

# AP Physics 1

## Sample Question Paper - 2024

Country: US | Duration: 3 hours | Max Marks: 5-point scale | Language: English

Negative Marking: No | Total Questions: 40 | QuizVerse AI Tutor

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### General Instructions:

1. This paper contains 40 questions across 1 section(s): Physics.
2. Duration: 3 hours. Maximum marks: 5-point scale.
3. Negative marking: No.
4. Read each question carefully before answering.

### Section 1: Physics (40 Questions)

**Q1. A convex lens of focal length 18 cm forms a real image of an object placed 46 cm away. The image distance is:**

- (A) 35 cm
- (B) 19 cm
- (C) 25 cm
- (D) 34 cm

**Q2. A body of mass 4 kg is moving in a circle of radius 8 m at 19 m/s. The centripetal force is:**

- (A) 176 N
- (B) 124 N
- (C) 65 N
- (D) 146 N

**Q3. A car of mass 1229 kg moving at 56 m/s brakes to rest in 7 s. The braking force is:**

- (A) 5716 N
- (B) 11583 N
- (C) 10834 N
- (D) 14865 N

**Q4. A projectile is launched at 45 degrees with initial velocity 36 m/s. The time of flight is approximately:**

- (A) 4.3 s
- (B) 1.6 s
- (C) 2.4 s
- (D) 2.5 s

**Q5. A block of mass 6 kg slides down a frictionless incline of angle 37 degrees. The acceleration is:**

- (A) 6.6 m/s<sup>2</sup>
- (B) 5.2 m/s<sup>2</sup>
- (C) 6.8 m/s<sup>2</sup>
- (D) 4.1 m/s<sup>2</sup>

**Q6. In photoelectric effect, the stopping potential for light of wavelength 252 nm on a metal with work function 3.7 eV is:**

- (A) 2.45 V
- (B) 3.34 V
- (C) 1.49 V
- (D) 3.59 V

**Q7. Two capacitors 10  $\mu\text{F}$  and 6  $\mu\text{F}$  are connected in series. The equivalent capacitance is:**

- (A) 2.11  $\mu\text{F}$
- (B) 4.84  $\mu\text{F}$
- (C) 3.31  $\mu\text{F}$
- (D) 2.91  $\mu\text{F}$

**Q8. The de Broglie wavelength of an electron accelerated through 50 V is approximately:**

- (A) 2.48 Angstrom
- (B) 2.67 Angstrom
- (C) 1.06 Angstrom
- (D) 2.95 Angstrom

**Q9. An ideal gas at 295 K is heated at constant pressure to 678 K. The ratio of final to initial volume is:**

- (A) 2.3
- (B) 1.5
- (C) 2.4
- (D) 1.5

**Q10. Two masses 7 kg and 12 kg are connected by a string over a frictionless pulley. The acceleration of the system is:**

- (A) 2.75  $\text{m/s}^2$
- (B) 1.05  $\text{m/s}^2$
- (C) 4.57  $\text{m/s}^2$
- (D) 3.30  $\text{m/s}^2$

**Q11. The electric field at 1 m from a point charge of 10  $\mu\text{C}$  is:**

- (A) 5784 N/C
- (B) 4338 N/C
- (C) 2935 N/C
- (D) 6300 N/C

**Q12. A spring with  $k = 494 \text{ N/m}$  is compressed by 0.17 m. The stored PE is:**

- (A) 16.40 J
- (B) 22.76 J
- (C) 18.25 J
- (D) 20.63 J

**Q13. A convex lens of focal length 21 cm forms a real image of an object placed 23 cm away. The image distance is:**

- (A) 38 cm
- (B) 18 cm
- (C) 35 cm
- (D) 55 cm

**Q14. Two capacitors 9  $\mu\text{F}$  and 9  $\mu\text{F}$  are connected in series. The equivalent capacitance is:**

- (A) 4.38  $\mu\text{F}$
- (B) 4.96  $\mu\text{F}$
- (C) 3.34  $\mu\text{F}$
- (D) 1.37  $\mu\text{F}$

**Q15. Two capacitors 9  $\mu\text{F}$  and 8  $\mu\text{F}$  are connected in series. The equivalent capacitance is:**

- (A) 3.56  $\mu\text{F}$
- (B) 4.24  $\mu\text{F}$
- (C) 2.11  $\mu\text{F}$
- (D) 2.76  $\mu\text{F}$

**Q16. A radioactive substance has half-life 20 days. The fraction remaining after 14 days is:**

- (A)  $1/4$
- (B)  $1/32$
- (C)  $1/16$
- (D)  $1/16$

**Q17. A radioactive substance has half-life 30 days. The fraction remaining after 33 days is:**

- (A)  $1/8$
- (B)  $1/16$
- (C)  $1/16$
- (D)  $1/4$

**Q18. The current through a 11 ohm resistor connected to a 12 V battery is:**

- (A) 2.51 A
- (B) 2.22 A
- (C) 2.50 A
- (D) 2.81 A

**Q19. A car of mass 1565 kg moving at 25 m/s brakes to rest in 7 s. The braking force is:**

- (A) 15156 N
- (B) 17916 N
- (C) 6209 N
- (D) 6477 N

**Q20. The focal length of a concave mirror is 21 cm. An object at 25 cm forms image at:**

- (A) 15 cm, real inverted
- (B) 34 cm, real inverted
- (C) 53 cm, real inverted
- (D) 47 cm, real inverted

**Q21. A solenoid of 145 turns and length 0.1 m carries current 4 A. The magnetic field inside is:**

- (A) 1.19 mT
- (B) 17.15 mT
- (C) 16.56 mT
- (D) 9.69 mT

**Q22. A wire of resistance 11 ohm is bent into a circle. Effective resistance between diametrically opposite points is:**

- (A) 7 ohm
- (B) 2 ohm
- (C) 4 ohm
- (D) 3 ohm

**Q23. A Carnot engine operates between 461 K and 327 K. Its efficiency is:**

- (A) 63%
- (B) 46%
- (C) 69%
- (D) 35%

**Q24. A ball is dropped from height 90 m. Its velocity just before hitting the ground is:**

- (A) 32.6 m/s
- (B) 28.3 m/s
- (C) 35.8 m/s
- (D) 35.0 m/s

**Q25. The electric field at 3 m from a point charge of 6  $\mu\text{C}$  is:**

- (A) 1784 N/C
- (B) 8811 N/C
- (C) 672 N/C
- (D) 7047 N/C

**Q26. The work function of a metal is 1.6 eV. The threshold frequency is:**

- (A)  $11.96 \times 10^{14}$  Hz
- (B)  $10.62 \times 10^{14}$  Hz
- (C)  $9.14 \times 10^{14}$  Hz
- (D)  $3.11 \times 10^{14}$  Hz

**Q27. The escape velocity from a planet of mass  $8 \times 10^{24}$  kg and radius 6600 km is:**

- (A) 9.9 km/s
- (B) 14.3 km/s
- (C) 10.1 km/s
- (D) 14.9 km/s

**Q28. The de Broglie wavelength of an electron accelerated through 50 V is approximately:**

- (A) 2.64 Angstrom
- (B) 1.53 Angstrom
- (C) 2.14 Angstrom
- (D) 1.20 Angstrom

**Q29. A body of mass 5 kg is moving in a circle of radius 8 m at 11 m/s. The centripetal force is:**

- (A) 51 N
- (B) 173 N
- (C) 113 N
- (D) 59 N

**Q30. Light passes from glass ( $n=1.6$ ) to air. The critical angle is:**

- (A) 42 degrees
- (B) 42 degrees
- (C) 46 degrees
- (D) 48 degrees

**Q31. A force of 38 N acts on a 19 kg body initially at rest. The velocity after 3 s is:**

- (A) 8 m/s
- (B) 13 m/s
- (C) 48 m/s
- (D) 14 m/s

**Q32. The work function of a metal is 3.3 eV. The threshold frequency is:**

- (A)  $10.83 \times 10^{14}$  Hz
- (B)  $6.65 \times 10^{14}$  Hz
- (C)  $9.88 \times 10^{14}$  Hz
- (D)  $7.25 \times 10^{14}$  Hz

**Q33. A spring with  $k = 388$  N/m is compressed by 0.15 m. The stored PE is:**

- (A) 15.02 J
- (B) 20.86 J
- (C) 4.98 J
- (D) 15.44 J

**Q34. A force of 64 N acts on a 17 kg body initially at rest. The velocity after 4 s is:**

- (A) 49 m/s
- (B) 7 m/s
- (C) 37 m/s
- (D) 26 m/s

**Q35. A Carnot engine operates between 765 K and 254 K. Its efficiency is:**

- (A) 58%
- (B) 52%
- (C) 65%
- (D) 30%

**Q36. The work function of a metal is 4.9 eV. The threshold frequency is:**

- (A)  $9.53 \times 10^{14}$  Hz
- (B)  $4.48 \times 10^{14}$  Hz
- (C)  $10.76 \times 10^{14}$  Hz
- (D)  $9.74 \times 10^{14}$  Hz

**Q37. A convex lens of focal length 16 cm forms a real image of an object placed 22 cm away. The image distance is:**

- (A) 25 cm
- (B) 51 cm
- (C) 15 cm
- (D) 45 cm

**Q38. An electron moves with velocity  $1 \times 10^6$  m/s perpendicular to a magnetic field of 0.2 T. The radius of its path is:**

- (A) 3.91 cm
- (B) 1.43 cm
- (C) 1.26 cm
- (D) 1.26 cm

**Q39. Light passes from glass ( $n=1.5$ ) to air. The critical angle is:**

- (A) 41 degrees
- (B) 47 degrees
- (C) 40 degrees
- (D) 39 degrees

**Q40. An electron moves with velocity  $3 \times 10^6$  m/s perpendicular to a magnetic field of 0.7 T. The radius of its path is:**

- (A) 0.85 cm
- (B) 1.21 cm
- (C) 2.99 cm
- (D) 3.79 cm

# Answer Key

Q1: (C)	Q2: (D)	Q3: (C)	Q4: (C)	Q5: (B)
Q6: (C)	Q7: (A)	Q8: (C)	Q9: (B)	Q10: (B)
Q11: (C)	Q12: (A)	Q13: (B)	Q14: (A)	Q15: (B)
Q16: (B)	Q17: (D)	Q18: (D)	Q19: (B)	Q20: (D)
Q21: (B)	Q22: (B)	Q23: (C)	Q24: (D)	Q25: (C)
Q26: (A)	Q27: (C)	Q28: (B)	Q29: (D)	Q30: (A)
Q31: (D)	Q32: (C)	Q33: (A)	Q34: (D)	Q35: (B)
Q36: (B)	Q37: (C)	Q38: (C)	Q39: (A)	Q40: (A)

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