

8. An aeroplane gets its upward lift due to a phenomenon described by the _____.
- a) Archimedes' principle
b) Buoyancy principle
c) Bernoulli's principle
d) Pascal law
9. For an isochoric process _____.
- a) Pressure is constant
b) Temperature is constant
c) Volume is constant
d) None of these
10. Relation between N/m^2 and dyne/cm^2 _____.
- a) $1\text{N} = 10^5 \text{ dyne}$
b) $1\text{N} = 10^7 \text{ dyne}$
c) $1\text{N} = 10^{-5} \text{ dyne}$
d) $1\text{N} = 10^{-7} \text{ dyne}$

Q2) Answer the following

(Any 10)

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- Discuss the gravitational force.
- Compare mass and weight.
- Calculate the unit vector $\vec{r} = (4\vec{i} - 2\vec{j} + 6\vec{k})$.
- Explain the term collisions.
- State first law of thermodynamics.
- Define critical temperature and critical volume.
- What is geothermal energy?
- State any one postulate of kinetic theory of gasses.
- What is the pressure on a swimmer 11 m below the surface of the lake?
(Given $\text{Pa} = 1.013 \times 10^5 \text{ N/m}^2$)
- Define gravitational potential energy.
- Water flows through a horizontal pipe of varying cross-section at the rate of $30\text{m}^3/\text{min}$. Determine the velocity of water at a point where the radius of pipe is 15 cm.
- State Pascal's law.

Q3) Answer the following.

(Any 4)

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- The position of ball dropped from rest from a top of tower is given by $x = 5t^2 + 4$. Calculate the magnitude of velocity of the ball at $t = 2$ second.
- A bullet of mass 25 gm was moving with a speed 400 m/sec. After passing through a solid substance, it continues to move at the rate of 100m/sec. How much work the bullet had to do in passing through a solid substance.
- Obtain equation of continuity. Explain energy of flowing liquid.
- A 1.2 liter of hydrogen at 137°C and 10^6 dyne/cm^2 pressure expands isothermally, until its volume is doubled. Find the pressure of the gas.
- Calculate the change in the melting point of ice at 273 K when pressure is increased by 1 atmosphere. The latent heat of fusion is 80 kcal/kg. The specific volume of ice at 273 k is $1.09 \times 10^{-3} \text{ m}^3/\text{kg}$ and that of water at the same temperature is $1 \times 10^{-3} \text{ m}^3/\text{kg}$. (Given- $1 \text{ atm} = 1.013 \times 10^5 \text{ N/m}^2$)
- State second law of thermodynamics. Explain the concept of entropy and obtain the relation for it.