**QUESTION 1**

**It is generally considered that in engineering application problem, there are no perfectly frictionless surfaces. Explain these two types of friction; dry friction and fluid friction and give practical examples.**

* **Dry Friction: is a force that opposes the relative lateral motion of two solid surfaces in contact. Dry friction is subdivided into static friction ("stiction") between non-moving surfaces, and kinetic friction between moving surfaces. With the exception of atomic or molecular friction, dry friction generally arises from the interaction of surface features, known as asperities .E.g. the wearing-off of your slipper soles and even the grip between your bike tires and the road, which is required for the wheel to rotate and for you to cycle forward.**
* **Fluid Friction: describes the friction between layers of a viscous fluid that are moving relative to each other. E.g. 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**

**Explain the following types of machines;**

**Wedges**

**Square-Threaded Screws**

**Journal Bearings**

**ANS**

**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. It functions by converting a force applied to its blunt end into forces perpendicular (normal) to its inclined surfaces. The mechanical advantage of a wedge is given by the ratio of the length of its slope to its width. Although a short wedge with a wide angle may do a job faster, it requires more force than a long wedge with a narrow angle.**

**Square -Threaded Screws:** **The square thread form is a common screw thread form, used in high load applications such as leadscrews and jackscrews. It gets its name from the square cross-section of the thread. It is the lowest friction and most efficient thread form, but it is difficult to fabricate.**

**Journal Bearings:**

**Definition - What does Journal Bearing mean?**

**A Journal Bearing is a comprehensive kind of bearing that contains a journal or shaft that freely rotates in a support with a shell or metal sleeve. In the bearing there are no rolling elements present. The construction and design of these bearings is very simple but the operation and theory is complicated. The Journal Bearing is designed in a plain or straight configuration along with a flange that accommodates the combination of axial and radial loads with the corrosion resistant coatings and materials. These are offered in a water resistant and high temperature series.**