

Read and scan the texts on FORCES IN ENGINEERING and find:

FORCES IN ENGINEERING-1

- 1- The names of four important forces in engineering. **Buoyancy, elasticity, gravity, friction**
- 2- A **SPRING** exerts more force the more it is stretched.
- 3- An adverb meaning: toward a lower place, point, or level. **DOWNWARDS**
- 4- The name of the force on an object due to gravity. **WEIGHT**
- 5- An object is in equilibrium when **THE RESULTANT FORCE** is zero.
- 6- **NEWTON** is the unit of force
- 7- An adjective meaning: moving, pointing, or leading to a higher place, point, or level. **UPWARD**
- 8- **MASS**, which is measured in kilograms, is not a force, it is the quantity of matter in an object.
- 9- The opposite of help, synonym of obstacle: **HINDRANCE**
- 10- An inclined surface from a vertical or horizontal line. **SLOPE**

What is it?

- 1- It allows an object to float. **BUOYANCY**
- 2- It stretches a spring down. **WEIGHT**
- 3- It is a force exerted when an object is stretched. **ELASTICITY**
- 4- It is a force on an object because of gravity. **WEIGHT**

FORCES IN ENGINEERING 2

Complete the gaps and answer the questions as appropriate:

- 1- Engineers choose materials according to their capacity to **WITHSTAND** stresses without failure.
- 2- Name examples of structures which engineers design: **BUILDINGS, DAMS, AIRPLANES, AUTOMOBILES, TUNNELS, CHAIRS, BICYCLE FRAMES, TOYS**
- 3- What does **them** refer to?

Engineers design **structures**, such as buildings, dams, airplanes, automobiles, tunnels, chairs, bicycle frames and even toys to hold weight and withstand forces that are placed on **them** and that could tear **them** apart.

- 4- Why do engineers calculate the resulting internal stresses or forces of a structure? **TO MAKE A STRUCTURE STRONG ENOUGH TO CARRY THE LOADS WITHOUT BREAKING**
- 5- What are the types of loads that can act on a structure? **TENSION, COMPRESSION, SHEAR, BENDING AND TORSION**
- 6- Name an example of TENSION- **A CAR TOWING ANOTHER CAR WITH A CHAIN**

- 7- Name an example of **COMPRESSION-SQUEEZING A PIECE OF WOOD IN A VISE**
- 8- Name an example of **SHEAR-PRUNING SHEARS CUTTING THROUGH A BRANCH, PAPER-CUTTER CUTTING PAPER; PULLING ON TWO PIECES OF WOOD THAT ARE GLUED TOGETHER**
- 9- What is another name for a **TURNING FORCE? A MOMENT OF A FORCE**
- 10- What is the **MOMENT ARM? THE DISTANCE AT WHICH THE FORCE IS APPLIED, TAKEN FROM A FIXED POINT.**
- 11- When can a beam or pole “smile”? Why? **WHEN A TURNING FORCE CAUSES BENDING ON A POLE, BECAUSE IT PRODUCES BOTH TENSION AND COMPRESSION ON THE POLE**
- 12- When a structural member is twisted it is in **TORSION-**

FORCES IN ENGINEERING-COMPLEMENT

Find an **antonym** for:

- 1- Pushing - **PULLING**
- 2- Tension, traction- **COMPRESSION**
- 3- Inward - **OUTWARD**
- 4- Uniaxial compression- **BIAXIAL COMPRESSION**
- 5- Increase- **DECREASE**
- 6- Solid- **LIQUID/GAS**
- 7- Temporary- **PERMANENT**
- 8- Appear- **DISAPPEAR**
- 9- The former- **THE LATTER**

(FYI) FOR YOUR INFORMATION:

Traction, or tractive force, is **the force used to generate motion between a body and a tangential surface, through the use of dry friction**, though the use of shear force of the surface is also commonly used.

Tension Force is the force that is transmitted through a cable, rope, wire or string when it is pulled tight by forces acting from opposite ends.

In physics, tension is described as the pulling force transmitted axially by the means of a string, a cable, chain, or similar object, or by each end of a rod, truss member, or similar three-dimensional object; tension might also be described as the action-reaction pair of forces acting at each end of said elements. Tension could be the opposite of compression.