Physics Paper

1. The equation for angular velocity ω for a rotating object is given by $\omega = \frac{v}{r}$, where v is the linear velocity and r is the distance from axis of rotation. We can conclude that:
    a. ω is inversely proportional to r
    b. ω is directly proportional to r
    c. ω is independent of r
    d. r is inversely proportional to ω

2. Suppose you shake hands with your friend. What kind of force did you both exert?
    a. Gravitational Force
    b. Electromagnetic Force
    c. Strong Nuclear Force
    d. Weak Nuclear Force

3. A particle oscillates in X-axis following the equation: $x = A + Bsin\omega t$. The amplitude of the oscillation is:
    a. A
    b. B
    c. $\sqrt{A^2 + B^2}$
    d. A+B

4. A wire can sustain 50 kg before it ruptures. Suppose the wire is cut into two equal parts, each part can sustain a weight of:
    a. 50 kg
    b. 25 kg
    c. 100 kg
    d. 20 kg

5. A solenoid has length L = 1.5 m and inner diameter of d = 2.5 cm and it carries a current I = 6 A. It consists of 3 closed-packed layers, each with 500 turns along the length L. What is the magnetic field B at its center?
    a. 0.004 T
    b. 0.006 T
    c. 0.005 T
    d. 0.007 T

6. A sound wave is refracted passing from glass to water to glass again. Which of the following parameters remain unchanged?
    a. Frequency
    b. Wavelength
    c. Wave number
    d. Velocity of wave

7. The diameter of Jupiter is roughly 1.3×10^8m and distance from earth is 8.7×10^{11}m. We take a lens of focal length 30 cm. What will be the radius of the image of Jupiter formed by the lens?
    a. 1.8 μm
    b. 2.8 μm
    c. 3 μm
    d. 2.2 μm

8. Aviakul Aviation Academy is in Greater Kailash, South Delhi. Suppose you are in a class in academy and start playing with a magnetic compass. You notice a certain angle of dip of the magnetic dip. As you move towards North Pole from South Delhi, the angle of dip will:
    a. Remain same
    b. Increase
    c. Decrease
    d. Insufficient Data

9. An electron is subjected to very high magnetic field. The electron will move in:
    a. Direction parallel to magnetic field
    b. Direction perpendicular to magnetic field
    c. Direction opposite to the magnetic field
    d. None of the above

10. A stone is dropped with no initial velocity and at the same a horizontal projectile is launched with an initial velocity of 10 m/s. The vertical distance covered by stone and horizontal projectile at any given time will be:
    a. Same
    b. Stone will cover more vertical distance compared to horizontal projectile
    c. Stone will cover less vertical distance compared to horizontal projectile
    d. No correlation

Answer Key

1. C
2. B
3. B
4. A
5. D
6. A
7. D
8. B
9. D
10. A