

Quiz: Physics set 10

Q451: A particle starts from rest and moves with uniform acceleration. If it covers 20 m in the first 2 s, the acceleration is:

- A) 5 m/s²
- B) 10 m/s²
- C) 20 m/s²
- D) 2.5 m/s²

Q452: A body is projected vertically upward with speed 40 m/s. The time of flight ($g = 10 \text{ m/s}^2$) is:

- A) 4 s
- B) 6 s
- C) 8 s
- D) 10 s

Q453: Two forces of magnitudes 3 N and 4 N act at right angles. The magnitude of the resultant is:

- A) 5 N
- B) 7 N
- C) 1 N
- D) 12 N

Q454: The work done by a force of 10 N in moving a body through 2 m in the direction of force is:

- A) 5 J
- B) 10 J
- C) 20 J
- D) 40 J

Q455: A disc and a ring of same mass and radius roll down an inclined plane. Which reaches the bottom first?

- A) Disc
- B) Ring
- C) Both together
- D) Depends on angle

Q456: The angular momentum of a body remains constant when:

- A) No external torque acts
- B) No force acts
- C) Speed is constant
- D) Mass is constant

Q457: The acceleration due to gravity at a depth d below Earth's surface is proportional to:

- A) $(R - d)$
- B) $1/(R - d)$
- C) $R + d$
- D) $1/(R + d)$

Q458: The pressure at a depth h in a liquid of density ρ is given by:

- A) ρgh
- B) $\rho gh/h$
- C) gh/ρ
- D) $g/\rho h$

Q459: The dimensional formula of bulk modulus is the same as that of:

- A) Pressure
- B) Force
- C) Energy
- D) Density

Q460: For an isothermal expansion of an ideal gas, the work done is:

- A) $nRT \ln(V_2/V_1)$
- B) $P(V_2 - V_1)$
- C) Zero
- D) $nC_v \Delta T$

Q461: The frequency of a simple pendulum depends on:

- A) Length
- B) Mass of bob
- C) Amplitude
- D) Material of bob

Q462: The speed of sound in air increases when:

- A) Temperature increases
- B) Pressure decreases
- C) Density increases
- D) Humidity decreases

Q463: The electric field at the center of a uniformly charged spherical shell is:

- A) Zero
- B) Maximum
- C) Infinite
- D) Depends on charge

Q464: The SI unit of electric potential is:

- A) Volt
- B) Joule
- C) Coulomb
- D) Ampere

Q465: If a dielectric slab is introduced between capacitor plates, the capacitance:

- A) Increases
- B) Decreases
- C) Becomes zero
- D) Remains same

Q466: The drift velocity of electrons in a conductor is of the order of:

- A) 10^{-4} m/s
- B) 102 m/s
- C) 106 m/s
- D) 108 m/s

Q467: The magnetic field at the center of a circular coil of radius R carrying current I is:

- A) $\mu_0 I / 2R$
- B) $\mu_0 I / R$
- C) $\mu_0 I R$
- D) $\mu_0 / 2RI$

Q468: The force between two parallel current-carrying conductors is directly proportional to:

- A) Product of currents
- B) Distance between them
- C) Resistance
- D) Length only

Q469: The induced emf in a circuit is proportional to:

- A) Rate of change of magnetic flux
- B) Magnetic flux
- C) Area only
- D) Resistance only

Q470: In an AC circuit, the power factor is maximum when the circuit is:

- A) Purely resistive
- B) Purely inductive
- C) Purely capacitive
- D) LCR at high frequency

Q471: The focal length of a plane mirror is:

- A) Infinite
- B) Zero
- C) Positive
- D) Negative

Q472: The refractive index of a medium is equal to the ratio of:

- A) Speed of light in vacuum to that in medium
- B) Wavelengths in vacuum and medium
- C) Frequencies in vacuum and medium
- D) Both A and B

Q473: In Young's double slit experiment, the fringe width increases if:

- A) Wavelength increases
- B) Slit separation increases
- C) Screen distance decreases
- D) Source intensity decreases

Q474: The stopping potential in photoelectric effect depends on:

- A) Frequency of incident light
- B) Intensity of light
- C) Area of metal
- D) Time of exposure

Q475: The de Broglie wavelength of a particle is inversely proportional to:

- A) Momentum
- B) Velocity
- C) Mass
- D) Energy

Q476: The radius of a nucleus varies with mass number A as:

- A) $A^{(1/3)}$
- B) A
- C) $1/A$
- D) A^2

Q477: The energy released in nuclear reactions is due to:

- A) Mass defect
- B) Charge defect
- C) Volume defect
- D) Energy absorption

Q478: The half-life of a radioactive substance is independent of:

- A) Temperature
- B) Pressure
- C) Chemical state
- D) Initial amount

Q479: The conductivity of a semiconductor increases with:

- A) Increase in temperature
- B) Decrease in temperature
- C) Increase in pressure
- D) Decrease in pressure

Q480: In an n-type semiconductor, the majority charge carriers are:

- A) Electrons
- B) Holes
- C) Protons
- D) Ions

Q481: The SI unit of angular momentum is:

- A) $\text{kg}\cdot\text{m}^2/\text{s}$
- B) $\text{kg}\cdot\text{m}/\text{s}$
- C) $\text{N}\cdot\text{m}$
- D) $\text{J}\cdot\text{s}$

Q482: The center of mass of an isolated system moves with constant velocity due to conservation of:

- A) Linear momentum
- B) Energy
- C) Angular momentum
- D) Force

Q483: The SI unit of torque is:

- A) N·m
- B) J
- C) W
- D) kg·m²

Q484: The speed of sound in air is maximum when air is:

- A) Hot
- B) Cold
- C) Dry
- D) At low pressure

Q485: The electric potential at infinity due to a point charge is:

- A) Zero
- B) Infinite
- C) Maximum
- D) Minimum

Q486: The magnetic field inside a toroid is:

- A) Confined within core
- B) Zero everywhere
- C) Uniform outside
- D) Maximum outside

Q487: An AC generator converts:

- A) Mechanical energy into electrical energy
- B) Electrical into mechanical
- C) Thermal into electrical
- D) Chemical into electrical

Q488: The power factor of a purely resistive AC circuit is:

- A) 1
- B) 0
- C) 0.5
- D) Depends on frequency

Q489: The magnification produced by a plane mirror is:

- A) +1
- B) -1
- C) 0
- D) Depends on distance

Q490: The resolving power of a telescope increases when:

- A) Diameter of objective increases
- B) Wavelength increases
- C) Focal length decreases
- D) Intensity increases

Q491: The work function of a metal depends on:

- A) Nature of metal
- B) Intensity of light
- C) Frequency of light
- D) Time of exposure

Q492: The energy of a photon is given by:

- A) $h\nu$
- B) hc
- C) h/λ
- D) Both A and C

Q493: The decay constant of a radioactive element depends on:

- A) Nature of nucleus
- B) Temperature
- C) Pressure
- D) Chemical state

Q494: The Fermi level in an intrinsic semiconductor lies:

- A) At mid-gap
- B) Near conduction band
- C) Near valence band
- D) Outside bands

Q495: The logic gate whose output is 0 only when all inputs are 1 is:

- A) NAND
- B) AND
- C) OR
- D) NOR

Q496: The SI unit of capacitance is named after:

- A) Faraday
- B) Tesla
- C) Henry
- D) Ampere

Q497: The phenomenon responsible for mirage is:

- A) Total internal reflection
- B) Refraction
- C) Diffraction
- D) Scattering

Q498: The SI unit of electric current density is:

- A) A/m^2
- B) A/m
- C) C/m^2
- D) V/m

Q499: The magnetic susceptibility of a diamagnetic material is:

- A) Negative
- B) Positive
- C) Zero
- D) Infinite

Q500: Faraday's law of electromagnetic induction states that induced emf is proportional to:

- A) Rate of change of magnetic flux
- B) Magnetic field strength
- C) Area of coil
- D) Resistance of circuit