Chapter 13 - Reminder

1- The requirement of the **static equilibrium**: $\vec{F}_{net,x} = 0,\ \vec{F}_{net,y} = 0,\ \vec{\tau}_{net,z} = 0$ (**Normally you will have three formulas of three variables**)

2- **Modulus of elasticity** formula: **Stress = modulus × strain**

3- **Young's modulus** (E) is defined as: $\frac{F}{A} = E\ \frac{\Delta L}{L}$

4- **Shearing's modulus** (G) is defined as: $\frac{F}{A} = G\ \frac{\Delta x}{L}$

5- **Bulk modulus** of a hydraulic stress (B) is defined as: $P = \frac{F}{A} = B\ \frac{\Delta V}{V}$

Notice:
For any Hinge problem, it is better to take the torque at the hinge in order to reduce the number of variables.

Models of Free static force diagram

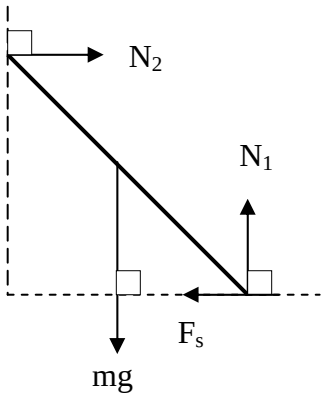

Fig. 1 (One ends of a ladder touching frictionless wall and the second touching friction floor)

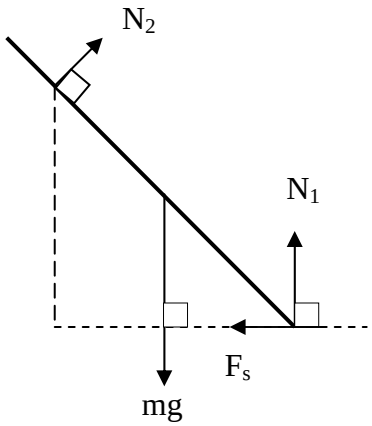

Fig. 2 (One ends of a ladder touching friction floor and point on it touching frictionless wall)

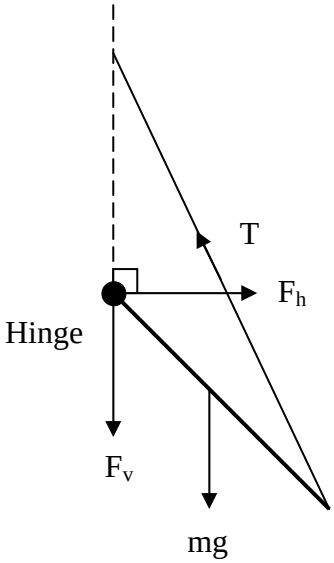

Fig. 3 (A rod connecting to a hinge and string)

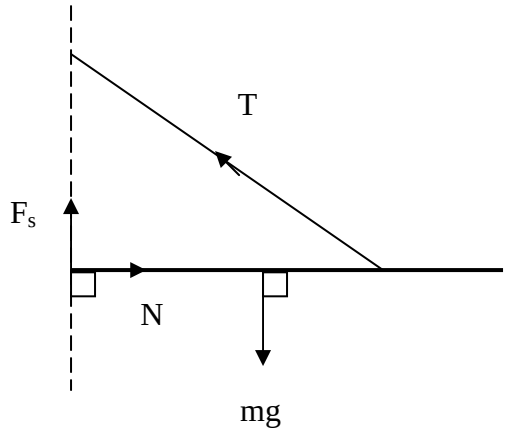

Fig. 4 (A rod is perpendicular to a friction wall and attached string)

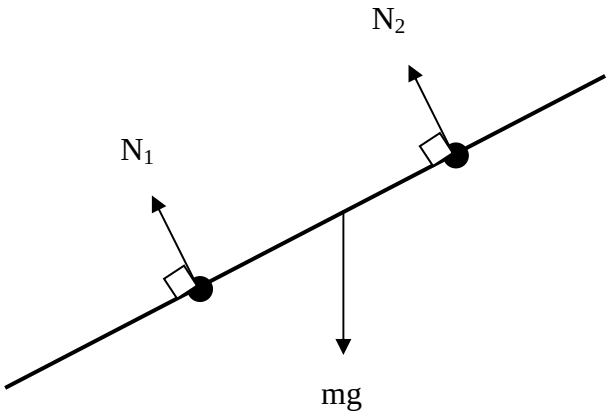

Fig. 5 (A rod is touching two points)

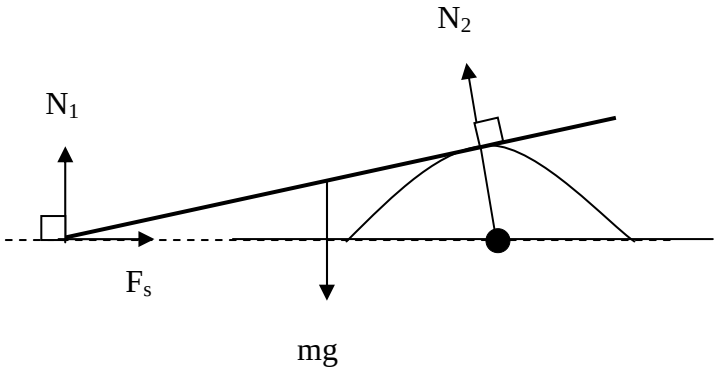

Fig. 6 (A rod is touching sooth half spherical shape on one point and friction floor on one ends)

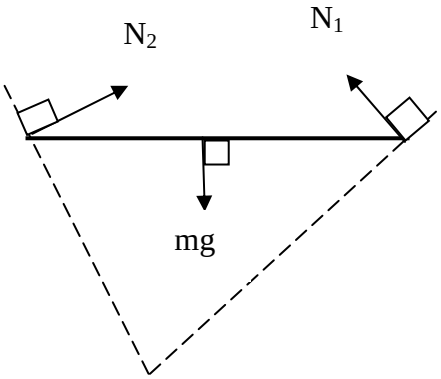

Fig. 7 (A rod is touching two incline planes)