

1. Write the dimensional equation for coefficient of dynamic viscosity using its formula.
2. If the coefficient of restitution equals to one explain the behaviour of motion of the colliding bodies having equal masses with reason.
3. The position vectors of two bodies of masses 2 kg and 3 kg are given as $2\mathbf{i} + 3\mathbf{j} + 5\mathbf{k}$ and $3\mathbf{i} - 5\mathbf{j} + 7\mathbf{k}$. Find the position vector of centre of mass of the system.
4. What is Chandrasekhar limit and mention its value in terms of solar mass?
5. What is surface tension of a liquid and mention effect of temperature on it?
6. Write any two applications of Bernoulli's theorem.
7. Why the glass beaker breaks when cold water sprinkled on it?
8. What is triple point of water?
9. State Newton's law of cooling. Which one cools faster, body 'A' at higher temperature or body 'B' at lower temperature kept in the same environment or surroundings.
10. State Stephen's law of radiation and express it in mathematical form.
11. State the law of conservation of Energy and verify it in the case of freely falling object. Calculate the total energy of the body mass 5 kg which is freely falling from a height of 100m, at the highest point and at middle and at the lowest point.
12. Explain the concept of moment of inertia. Derive an expression for the moment of Inertia about an axis passing through the centre of a rectangular lamina and parallel to its breadth.
13. Explain the procedure to determine the coefficient of apparent expansion of a liquid using specific gravity bottle with relevant theory
14. Define the coefficients of real expansion and apparent expansion of liquid. Establish a relation between them?
15. Define two molar specific heats of gas, and deduce the relation between them.
16. State Newton's law of cooling and describe an experiment to verify the Newton's law of cooling.
17. Show that the motion of simple pendulum is simple harmonic and hence derive an equation for its time period. What is seconds pendulum?
18. A stone is dropped from a height of 300m and at the same another stone is projected vertically upwards with a velocity of 100ms^{-1} . Find when and where the two stones meet?
19. State parallelogram law of vector addition and derive an expression for its magnitude.
20. Obtain an expression for the acceleration of a body moving down a rough inclined plane.