

AP Physics 1 Practice Test 19

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 covers a distance of 450 m in 25 s on a straight road. What is the cyclist's average speed?

- (A) 18 m/s
- (B) 11250 m/s
- (C) 0.06 m/s
- (D) 9 m/s

Q2. A delivery scooter starts from a velocity of 7 m/s and accelerates uniformly at 3 m/s^2 for 5 s. What is its final velocity? (Ignore air resistance.)

- (A) 10 m/s
- (B) 22 m/s
- (C) 15 m/s
- (D) 37 m/s

Q3. A small ball is dropped from rest from a tall tower. Ignoring air resistance, how far does it fall in the first 5 s?

- (A) 61.25 m
- (B) 245 m
- (C) 122.5 m
- (D) 183.75 m

Q4. A stone is dropped from rest from a bridge 122.5 m above a river. Ignoring air resistance, how long does it take to reach the water?

- (A) 6 s
- (B) 10 s
- (C) 2.5 s
- (D) 5 s

Q5. A train increases its speed by 32 m/s in 5 s with constant acceleration. What is the magnitude of its acceleration?

- (A) 6.4 m/s^2
- (B) 160 m/s^2
- (C) 3.2 m/s^2
- (D) 32 m/s^2

Q6. A kart starts from rest and accelerates uniformly at 3.5 m/s^2 . How far does it travel in 4 s?

- (A) 14 m
- (B) 28 m
- (C) 56 m
- (D) 42 m

Q7. A car travelling at 26 m/s brakes with a constant deceleration of 5 m/s^2 on a dry road. What is its stopping distance?

- (A) 135.2 m
- (B) 5.2 m
- (C) 67.6 m
- (D) 33.8 m

Unit 2: Force and Translational Dynamics

Q8. A net force acts on a 9 kg toolbox and gives it an acceleration of 3 m/s^2 across a smooth floor. What is the magnitude of the net force?

- (A) 12 N
- (B) 54 N
- (C) 3 N
- (D) 27 N

Q9. What is the weight of a 24 kg suitcase on Earth?

- (A) 235.2 N
- (B) 24 N
- (C) 240 N
- (D) 117.6 N

Q10. A crate on a horizontal floor experiences a normal force of 250 N. If the coefficient of kinetic friction is 0.35, what is the magnitude of the kinetic friction force?

- (A) 0.35 N
- (B) 87.5 N
- (C) 250 N
- (D) 175 N

Q11. A 10 kg wagon is pulled to the right with a 90 N force while a 20 N friction force acts to the left. What is the wagon's acceleration?

- (A) 11 m/s^2 to the right
- (B) 9 m/s^2 to the right
- (C) 7 m/s^2 to the right
- (D) 7 m/s^2 to the left

Q12. A 14 kg parcel sits on a frictionless ramp inclined at 30° to the horizontal. Using $\sin 30^\circ = 0.5$, what is the component of the parcel's weight down the ramp?

- (A) 137.2 N
- (B) 102.9 N
- (C) 34.3 N
- (D) 68.6 N

Q13. Two masses of 8 kg and 2 kg hang from opposite ends of a light string over a frictionless pulley. What is the magnitude of their acceleration? (Ignore the mass of the pulley.)

- (A) 5.88 m/s^2
- (B) 9.8 m/s^2
- (C) 7.84 m/s^2
- (D) 11.76 m/s^2

Q14. A spring with spring constant 350 N/m is stretched 0.16 m from equilibrium. What is the magnitude of the spring force?

- (A) 2187.5 N
- (B) 56 N
- (C) 350.16 N
- (D) 112 N

Q15. A 75 kg student stands on a bathroom scale in a lift that accelerates upward at 2 m/s^2 . What does the scale read, in newtons?

- (A) 735 N
- (B) 585 N
- (C) 885 N
- (D) 150 N

Unit 3: Work, Energy, and Power

Q16. A gardener pushes a wheelbarrow with a constant horizontal force of 80 N through a distance of 12 m. How much work is done by the push?

- (A) 92 J
- (B) 6.67 J
- (C) 1920 J
- (D) 960 J

Q17. What is the kinetic energy of a 5 kg medicine ball moving at 10 m/s?

- (A) 250 J
- (B) 50 J
- (C) 500 J
- (D) 125 J

Q18. A 8 kg box is raised 10 m above the ground at constant speed. By how much does its gravitational potential energy increase?

- (A) 80 J
- (B) 784 J
- (C) 78.4 J
- (D) 392 J

Q19. A crane does 1800 J of work in 20 s while lifting a load. What is its average power output?

- (A) 36000 W
- (B) 900 W
- (C) 90 W
- (D) 180 W

Q20. A diver drops from rest from a platform 40 m above the water. Ignoring air resistance, what is the diver's speed just before hitting the water?

- (A) 392 m/s
- (B) 19.8 m/s
- (C) 14 m/s
- (D) 28 m/s

Q21. A spring with spring constant 350 N/m is compressed 0.2 m from equilibrium. How much elastic potential energy is stored in the spring?

- (A) 7 J
- (B) 70 J
- (C) 14 J
- (D) 10.5 J

Q22. A motor lifts a 35 kg crate 5 m in 10 s at constant speed. What is the average power output of the motor?

- (A) 1715 W
- (B) 171.5 W
- (C) 17150 W
- (D) 85.75 W

Unit 4: Linear Momentum

Q23. What is the magnitude of the momentum of a 6 kg bowling ball rolling at 12 m/s?

- (A) 18 kg·m/s
- (B) 864 kg·m/s
- (C) 72 kg·m/s
- (D) 36 kg·m/s

Q24. A constant force of 70 N acts on a hockey puck for 3 s. What is the impulse delivered to the puck?

- (A) 23.33 N·s
- (B) 73 N·s
- (C) 420 N·s
- (D) 210 N·s

Q25. A 7 kg trolley moving at 6 m/s collides with a stationary 2 kg trolley and the two stick together. What is their common velocity after the collision? (Ignore friction.)

- (A) 4.67 m/s
- (B) 6 m/s
- (C) 21 m/s
- (D) 9.33 m/s

Q26. An astronaut of mass 75 kg, floating at rest in space, throws a 2 kg tool away at 10 m/s. What is the astronaut's recoil speed? (Ignore external forces.)

- (A) 10 m/s
- (B) 0.27 m/s
- (C) 375 m/s
- (D) 0.53 m/s

Q27. A 2.5 kg squash ball travelling at 5 m/s hits a wall and rebounds at 5 m/s in the opposite direction. What is the magnitude of the change in the ball's momentum?

- (A) 12.5 kg·m/s
- (B) 0 kg·m/s
- (C) 25 kg·m/s
- (D) 37.5 kg·m/s

Q28. A footballer's foot changes a ball's momentum by 210 kg·m/s during a contact lasting 4 s. What is the average force exerted on the ball?

- (A) 840 N
- (B) 210 N
- (C) 26.25 N
- (D) 52.5 N

Q29. Two bumper cars move in the same direction and stick together on collision. The first has mass 5 kg and velocity 4 m/s; the second has mass 4 kg and velocity 2 m/s. What is their velocity after the collision? (Ignore friction.)

- (A) 3.11 m/s
- (B) 3 m/s
- (C) 4 m/s
- (D) 6.22 m/s

Q30. Two skaters glide in the same direction. One has mass 5 kg and velocity 3 m/s; the other has mass 4 kg and velocity 2 m/s. What is the total momentum of the pair?

- (A) 15 kg·m/s
- (B) 23 kg·m/s
- (C) 8 kg·m/s
- (D) 28 kg·m/s

Unit 5: Torque and Rotational Dynamics

Q31. A wrench handle is 0.7 m long. A force of 50 N is applied at right angles to the handle at its end. What is the magnitude of the torque about the nut?

- (A) 71.43 N·m
- (B) 50.7 N·m
- (C) 35 N·m
- (D) 70 N·m

Q32. What is the moment of inertia of a 5 kg point mass at a distance of 0.5 m from an axis of rotation?

- (A) 2.5 kg·m²
- (B) 5 kg·m²
- (C) 3.75 kg·m²
- (D) 1.25 kg·m²

Q33. A net torque of $30 \text{ N}\cdot\text{m}$ acts on a wheel with moment of inertia $3 \text{ kg}\cdot\text{m}^2$. What is the wheel's angular acceleration?

- (A) 10 rad/s^2
- (B) 90 rad/s^2
- (C) 0.1 rad/s^2
- (D) 5 rad/s^2

Q34. A spinning top has an initial angular velocity of 5 rad/s and a constant angular acceleration of 3 rad/s^2 . What is its angular velocity after 4 s ?

- (A) 8 rad/s
- (B) 17 rad/s
- (C) 12 rad/s
- (D) 34 rad/s

Q35. A uniform plank is balanced on a pivot. A weight of 160 N sits 0.5 m to the left of the pivot. What downward force must be applied 2 m to the right of the pivot to keep the plank balanced?

- (A) 160 N
- (B) 640 N
- (C) 40 N
- (D) 80 N

Q36. A merry-go-round starts with an angular velocity of 2 rad/s and accelerates uniformly at 2 rad/s^2 . Through what angle does it rotate in 6 s ?

- (A) 12 rad
- (B) 36 rad
- (C) 96 rad
- (D) 48 rad

Q37. Two torques act on a door about its hinges: $60 \text{ N}\cdot\text{m}$ clockwise and $10 \text{ N}\cdot\text{m}$ anticlockwise. What is the net torque?

- (A) $50 \text{ N}\cdot\text{m}$ clockwise
- (B) $70 \text{ N}\cdot\text{m}$ clockwise
- (C) $50 \text{ N}\cdot\text{m}$ anticlockwise
- (D) $10 \text{ N}\cdot\text{m}$ clockwise

Unit 6: Energy and Momentum of Rotating Systems

Q38. A flywheel has moment of inertia $5 \text{ kg}\cdot\text{m}^2$ and rotates at 4 rad/s . What is its rotational kinetic energy?

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

Q39. A spinning disc has moment of inertia $6 \text{ kg}\cdot\text{m}^2$ and angular velocity 2 rad/s . What is its angular momentum?

- (A) $8 \text{ kg}\cdot\text{m}^2/\text{s}$
- (B) $3 \text{ kg}\cdot\text{m}^2/\text{s}$
- (C) $12 \text{ kg}\cdot\text{m}^2/\text{s}$
- (D) $24 \text{ kg}\cdot\text{m}^2/\text{s}$

Q40. An ice skater spins with moment of inertia $4 \text{ kg}\cdot\text{m}^2$ at 6 rad/s . She pulls her arms in, reducing her moment of inertia to $2 \text{ kg}\cdot\text{m}^2$. What is her new angular velocity? (Ignore external torques.)

- (A) 6 rad/s
- (B) 3 rad/s
- (C) 24 rad/s
- (D) 12 rad/s

Q41. A hoop of mass 5 kg rolls without slipping at 3 m/s . Its moment of inertia about its centre is mr^2 . What is its total kinetic energy?

- (A) 45 J
- (B) 22.5 J
- (C) 15 J
- (D) 90 J

Q42. A constant torque of $25 \text{ N}\cdot\text{m}$ rotates a shaft through an angle of 4 rad . How much work is done by the torque?

- (A) 6.25 J
- (B) 100 J
- (C) 29 J
- (D) 200 J

Q43. A solid disc of mass 4 kg and radius 0.5 m rotates at 16 rad/s . Its moment of inertia is $0.5mr^2$. What is its rotational kinetic energy?

- (A) 8 J
- (B) 128 J
- (C) 64 J
- (D) 32 J

Q44. A 2 kg particle moves at 8 m/s at a perpendicular distance of 0.4 m from a fixed point. What is its angular momentum about that point?

- (A) $16 \text{ kg}\cdot\text{m}^2/\text{s}$
- (B) $0.8 \text{ kg}\cdot\text{m}^2/\text{s}$
- (C) $12.8 \text{ kg}\cdot\text{m}^2/\text{s}$
- (D) $6.4 \text{ kg}\cdot\text{m}^2/\text{s}$

Q45. A turbine wheel with moment of inertia $6 \text{ kg}\cdot\text{m}^2$ speeds up from 2 rad/s to 9 rad/s . By how much does its rotational kinetic energy increase?

- (A) 231 J
- (B) 243 J
- (C) 12 J
- (D) 462 J

Unit 7: Oscillations

Q46. A mass of 25 kg hangs from a spring of spring constant 100 N/m and oscillates vertically. Using $\pi = 3.14$, what is the period of oscillation?

- (A) 12.56 s
- (B) 3.14 s
- (C) 1.57 s
- (D) 6.28 s

Q47. A simple pendulum has length 9.8 m. Using $\pi = 3.14$ and $g = 9.8 \text{ m/s}^2$, what is its period for small oscillations?

- (A) 19.66 s
- (B) 3.14 s
- (C) 6.28 s
- (D) 12.56 s

Q48. A vibrating string completes 35 oscillations in 10 s. What is its frequency?

- (A) 0.29 Hz
- (B) 350 Hz
- (C) 7 Hz
- (D) 3.5 Hz

Q49. A mass on a spring oscillates with amplitude 0.35 m and angular frequency 5 rad/s. What is its maximum speed?

- (A) 1.75 m/s
- (B) 14.29 m/s
- (C) 0.61 m/s
- (D) 3.5 m/s

Q50. A spring of spring constant 200 N/m oscillates with amplitude 0.25 m. What is the total mechanical energy of the oscillation?

- (A) 50 J
- (B) 6.25 J
- (C) 12.5 J
- (D) 9.38 J

Q51. A mass-spring system has a period of 2.5 s. If the mass is quadrupled while the spring constant stays the same, what is the new period?

- (A) 2.5 s
- (B) 10 s
- (C) 5 s
- (D) 1.25 s

Q52. A particle in simple harmonic motion has angular frequency 4 rad/s and amplitude 0.4 m. What is its maximum acceleration?

- (A) 1.6 m/s^2
- (B) 16 m/s^2
- (C) 12.8 m/s^2
- (D) 6.4 m/s^2

Unit 8: Fluids

Q53. A metal block has mass 70 kg and volume 0.02 m^3 . What is its density?

- (A) 3500 kg/m^3
- (B) 1.4 kg/m^3
- (C) 0 kg/m^3
- (D) 1750 kg/m^3

- Q54. A force of 350 N acts uniformly over an area of 0.5 m^2 . What is the pressure?**
- (A) 175 Pa
 - (B) 700 Pa
 - (C) 350.5 Pa
 - (D) 1400 Pa
- Q55. What is the gauge pressure due to water at a depth of 5 m below the surface? (Density of water = 1000 kg/m^3 , $g = 9.8 \text{ m/s}^2$.)**
- (A) 5000 Pa
 - (B) 49 Pa
 - (C) 49000 Pa
 - (D) 24500 Pa
- Q56. A block displaces 0.04 m^3 of water when fully submerged. What is the buoyant force on it? (Density of water = 1000 kg/m^3 .)**
- (A) 40 N
 - (B) 0.39 N
 - (C) 784 N
 - (D) 392 N
- Q57. Water flows through a pipe of cross-sectional area 0.04 m^2 at 2 m/s, then enters a narrower or wider section of area 0.05 m^2 . What is the water speed in the second section?**
- (A) 1.6 m/s
 - (B) 0.8 m/s
 - (C) 2.4 m/s
 - (D) 4.6 m/s
- Q58. Water flows through a hose of cross-sectional area 0.02 m^2 at 6 m/s. What is the volume flow rate?**
- (A) $300 \text{ m}^3/\text{s}$
 - (B) $0.12 \text{ m}^3/\text{s}$
 - (C) $6.02 \text{ m}^3/\text{s}$
 - (D) $0.24 \text{ m}^3/\text{s}$
- Q59. In a horizontal pipe, water speeds up from 2 m/s to 7 m/s. By how much does the pressure drop? (Density of water = 1000 kg/m^3 .)**
- (A) 5000 Pa
 - (B) 11250 Pa
 - (C) 22500 Pa
 - (D) 45000 Pa
- Q60. A wooden block of density 500 kg/m^3 floats in water of density 1000 kg/m^3 . What percentage of the block's volume is submerged?**
- (A) 60%
 - (B) 25%
 - (C) 100%
 - (D) 50%

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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