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Question1:

**Dry friction:** Dry friction resists relative lateral motion of two solid surfaces in contact. The two regimes of dry friction are 'static friction' between non-moving surfaces, and kinetic friction (sometimes called sliding friction or dynamic friction) between moving surfaces. The Coulomb friction may take any value from zero up to one, and the direction of the frictional force against a surface is opposite to the motion that surface would experience in the absence of friction. Thus, in the static case, the frictional force is exactly what it must be in order to prevent motion between the surfaces; it balances the net force tending to cause such motion. In this case, rather than providing an estimate of the actual frictional force, the Coulomb approximation provides a threshold value for this force, above which motion would commence. This maximum force is known as traction. The force of friction is always exerted in a direction that opposes movement (for kinetic friction) or potential movement (for static friction) between the two surfaces. For example, a curling stone sliding along the ice experiences a kinetic force slowing it down. For an example of potential movement, the drive wheels of an accelerating car experience a frictional force pointing forward; if they did not, the wheels would spin, and the rubber would slide backwards along the pavement. Note that it is not the direction of movement of the vehicle they oppose; it is the direction of (potential) sliding between tire and road.

**Fluid Friction:** Fluid friction occurs between fluid layers that are moving relative to each other. This internal resistance to flow is named viscosity. In everyday terms, the viscosity of a fluid is described as its "thickness". All real fluids offer some resistance to shearing and therefore are viscous. It is helpful to use the concept of an inviscid fluid or an ideal fluid that offers no resistance to shearing and so is not viscous.

**Examples of Fluid Friction**

- If there is a wet surface between two thin glass plates, you will notice that plates get stuck and the bottom plate doesn't fall when you hold only the top one.
- When any object is dropped in a fluid, the extent of splash is depended on the fluid friction of that particular fluid.
- You find lighter dust particles move fast on the surface of a flowing river. This is due to the high-velocity gradient at the top layer of water due to lower dynamic fluid friction at that layer.

## **Question 2 :**

**Wedges:** A wedge is a triangular shaped tool, and is a portable inclined plane, and one of the six classical simple machines. It can be used to separate two objects or portions of an object, lift up an object, or hold an object in place.

**Square-Threaded Screws:** Square threads are used for screw jacks, presses and clamping devices. Trapezoidal and acme threads are used for lead-screw and other power transmission devices in machine tools. Buttress threads are used in vices, where force is applied only in one direction.

**Journal Bearings:** In industry, the use of journal bearings is specialized for rotating machinery both low and high speed. Journal bearings are used widely to support the shafts in industrial machinery involving heavy loads, such as compressors, turbines and centrifugal pumps.