

Quiz: Physics set 13

Q602: A particle moves with acceleration $a = 6 - 2t$ (m/s²). If its velocity at $t = 0$ is 4 m/s, the velocity at $t = 2$ s is:

- A) 8 m/s
- B) 10 m/s
- C) 12 m/s
- D) 14 m/s

Q603: A projectile is launched with speed 25 m/s at 37 deg. The maximum height reached ($g = 10$ m/s², $\sin 37 \text{ deg} = 0.6$) is:

- A) 9 m
- B) 11.25 m
- C) 15 m
- D) 18.75 m

Q604: A 2 kg block moving at 6 m/s collides elastically with a stationary 4 kg block. The speed of the 2 kg block after collision is:

- A) -2 m/s
- B) -4 m/s
- C) 0 m/s
- D) 2 m/s

Q605: The work done by force $F = 5x$ (N) from $x = 0$ to $x = 4$ m is:

- A) 20 J
- B) 30 J
- C) 40 J
- D) 50 J

Q606: For pure rolling of a ring, the ratio of rotational KE to translational KE is:

- A) 1
- B) 1/2
- C) 2
- D) 1/3

Q607: The total mechanical energy of a satellite in circular orbit of radius r is:

- A) $-GMm/2r$
- B) $-GMm/r$
- C) $GMm/2r$
- D) Zero

Q608: Terminal velocity of a sphere in a viscous liquid is inversely proportional to:

- A) Viscosity
- B) Radius
- C) Density difference
- D) Gravity

Q609: The dimensional formula of Young's modulus is:

- A) $ML^{-1}T^{-2}$
- B) MLT^{-2}
- C) M^0LT^{-2}
- D) ML^2T^{-2}

Q610: In an isobaric process for an ideal gas, the work done is:

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

Q611: The phase difference between displacement and acceleration in SHM is:

- A) π
- B) $\pi/2$
- C) 0
- D) 2π

Q612: The speed of sound in a gas is proportional to:

- A) $\sqrt{\gamma T}$
- B) T
- C) $1/\sqrt{T}$
- D) Pressure

Q613: The electric field due to a point charge varies with distance r as:

- A) $1/r^2$
- B) $1/r$
- C) r
- D) r^2

Q614: Capacitance of a parallel plate capacitor is independent of:

- A) Charge on plates
- B) Plate area
- C) Plate separation
- D) Dielectric constant

Q615: Drift velocity of electrons in a conductor is proportional to:

- A) Electric field
- B) Potential only
- C) Length
- D) Area

Q616: The magnetic field at the center of a circular coil with N turns is proportional to:

- A) NI
- B) I/R
- C) N/R
- D) R

Q617: The SI unit of magnetic flux density is:

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

Q618: The induced emf in a coil is zero when:

- A) Flux is constant
- B) Flux is maximum
- C) Area is large
- D) Resistance is high

Q619: In an AC circuit, the average power consumed by a pure inductor is:

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

Q620: At resonance in an LCR circuit, the current is:

- A) Maximum
- B) Minimum
- C) Zero
- D) Independent of R

Q621: The focal length of a concave mirror (by sign convention) is:

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

Q622: A convex lens forms a virtual image when the object is placed:

- A) Within focal length
- B) Beyond focal length
- C) At infinity
- D) At $2F$

Q623: In Young's double slit experiment, fringe width is proportional to:

- A) Wavelength
- B) Slit separation
- C) $1/\text{Screen distance}$
- D) Intensity

Q624: The stopping potential in photoelectric effect measures:

- A) Maximum kinetic energy
- B) Intensity
- C) Work function only
- D) Frequency

Q625: The de Broglie wavelength of an electron accelerated through potential V is:

- A) $h/\sqrt{2meV}$
- B) h/eV
- C) $\sqrt{2meV}/h$
- D) $h/2meV$

Q626: The binding energy per nucleon is highest for:

- A) Iron
- B) Helium
- C) Uranium
- D) Hydrogen

Q627: The SI unit of activity of a radioactive sample is:

- A) Becquerel
- B) Gray
- C) Sievert
- D) Curie

Q628: The conductivity of a semiconductor increases with increase in:

- A) Temperature
- B) Pressure
- C) Length
- D) Area

Q629: In a p-n junction diode, the depletion layer is formed due to:

- A) Diffusion of carriers
- B) Drift only
- C) External field
- D) Heating

Q630: The current gain in common emitter configuration is:

- A) beta
- B) alpha
- C) gamma
- D) delta

Q631: The dimensional formula of electric field is:

- A) $MLT^{-3}I^{-1}$
- B) MLT^{-2}
- C) $MT^{-2}I^{-1}$
- D) LT^{-1}

Q632: The escape speed from Earth is independent of:

- A) Mass of the body
- B) Mass of Earth
- C) Radius of Earth
- D) Gravitational constant

Q633: The coefficient of viscosity of a liquid decreases with:

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

Q634: The electric potential inside a conducting sphere is:

- A) Constant
- B) Zero
- C) Maximum at center
- D) Minimum at surface

Q635: The magnetic field inside a long solenoid is:

- A) Uniform
- B) Zero
- C) Non-uniform
- D) Infinite

Q636: The power factor of an AC circuit is:

- A) cosphi
- B) sinphi
- C) tanphi
- D) 1/phi

Q637: A concave mirror forms a virtual image when the object is placed:

- A) Between pole and focus
- B) Beyond focus
- C) At center of curvature
- D) At infinity

Q638: The refractive index of a medium is inversely proportional to:

- A) Speed of light in medium
- B) Wavelength
- C) Frequency
- D) Amplitude

Q639: The work function of a metal is expressed in:

- A) eV
- B) J
- C) W
- D) N

Q640: The energy of a photon is given by:

- A) hnu
- B) hc
- C) h/lambda
- D) Both A and C

Q641: The decay constant of a radioactive substance depends on:

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

Q642: The Fermi level in an intrinsic semiconductor lies:

- A) Midway between bands
- B) Near conduction band
- C) Near valence band
- D) Outside bands

Q643: The logic gate that outputs 1 when inputs are different is:

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

Q644: The SI unit of inductance is:

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

Q645: The phenomenon responsible for mirage is:

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

Q646: The SI unit of current density is:

- A) A/m²
- B) A/m
- C) C/m²
- D) V/m

Q647: Magnetic susceptibility of a diamagnetic substance is:

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

Q648: Faraday's law states that induced emf is proportional to:

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

Q649: The SI unit of magnetic moment is:

- A) A·m²
- B) T·m
- C) Wb
- D) N·m

Q650: 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

Q651: The SI unit of electric power is:

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

Q652: The blue colour of the sky is due to:

- A) Rayleigh scattering
- B) Reflection
- C) Refraction
- D) Diffraction