ODM EDUCATIONAL GROUP
Changing your Tomorrow

FORCE AND PRESSURE

CHAPTER NO.3

SUB: PHYSICS

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LEARNING OUTCOMES

- Students will be able to
- Define pressure.
- give examples of pressure from everyday experience
- To be able to use the basic formula to calculate pressure
- To be able to carry out a simple experiment to investigate the relationship between pressure and depth
- To recall that Pascal is the unit of pressure
- To rearrange the formula to correctly calculate force, area or pressure

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POINTS TO BE COVERED

- Thrust
- Pressure
- Units of pressure
- Factors affecting pressure.

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INTRODUCTION

- Define the term moment of force.
- State two factors which affect moment of force.

Factors affecting the turning of a body

- Magnitude of force.
- Perpendicular distance of the force from the pivoted point.

Examples:

- A person pushing a swing will make the swing rotate about its pivot.
- A worker applies a force to a spanner to rotate a nut.
- A person removes a bottle's cork by pushing down the bottle opener's lever.
- A force is applied to a door knob and the door swings open about its hinge.

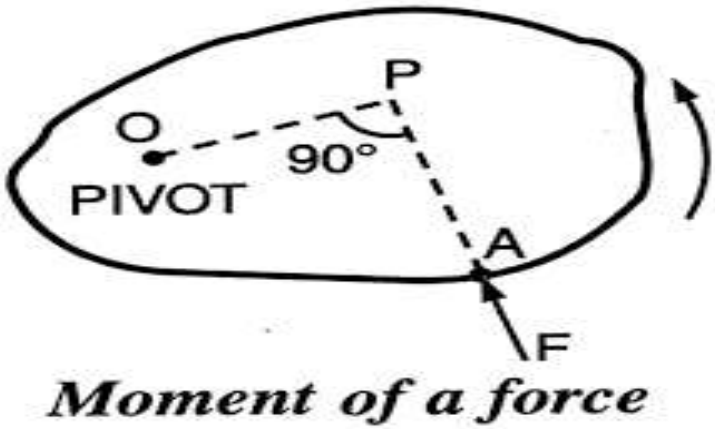
Force

•Moment of a force:

The moment of a force is equal to the product of the magnitude of the force and the perpendicular distance of the force from the pivoted point.

Moment of force about the point O

= F x OP



Moment of a force

Units Of Moment of Force

- Unit of moment of force:
- Sl unit: newton x metre
- CGS Unit: dyne x cm
- Nm = 10^7 dyne cm.
  - 1 kgf m = 9.8 Nm.
  - 1 gf cm = 980 dyne cm.

Pressure

Thrust:

- The force acting normally on a surface is called thrust.
- SI unit of thrust: newton.

Effect of thrust:

- Smaller the area, larger is the effect.
- Examples:
- If you stand on loose sand, your feet will sink deeply into sand, but when you lie on sand; your body does not sink much into the sand.

Examples of Thrust

- https://youtu.be/iwJUL3hUJmo

Pressure

- Definition of pressure:
- Pressure is defined as the thrust per unit area.
- P = Thrust/Area
- It is denoted by the letter P
- If the force increases, the pressure increases.
- If the area over which the force act decreases, the pressure increases.
- Units of pressure:
- The SI unit of pressure is pascal.
- Pa
- It is the pressure exerted by a force of 1N acting over an area of 1 sq m.
- 1 pa = 1N/sq.m
- The atmospheric pressure is expressed in a unit atm
- 1 atm = 76 cm of mercury = 1.013×10^5 pa.

Factors affecting pressure

Factors affecting pressure:

- On area of the surface on which thrust acts.
- On magnitude of thrust acting on the surface.
- Examples of pressure in our daily life:
- **It is easier to cut an apple with a knife.**
- The sharper the knife, the smaller is the area of contact.
- So, it exerts greater pressure, and it makes easier to cut that apple.
- **School bags have broad straps.**
- Because the area is more. So, it applies less pressure. So, the pain is less.
- **The tip of a sewing needle is very sharp.**
- So that it will have lesser area and it will exert more pressure and it will become easy to pierce a cloth.
- **Snow shoes stop you from sinking into snow.**
- Because their area of cross section is more. So they apply less pressure and prevent us from sinking into the snow.
- **War tanks move on caterpillar tracks which are broad chain like covers on the wheels.**
- This causes a large increase in the area of
- Contact with the ground. Due to this, the pressure on the ground reduces so much that the tanks can even move on soft wet grounds without sinking.

HOME ASSIGNMENT

- Exrcise:B-17,18,19

THANKING YOU

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