s
- (D) 22.5 m/s

Q2. A car starts at 5 m/s and accelerates uniformly at 2 m/s^2 for 6 s. What is its final speed?

- (A) 34 m/s
- (B) 17 m/s
- (C) 8.5 m/s
- (D) 25.5 m/s

Q3. A trolley starts at 3 m/s and accelerates at 2 m/s^2 for 5 s. How far does it travel?

- (A) 80 m
- (B) 20 m
- (C) 40 m
- (D) 60 m

Q4. A sprinter starts at 4 m/s and accelerates at 3 m/s^2 over a distance of 20 m. What is the final speed?

- (A) 23.32 m/s
- (B) 5.83 m/s
- (C) 17.49 m/s
- (D) 11.66 m/s

Q5. A stone is dropped from rest from a tall tower. Ignoring air resistance, what is its speed after 2 s?

- (A) 19.6 m/s
- (B) 39.2 m/s
- (C) 9.8 m/s
- (D) 29.4 m/s

Q6. A metal ball is dropped from rest. Ignoring air resistance, how far does it fall in 2 s?

- (A) 39.2 m
- (B) 19.6 m
- (C) 9.8 m
- (D) 29.4 m

Q7. A ball rolls horizontally off a cliff 19.6 m high with a speed of 8 m/s. Ignoring air resistance, how far from the base of the cliff does it land?

- (A) 32 m
- (B) 8 m
- (C) 16 m
- (D) 24 m

Q8. A car travelling at 12 m/s brakes with a constant deceleration of 3 m/s^2 until it stops. What is its stopping distance?

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

Unit 2: Force and Translational Dynamics

Q9. A net force accelerates a 4 kg crate at 3 m/s^2 across a smooth floor. What is the size of the net force?

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

Q10. A 10 kg box is pushed across a rough floor at constant speed by a horizontal force of 40 N. What is the coefficient of kinetic friction between the box and the floor?

- (A) 0.10
- (B) 0.41
- (C) 0.80
- (D) 4.0

Q11. A 10 kg box slides on a horizontal floor where the coefficient of kinetic friction is 0.2. What is the kinetic friction force?

- (A) 39.2 N
- (B) 9.8 N
- (C) 19.6 N
- (D) 29.4 N

Q12. A horizontal force of 50 N pushes a 10 kg sled on a rough surface ($\mu = 0.2$). What is the acceleration of the sled?

- (A) 6.08 m/s^2
- (B) 1.52 m/s^2
- (C) 4.56 m/s^2
- (D) 3.04 m/s^2

Q13. A 10 kg block rests on a frictionless slope inclined at 30° to the horizontal. What is the component of its weight down the slope? ($\sin 30^\circ = 0.5$)

- (A) 49 N
- (B) 98 N
- (C) 24.5 N
- (D) 73.5 N

Q14. Two masses of 3 kg and 5 kg are joined by a light string over a frictionless pulley. What is the magnitude of their acceleration? (The 5 kg mass is heavier.)

- (A) 4.9 m/s^2
- (B) 2.45 m/s^2
- (C) 1.23 m/s^2
- (D) 3.68 m/s^2

Q15. A 2 kg ball on a string moves in a horizontal circle of radius 3 m at a speed of 6 m/s. What is the centripetal force on the ball?

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

Unit 3: Work, Energy, and Power

Q16. A worker pushes a crate with a constant horizontal force of 20 N over a distance of 15 m. How much work is done?

- (A) 600 J
- (B) 150 J
- (C) 450 J
- (D) 300 J

Q17. A rope pulls a box with a force of 50 N at 37° above the horizontal while the box moves 10 m. How much work is done by the rope? ($\cos 37^\circ = 0.8$)

- (A) 400 J
- (B) 800 J
- (C) 200 J
- (D) 600 J

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

- (A) 100 J
- (B) 50 J
- (C) 25 J
- (D) 75 J

Q19. A 2 kg book is lifted to a shelf 10 m above the floor. By how much does its gravitational potential energy increase?

- (A) 392 J
- (B) 98 J
- (C) 196 J
- (D) 294 J

Q20. A 4 kg cart starts from rest. A net force does work on it until it reaches 6 m/s. How much work was done on the cart?

- (A) 144 J
- (B) 36 J
- (C) 108 J
- (D) 72 J

Q21. A motor does 600 J of work in 10 s. What is its average power output?

- (A) 60 W
- (B) 120 W
- (C) 30 W
- (D) 90 W

Q22. A car engine exerts a constant driving force of 200 N while the car moves at a steady 3 m/s. What power does the engine deliver?

- (A) 1200 W
- (B) 600 W
- (C) 300 W
- (D) 900 W

Q23. A spring of spring constant 200 N/m is compressed by 0.2 m from its natural length. What is its elastic potential energy?

- (A) 8 J
- (B) 2 J
- (C) 4 J
- (D) 6 J

Unit 4: Linear Momentum

Q24. What is the momentum of a 3 kg cart moving at 6 m/s?

- (A) 36 kg m/s
- (B) 9 kg m/s
- (C) 27 kg m/s
- (D) 18 kg m/s

Q25. A constant force of 40 N acts on a hockey puck for 0.5 s. What impulse does it deliver?

- (A) 20 N s
- (B) 40 N s
- (C) 10 N s
- (D) 30 N s

Q26. A 2 kg ball changes velocity by 6 m/s during a 0.3 s contact with a bat. What is the average force exerted by the bat?

- (A) 80 N
- (B) 40 N
- (C) 20 N
- (D) 60 N

Q27. A 4 kg cart moving at 5 m/s hits a stationary 6 kg cart and the two stick together. What is their common speed after the collision? (Ignore friction.)

- (A) 4 m/s
- (B) 1 m/s
- (C) 2 m/s
- (D) 3 m/s

Q28. Two skaters at rest on frictionless ice push apart. One skater has mass 50 kg and moves at 2 m/s. The other has mass 25 kg. How fast does the other skater move?

- (A) 8 m/s
- (B) 2 m/s
- (C) 6 m/s
- (D) 4 m/s

Q29. A 0.5 kg rubber ball hits a wall at 6 m/s and rebounds at 6 m/s in the opposite direction. What is the magnitude of the change in its momentum?

- (A) 6 kg m/s
- (B) 12 kg m/s
- (C) 3 kg m/s
- (D) 9 kg m/s

Q30. A 3.0 kg cart moving at 4.0 m/s on a frictionless track collides with a stationary 2.0 kg cart, and the two carts stick together. What is their common speed after the collision?

- (A) 1.2 m/s
- (B) 2.4 m/s
- (C) 4.0 m/s
- (D) 6.0 m/s

Unit 5: Torque and Rotational Dynamics

Q31. A force of 20 N is applied perpendicular to a wrench at a distance of 0.5 m from the pivot. What is the torque about the pivot?

- (A) 20 N m
- (B) 5 N m
- (C) 10 N m
- (D) 15 N m

Q32. A force of 40 N acts at 30° to a lever arm of length 0.5 m. What is the torque about the pivot? ($\sin 30^\circ = 0.5$)

- (A) 20 N m
- (B) 5 N m
- (C) 15 N m
- (D) 10 N m

Q33. Two forces act on opposite sides of a pivot: 20 N at 0.6 m on one side and 10 N at 0.4 m on the other side, tending to rotate it oppositely. What is the magnitude of the net torque?

- (A) 8 N m
- (B) 16 N m
- (C) 4 N m
- (D) 12 N m

Q34. A net torque of 12 N m acts on a wheel with moment of inertia 4 kg m². What is its angular acceleration?

- (A) 6 rad/s²
- (B) 3 rad/s²
- (C) 1.5 rad/s²
- (D) 4.5 rad/s²

Q35. A flywheel starts with angular velocity 2 rad/s and angular acceleration 3 rad/s². What is its angular velocity after 4 s?

- (A) 28 rad/s
- (B) 7 rad/s
- (C) 14 rad/s
- (D) 21 rad/s

Q36. A disc starts with angular velocity 2 rad/s and angular acceleration 2 rad/s². Through what angle does it rotate in 5 s?

- (A) 70 rad
- (B) 17.5 rad
- (C) 52.5 rad
- (D) 35 rad

Q37. A 2 kg point mass is attached at a distance of 0.5 m from an axis. What is its moment of inertia about that axis? (Treat it as a point mass.)

- (A) 0.5 kg m²
- (B) 1 kg m²
- (C) 0.25 kg m²
- (D) 0.75 kg m²

Q38. What net torque is needed to give a rotor of moment of inertia 4 kg m² an angular acceleration of 3 rad/s²?

- (A) 24 N m
- (B) 12 N m
- (C) 6 N m
- (D) 18 N m

Unit 6: Energy and Momentum of Rotating Systems

Q39. A spinning disc has moment of inertia 4 kg m² and angular velocity 5 rad/s. What is its rotational kinetic energy?

- (A) 100 J
- (B) 25 J
- (C) 50 J
- (D) 75 J

Q40. A wheel has moment of inertia 3 kg m² and spins at 6 rad/s. What is its angular momentum?

- (A) 36 kg m²/s
- (B) 9 kg m²/s
- (C) 27 kg m²/s
- (D) 18 kg m²/s

Q41. A figure skater spins with moment of inertia 6 kg m^2 at 4 rad/s , then pulls her arms in so her moment of inertia becomes 3 kg m^2 . What is her new angular velocity? (Ignore external torques.)

- (A) 8 rad/s
- (B) 16 rad/s
- (C) 4 rad/s
- (D) 12 rad/s

Q42. A rolling object of mass 4 kg moves at 6 m/s . Its moment of inertia is 2 kg m^2 and its radius is 0.5 m . What is its total kinetic energy?

- (A) 432 J
- (B) 216 J
- (C) 108 J
- (D) 324 J

Q43. A mass of 1 kg falls 5 m , turning a drum of moment of inertia 2 kg m^2 with no slipping and no other energy loss. What is the angular velocity of the drum at the end of the fall?

- (A) 14 rad/s
- (B) 3.5 rad/s
- (C) 7 rad/s
- (D) 10.5 rad/s

Q44. A 2 kg particle moves at 6 m/s at a perpendicular distance of 3 m from a point. What is its angular momentum about that point?

- (A) $72 \text{ kg m}^2/\text{s}$
- (B) $18 \text{ kg m}^2/\text{s}$
- (C) $54 \text{ kg m}^2/\text{s}$
- (D) $36 \text{ kg m}^2/\text{s}$

Q45. A rotor with moment of inertia 4 kg m^2 speeds up from 2 rad/s to 6 rad/s . How much rotational work is done on it?

- (A) 64 J
- (B) 128 J
- (C) 32 J
- (D) 96 J

Unit 7: Oscillations

Q46. A 1 kg mass on a spring of spring constant 100 N/m oscillates on a frictionless surface. What is the period of oscillation?

- (A) 1.26 s
- (B) 0.63 s
- (C) 0.31 s
- (D) 0.94 s

Q47. A pendulum completes one oscillation in 2 s . What is its frequency?

- (A) 1 Hz
- (B) 0.25 Hz
- (C) 0.5 Hz
- (D) 0.75 Hz

Q48. A simple pendulum has length 0.98 m. What is its period for small oscillations? (Ignore air resistance.)

- (A) 3.97 s
- (B) 0.99 s
- (C) 2.98 s
- (D) 1.99 s

Q49. A simple pendulum of length 0.64 m swings with a small amplitude on Earth. What is the period of the pendulum?

- (A) 1.6 s
- (B) 0.80 s
- (C) 2.5 s
- (D) 3.2 s

Q50. A spring of spring constant 200 N/m oscillates with amplitude 0.1 m. What is the total mechanical energy of the oscillation?

- (A) 2 J
- (B) 1 J
- (C) 0.5 J
- (D) 1.5 J

Q51. A pendulum of length 1 m has a period of 2 s. If its length is increased to 4 m, what is its new period?

- (A) 8 s
- (B) 2 s
- (C) 4 s
- (D) 6 s

Q52. A 1 kg mass on a spring ($k = 100 \text{ N/m}$) oscillates with amplitude 0.2 m. What is its maximum acceleration?

- (A) 40 m/s^2
- (B) 10 m/s^2
- (C) 30 m/s^2
- (D) 20 m/s^2

Q53. A 1 kg block on a spring of spring constant 25 N/m oscillates on a frictionless surface. What is the frequency of oscillation?

- (A) 0.8 Hz
- (B) 1.59 Hz
- (C) 0.4 Hz
- (D) 1.19 Hz

Unit 8: Fluids

Q54. A block of mass 200 kg has a volume of 0.2 m^3 . What is its density?

- (A) 2000 kg/m^3
- (B) 1000 kg/m^3
- (C) 500 kg/m^3
- (D) 1500 kg/m^3

Q55. A force of 200 N acts on an area of 0.5 m^2 . What pressure does it exert?

- (A) 800 Pa
- (B) 200 Pa
- (C) 400 Pa
- (D) 600 Pa

Q56. What is the gauge pressure due to water at a depth of 5 m below the surface? (Density of water = 1000 kg/m^3 .)

- (A) 98000 Pa
- (B) 24500 Pa
- (C) 73500 Pa
- (D) 49000 Pa

Q57. A solid of volume 0.02 m^3 is fully submerged in water (density 1000 kg/m^3). What is the buoyant force on it?

- (A) 196 N
- (B) 392 N
- (C) 98 N
- (D) 294 N

Q58. Water flows through a pipe of cross-sectional area 0.04 m^2 at 3 m/s, then enters a narrower section of area 0.02 m^2 . What is the speed in the narrower section?

- (A) 12 m/s
- (B) 6 m/s
- (C) 3 m/s
- (D) 9 m/s

Q59. Water flows through a pipe of cross-sectional area 0.02 m^2 at 3 m/s. What is the volume flow rate?

- (A) $0.12 \text{ m}^3/\text{s}$
- (B) $0.03 \text{ m}^3/\text{s}$
- (C) $0.06 \text{ m}^3/\text{s}$
- (D) $0.09 \text{ m}^3/\text{s}$

Q60. Water speeds up from 2 m/s to 4 m/s in a horizontal pipe. By how much does the pressure drop? (Density of water = 1000 kg/m^3 .)

- (A) 12000 Pa
- (B) 3000 Pa
- (C) 9000 Pa
- (D) 6000 Pa

Answer Key

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

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

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