

AP Physics 1 Practice Test 9

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 runner starts at 6 m/s and accelerates uniformly at 2 m/s^2 for 5 s. How far does it travel in that time?

- (A) 30
- (B) 80
- (C) 55
- (D) 65

Q2. A stone is dropped from rest from a bridge 78.4 m above the water. Ignoring air resistance, how long does it take to reach the water?

- (A) 5
- (B) 3.5
- (C) 8
- (D) 4

Q3. A hockey ball is thrown straight upward at 21 m/s. Ignoring air resistance, what is its maximum height above the release point?

- (A) 45
- (B) 22.5
- (C) 11.25
- (D) 31.83

Q4. A tram travelling at 20 m/s brakes uniformly at 6 m/s^2 . What is its stopping distance?

- (A) 66.67
- (B) 33.33
- (C) 16.67
- (D) 120

Q5. A marble rolls off a horizontal table 44.1 m high with a horizontal speed of 12 m/s. Ignoring air resistance, how far from the base of the table does it land?

- (A) 529.2
- (B) 18
- (C) 15
- (D) 36

Q6. A bus moving at 10 m/s accelerates at 2 m/s^2 for 6 s. What is its final speed?

- (A) 22
- (B) 16
- (C) 120
- (D) 20

Q7. A cyclist covers 100 m in 10 s and then 90 m in 10 s. What is the average speed for the whole trip?

- (A) 10.5
- (B) 10
- (C) 9.5
- (D) 14.02

Unit 2: Force and Translational Dynamics

Q8. A net force accelerates a 8 kg box at 3 m/s^2 on a frictionless surface. What is the magnitude of the net force?

- (A) 11
- (B) 12
- (C) 24
- (D) 32

Q9. A 20 kg metal toolbox slides on a horizontal floor with coefficient of kinetic friction 0.2. What is the kinetic friction force?

- (A) 39.2
- (B) 4
- (C) 196
- (D) 19.6

Q10. A 5 kg cart rests on a frictionless incline at 30° to the horizontal. What is the component of its weight parallel to the incline?

- (A) 49
- (B) 42.44
- (C) 12.25
- (D) 24.5

Q11. A person of mass 90 kg stands in a lift accelerating upward at 1 m/s^2 . What is the normal force on the person?

- (A) 882
- (B) 972
- (C) 792
- (D) 1072

Q12. Two blocks of masses 3 kg and 6 kg are pushed together on a frictionless surface by a 36 N horizontal force. What is the acceleration of the pair?

- (A) 4
- (B) 12
- (C) 6
- (D) 8

Q13. A 60 N horizontal force pulls a 10 kg crate while kinetic friction of 10 N opposes the motion. What is the acceleration?

- (A) 6
- (B) 1
- (C) 5
- (D) 7

Q14. A 2 kg ball on a string moves in a horizontal circle of radius 2 m at 6 m/s. What is the centripetal force on it?

- (A) 6
- (B) 72
- (C) 18
- (D) 36

Unit 3: Work, Energy, and Power

Q15. A force of 40 N at 0° to the horizontal pushes an object 5 m along the floor. How much work does the force do?

- (A) 250
- (B) 200
- (C) 100
- (D) 275

Q16. What is the kinetic energy of a 4 kg ball moving at 10 m/s?

- (A) 400
- (B) 200
- (C) 20
- (D) 100

Q17. What is the gravitational potential energy of a 10 kg toolbox held 10 m above the ground, relative to the ground?

- (A) 100
- (B) 98
- (C) 490
- (D) 980

Q18. A motor does 1000 J of work in 4 s. What is its average power output?

- (A) 250
- (B) 4000
- (C) 125
- (D) 270

Q19. A 4 kg cart moving at 3 m/s receives 90 J of net work on a frictionless surface. What is its final speed?

- (A) 25.5
- (B) 6.71
- (C) 7.35
- (D) 8.35

Q20. A spring of constant 200 N/m is compressed by 0.2 m. How much elastic potential energy is stored?

- (A) 40
- (B) 20
- (C) 4
- (D) 8

Q21. A worker lifts a 50 kg load through a height of 5 m in 10 s at constant speed. What is the average power delivered?

- (A) 245
- (B) 2450
- (C) 122.5
- (D) 25

Unit 4: Linear Momentum

Q22. What is the magnitude of the momentum of a 5 kg bowling ball moving at 4 m/s?

- (A) 9
- (B) 10
- (C) 40
- (D) 20

Q23. A constant force of 50 N acts on a 5 kg object moving at 8 m/s in the opposite direction until it stops. For how long does the force act?

- (A) 2000
- (B) 0.8
- (C) 1.6
- (D) 0.4

Q24. A 2 kg cart moving at 6 m/s collides with and sticks to a stationary 6 kg cart on a frictionless track. What is their common speed after the collision?

- (A) 1.5
- (B) 6
- (C) 2
- (D) 3

Q25. A 1 kg projectile is fired at 20 m/s from a stationary launcher of mass 5 kg on a frictionless surface. What is the recoil speed of the launcher?

- (A) 20
- (B) 8
- (C) 4
- (D) 6.48

Q26. A 0.4 kg ball hits a wall at 25 m/s and rebounds at 5 m/s in the opposite direction. What is the magnitude of the impulse on the ball?

- (A) 10
- (B) 2
- (C) 6
- (D) 12

Q27. An object at rest on a frictionless surface splits into a 4 kg part moving at 5 m/s and a 2 kg part. What is the speed of the 2 kg part?

- (A) 5
- (B) 10
- (C) 20
- (D) 14.7

Q28. A 4 kg object changes speed by 15 m/s in 2 s under a constant net force. What is the magnitude of that force?

- (A) 60
- (B) 30
- (C) 120
- (D) 15

Unit 5: Torque and Rotational Dynamics

Q29. A force of 50 N acts perpendicular to a door handle at a distance of 1.2 m from the pivot. What is the torque about the pivot?

- (A) 41.67
- (B) 51.2
- (C) 30
- (D) 60

Q30. A net torque of 16 N m acts on an object with moment of inertia 2 kg m^2 . What is its angular acceleration?

- (A) 8
- (B) 32
- (C) 4
- (D) 9

Q31. A disk starts with angular speed 2 rad/s and accelerates uniformly at 3 rad/s^2 for 4 s. What is its final angular speed?

- (A) 6
- (B) 24
- (C) 14
- (D) 11

Q32. A turntable with initial angular speed 0 rad/s undergoes angular acceleration 2 rad/s^2 for 3 s. Through what angle does it rotate?

- (A) 18
- (B) 6
- (C) 9
- (D) 4.5

Q33. What is the moment of inertia of a 4 kg point mass at a distance of 1 m from the rotation axis?

- (A) 4
- (B) 5
- (C) 8
- (D) 6.48

Q34. A seesaw is balanced when a 40 N force acts 1 m from the pivot on one side. What force must act 2 m from the pivot on the other side to keep it balanced?

- (A) 40
- (B) 80
- (C) 28.4
- (D) 20

Q35. A solid disk of mass 8 kg and radius 0.5 m experiences a net torque of 4 N m. What is its angular acceleration? (Disk: $I = (1/2)MR^2$.)

- (A) 0.5
- (B) 4
- (C) 1
- (D) 2

Q36. A grindstone with initial angular speed 2 rad/s accelerates at 2 rad/s² through an angle of 8 rad. What is its final angular speed?

- (A) 6
- (B) 18
- (C) 5.66
- (D) 7

Unit 6: Energy and Momentum of Rotating Systems

Q37. What is the rotational kinetic energy of an object with moment of inertia 4 kg m² rotating at 5 rad/s?

- (A) 100
- (B) 10
- (C) 50
- (D) 69.5

Q38. What is the angular momentum of a rotating body with moment of inertia 6 kg m² and angular speed 3 rad/s?

- (A) 2
- (B) 54
- (C) 9
- (D) 18

Q39. A skater spins with moment of inertia 4 kg m² at 8 rad/s, then changes shape so the moment of inertia becomes 4 kg m². With no external torque, what is the new angular speed?

- (A) 16
- (B) 8
- (C) 11.96
- (D) 15.92

Q40. A solid sphere of mass 3 kg rolls without slipping at 6 m/s. What is its total kinetic energy? (Sphere: $I = (2/5)MR^2$.)

- (A) 54
- (B) 75.6
- (C) 108
- (D) 37.8

Q41. A solid disk of mass 4 kg and radius 0.3 m spins at 10 rad/s. What is its rotational kinetic energy? (Disk: $I = (1/2)MR^2$.)

- (A) 12
- (B) 200
- (C) 18
- (D) 9

Q42. A 2 kg ball moves at 10 m/s at a perpendicular distance of 2 m from a point. What is its angular momentum about that point?

- (A) 40
- (B) 20
- (C) 4
- (D) 55.8

Q43. A turntable with moment of inertia 5 kg m^2 rotates at 4 rad/s. A stationary object is dropped onto it, raising the total moment of inertia to 6 kg m^2 . What is the new angular speed if no external torque acts?

- (A) 4
- (B) 4.8
- (C) 3.33
- (D) 4.33

Q44. A solid cylinder of mass 4 kg rolls without slipping at 4 m/s. What is its total kinetic energy? (Cylinder: $I = (1/2)MR^2$.)

- (A) 32
- (B) 64
- (C) 48
- (D) 96

Unit 7: Oscillations

Q45. A 4 kg mass on a spring of constant 400 N/m oscillates on a frictionless surface. What is the period of oscillation? (Use $\pi = 3.14$.)

- (A) 0.63
- (B) 62.8
- (C) 0.31
- (D) 1.26

Q46. What is the period of a simple pendulum with a brass bob and length 0.49 m on Earth? (Use $\pi = 3.14$, $g = 9.8 \text{ m/s}^2$.)

- (A) 28.09
- (B) 0.7
- (C) 2.92
- (D) 1.4

Q47. An tuning fork completes one oscillation in 2 s. What is its frequency?

- (A) 2
- (B) 0.5
- (C) 3.14
- (D) 1

Q48. A mass of 1 kg on a spring ($k = 200 \text{ N/m}$) oscillates with amplitude 0.1 m. What is its maximum speed?

- (A) 1.41
- (B) 0.14
- (C) 20
- (D) 2.83

Q49. A mass of 1 kg on a spring ($k = 400 \text{ N/m}$) oscillates with amplitude 0.1 m. What is its maximum acceleration?

- (A) 2
- (B) 20
- (C) 40
- (D) 55.8

Q50. What is the total mechanical energy of a spring oscillator with $k = 50 \text{ N/m}$ and amplitude 0.2 m?

- (A) 10
- (B) 5
- (C) 2
- (D) 1

Q51. A simple pendulum has a period of 1 s on Earth. What is its length? (Use $\pi = 3.14$, $g = 9.8 \text{ m/s}^2$.)

- (A) 0.78
- (B) 0.25
- (C) 9.8
- (D) 0.5

Q52. A 2 kg mass oscillates on a spring with period 2 s. What is the spring constant? (Use $\pi = 3.14$.)

- (A) 0.5
- (B) 19.72
- (C) 12.56
- (D) 9.86

Unit 8: Fluids

Q53. A force of 100 N acts uniformly over an area of 0.5 m^2 . What is the pressure?

- (A) 50
- (B) 100.5
- (C) 400
- (D) 200

Q54. What is the gauge pressure at a depth of 10 m in oil of density 800 kg/m^3 ? ($g = 9.8 \text{ m/s}^2$.)

- (A) 78400
- (B) 8000
- (C) 7840
- (D) 39200

Q55. A metal block of volume 0.05 m^3 is fully submerged in water (density 1000 kg/m^3). What is the buoyant force on it?

- (A) 50
- (B) 0.49
- (C) 490
- (D) 245

Q56. Water flows at 2 m/s through a pipe of cross-sectional area 0.08 m^2 , then enters a narrower section of area 0.02 m^2 . What is the speed in the narrower section?

- (A) 2
- (B) 0.5
- (C) 8
- (D) 4

Q57. Water flows through a pipe of area 0.02 m^2 at 1 m/s. What is the volume flow rate?

- (A) 0.02
- (B) 1.02
- (C) 0.04
- (D) 1.03

Q58. In a horizontal pipe, water speeds up from 3 m/s to 4 m/s. By how much does the pressure decrease? (Density of water = 1000 kg/m^3 .)

- (A) 1000
- (B) 500
- (C) 1750
- (D) 3500

Q59. What is the absolute pressure at a depth of 5 m in water? (Atmospheric pressure = 101000 Pa , density of water = 1000 kg/m^3 , $g = 9.8 \text{ m/s}^2$.)

- (A) 49000
- (B) 150000
- (C) 106000
- (D) 149000

Q60. A metal sample has mass 80 kg and volume 0.1 m^3 . What is its density?

- (A) 800
- (B) 8
- (C) 0
- (D) 400

Answer Key

Q1: C	Q11: B	Q21: A	Q31: C	Q41: D	Q51: B
Q2: D	Q12: A	Q22: D	Q32: C	Q42: A	Q52: B
Q3: B	Q13: C	Q23: B	Q33: A	Q43: C	Q53: D
Q4: B	Q14: D	Q24: A	Q34: D	Q44: C	Q54: A
Q5: D	Q15: B	Q25: C	Q35: B	Q45: A	Q55: C
Q6: A	Q16: B	Q26: D	Q36: A	Q46: D	Q56: C
Q7: C	Q17: D	Q27: B	Q37: C	Q47: B	Q57: A
Q8: C	Q18: A	Q28: B	Q38: D	Q48: A	Q58: D
Q9: A	Q19: C	Q29: D	Q39: B	Q49: C	Q59: B

Q10: D	Q20: C	Q30: A	Q40: B	Q50: D	Q60: A
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