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DEPARTMENT : MECHANICAL

COURSE : MECHANICS OF MACHINE

QUESTION 1

Explain DRY friction and FLUID friction and give practical examples

QUESTION2

Explain the following types of machines

WEDGES

SQUARE-THREADED SCREWs

JOURNAL BEARING

ANSWER

FRICTION: Is the force resisting the relative motion of a solid surfaces , fluid layers, and material elements sliding against each other.

Formula for FRICTIONAL FORCE: f=uN

F=friction force

U=coefficient of friction

N=normal force

There are four **types** of **friction**: static, sliding, rolling, and fluid friction

DRY FRICTION: Is a force that opposes the relative lateral motion of two solid surfaces in contact. Dry friction can be divided into

static friction and kinetic friction. Dry friction occurs when two surfaces come in contact with each other , forces are applied by each

surface on the other.

LAWs OF DRY FRICTION :The elementary property of sliding friction were discovered by some series of experiment and were

expressed as three empirical laws

·Amontons first Law :The force of friction is directly proportional to the applied load

·Amontons second Law :The force of friction is independent of the apparent area of the contact

· Coulombs Law of friction :Kinetic friction is independent of the sliding velocity

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. The force of FRICTION is always exerted in a direction that opposes movement.

Examples of dry friction: When a person is riding a bicycle and presses the brakes , the rough edges on the brake pads rubs the wheel

and it ends up slowing down the bicycle.

FLUID FRICTION:Is a force that resists motion either within the fluid itself or of another medium moving through the fluid. There is

internal friction , which is as a result of the interactions between molecules of the fluid ,and there is external friction, which refers to

how fluid interacts with other matter.

Example of FLUID friction :Air resistance is an example of fluid friction caused by the particles that makes up the air, an eagle soaring the air

QUESTION2

WEDGES: They can be used in many ways for cutting, splitting, tightening, or to hold back, to hold together, or for scraping such as snowplow or farm grader. HOW DO WEDGES WORK :Force is applied to the thick end of the wedge and the sloping sides of the wedge apply force to the object ,cutting it or splitting it apart .A wedge makes work easier by increasing the force applied to the object , although it applies the force over a short distance. Some examples of wedges that are used for separating might be shovel , a knife, an exe, a saw, a needle. But wedges can be used to hold things together as in the case of staple, push pins, tack, nails, doorstop, a shim. SQUARE-THREADED SCREWs: The square-threaded form is a common screw thread form , used in high load applications such as leadscrews and jackscrews. JOURNAL BEARING: Also known as sleeve bearings makes use of a pressure wedge of fluid that forms between the rotating shaft and the bearing. The portion of the shaft supported by the bearing is called JOURNAL and is usually hardened for wear-resistance. In industries, the major use of the journal bearing is for rotating machinery both low and high speed. Journal bearings are widely used to support the shafts in industrial machinery involving heavy loads, such as compressors, turbines and centrifugal pumps.