Class: XI   **Subject: Physics**

Q1. What is the Moment of Inertia of a circular ring about its tangent in its plane?

Q2. Moment of Force and Work done by a force have same units. What is the difference between them?

Q3. Which physical quantity is represented by the product of the moment of inertia & the angular velocity?

Q4.What is moment of inertia of a solid sphere about its diameter?

Q5. A wire stretches a certain amount under a load. If the load & diameter are both increased to three times, find the stretch caused in the wire.

Q6. The terminal velocity of a sphere of radius r in a viscous fluid is v. What is the Terminal velocity of a sphere of radius 2r and of the same density in a viscous fluid?

Q7. If two circular discs of the same mass & thickness are made from metals of different densities, which disc will have the larger moment of inertia about its central axis? Explain.

Q8. How does an ice-skater, a ballet dancer or an acrobat take advantage of the principle of conservation of angular momentum?

Q9. Discuss the variation of 'g' with altitude.

Q10.A steel wire of length 4 m & diameter 5 mm is stretched by 5 Kg-wt. Find the increase in its length if the Young's modulus of steel wire is 2.4×10^{12} dyne/cm^2.

Q11. Define terminal velocity. Show that the terminal velocity v of a sphere of Radius r, density ρ falling vertically through a viscous fluid of density σ & coefficient of viscosity η is given by

$$V = \frac{2}{9} \frac{(\rho - \sigma)r^2 g}{\eta}$$

Explain its cases also.

Q12. A body weighs 63 N on the surface of the Earth. What is the Gravitational force on it due to the Earth at a height equal to half the radius of the Earth?

Q13. A Steel wire of length 4.7 m & cross-section 3×10^{-5} m^2 stretches by the same amount as a Copper wire of length 3.5 m & cross-section 4×10^{-5} m^2 under a given load. What is the ratio of the Young's modulus of Steel to that of Copper?

Q14. Derive Stoke's law dimensionally.

Q15. What do you understand by 'Escape velocity'? Derive an expression for it in terms of parameters of given planet.

Q16.A wire is stretched by a certain amount under a load. If the load and radius both are increased to four times, find the stretch caused in the wire.

Q17. A liquid drop of radius 4 mm breaks into 1000 identical drop. Find the change in surface energy. S = 0.07 N/m.

Q18. The velocity of water in a river is 18 Km/h near the surface. If the river is 5 m deep ,find the shearing stress between horizontal layers of water. The coefficient of viscosity of water is 10^{-2} poise.

Q19.(i) With the help of a suitable diagram, explain the stress-strain relationship in the wire.
   (ii) Derive an expression for viscous force acting on the body.

Q20. (a)Glcerine flows steadily through a horizontal tube of length 1.5 m and radius 1 cm. If the amount of glycerine collected per second at one end is 4×10^{-3} Kg/s, what is the pressure difference between the two ends of the tube? (Density of glycerine , ρ = 1.3×10^3 Kg/m^3 and viscosity of glcerine , η = 0.83 Pas)