Class : 9th

Subject : Physics

Chapter : 6 (Mechanical Properties of Matter)

New Book Punjab Board

Short Answer Questions

6.1. Why heavy animals like an elephant have a large area of the foot?

Ans. Heavy animals like elephants have large feet to distribute their weight over a large area. This reduces the pressure exerted on the ground preventing them from sinking into soft surfaces and minimizing damage to the ground. Pressure in inversely proportional to area. A larger area results in lower pressure for the same force (weight).

6.2. Why animals like deer who run fast have a small area of the foot?

Ans. Animals like deer that run fast have small feet to minimize the surface area in contact with the ground. This reduces friction, allowing for faster and more efficient movement. A smaller area means less surface area for friction to act up and increase speed.

6.3. Why is it painful to walk bare footed on pebbles?

Ans. Walking bare foot on pebbles is painful because the small, sounded surface of the pebbles concentrate pressure on soles of feet, causing discomfort and pain.

6.4. State Pascal's law. Give an application of Pascal's law.

Ans. Pascal law: When pressure is applied at one point in an enclosed fluid, it is transmitted equally to all parts of liquid without loss.

Applications:

(i) Hydraulic Brakes

(ii) Hydraulic press

(iii) Water pumps

6.5. State what do you mean by elasticity of a solid.

Ans. Elasticity of a solid refers to its ability to return to its original shape or size after an external force, which caused deformation, is removed.

6.6. What is Hooke's law? Does an object remain elastic beyond elastic limit? Give reason.

Ans.

Hooke's Law: The force required to stretch or compress a spring by a distance is proportional to that distance.

Elastic Limit: No, an object does not remain elastic beyond its elastic limit. Once the elastic limit exceeded, the object undergoes plastic deformation and does not return to its original shape.

6.7. Distinguish between force and pressure.

Ans.

Force : A push or pull that causes an object to change its state of motion. Force is a vector quantity.

Pressure : Pressure is defined as the force exerted normally on unit area of an object. Pressure is a scalar quantity.

6.8. What is the relationship between liquid pressure and the depth of the liquid?

Ans. Liquid pressure increases linearly with depth. The deeper you go in a liquid, the greater the pressure. This is because the weight of the liquid above increases with depth.

6.9. What is basic principle to measure the atmospheric pressure by a simple. mercury barometer?

Ans. A simple mercury barometer measures atmospheric pressure based on the principle that the weight of the mercury column in the barometer is balanced by th atmospheric pressure acting on the surface of the, mercury in the reservoir. The height of the mercury column is directly proportional to the atmospheric pressure.

6.10. State the basic principle used in the hydraulic brake system of the automobiles.

Ans. The basic principle used in the hydraulic brake system of automobiles is pascal's principle define as when pressure is applied at one point in an enclosed fluid, it is transmitted equally to all parts of liquid without loss.

Constructed Response Questions.

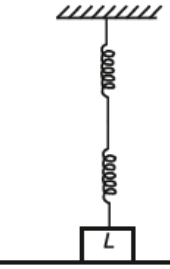
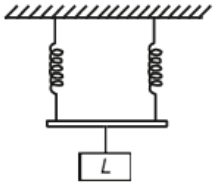
6.1. A spring having spring constant k hangs vertically from a fixed point. A load of weight L, when hung from the spring, causes an extension x, the elastic limit of the spring is not exceeded.

Some identical springs, each with spring constant k, are arranged as shown below:

For each arrangement, complete the table by determining:

(i) the total extension in terms of x.

(ii) the spring constant in terms of k.

Arrangement	Total Extension x	Spring constant (k) of the arrangement
	x	K
	x	2 K

6.2. Springs are made of steel instead of iron. Why?

Ans. Springs are made of steel instead of iron because steel has a higher elastic limit, than iron, which means it can with stand greater stresses and deformation without permanently deforming.

6.3. Which of the following material is more elastic?

(a) Iron or rubber (b) Air or water

Ans

. (a) Iron or rubber: Rubber is more elastic than iron.

(b) Air or water: Air is more elastic than water.

6.4. How does water pressure one metre below the surface of swimming pool compare to water pressure one metre below the surface of a very large and deep lake?

Ans. The water pressure one meter below the surface of swimming pool and a very large and deep lake is the same. This is because water pressure depend only on depth, not on the volume or size of the body of water.

6.5. What will happen to the pressure in all parts of a confined liquid if pressure is increase in one part. Give an example in your daily life by where such principle is applied.

Ans. According to pascal's law, If pressure is increased in one part of a confined liquid, the pressure will increase equally in all parts of the liquids.

Example: Hydraulic brake in vehicles, where pressure applied to brake pedal is transmitted equally to all four brakes.

6.6. If some air remains trapped within the top of the mercury column of the barometer which is supposed to be vacuum, how would it affect the height of the mercury column?

Ans. Trapped air in the barometer will reduce the height of mercury column as the air will exert pressure and oppose the weight of the mercury.

6.7. How does the long neck is not a problem to a giraffe while raising its neck suddenly?

Ans. The giraffe's long neck has thick walls in its blood vessels, and a specialized circulatory system that maintains sufficient blood pressure to the brain even when the neck is raised suddenly.

6.9. Comment on the statement, "Density is a property of a material not the property of an object made of that material."

Ans. This statement is correct. Density is a characteristic property of a material itself regardless of the shape or size of the object made from that material

6.10. How the load of a large structure is estimated by an engineer?

Ans. Engineers estimate the load of a large structure using various methods, including finite element analysis (EFA), which involves dividing the structure into smaller elements and analyzing the forces acting on each element. They also consider material properties, structural design and anticipated loads (e.g wind, snow, occupancy).