

F_g , F_s , \mathcal{F}_s and \mathcal{F}_k Quiz 1

$$F_g = G \frac{m_1 m_2}{r^2}$$

$$G = 6.67 \times 10^{-11} \text{ (MKS units)}$$

$$F_s = kx \text{ (Hooke's Law)}$$

$$\mathcal{F}_k = \mu_k \mathcal{N}$$

$$\max \mathcal{F}_s = \mu_s \mathcal{N}$$

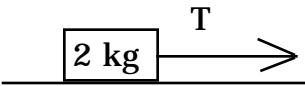
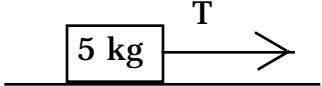
$$m_m = 7.36 \times 10^{22} \text{ kg} \quad r_m = 1.74 \times 10^6 \text{ m} \quad \text{moon}$$

$$m_e = 5.98 \times 10^{24} \text{ kg} \quad r_e = 6.38 \times 10^6 \text{ m} \quad \text{earth}$$

$$m_s = 1.99 \times 10^{30} \text{ kg} \quad r_s = 6.96 \times 10^8 \text{ m} \quad \text{sun}$$

$$r_{em} = 3.85 \times 10^8 \text{ m} \quad (\text{earth} - \text{moon distance})$$

$$r_{es} = 1.5 \times 10^{11} \text{ m} \quad (\text{earth} - \text{sun distance})$$

1. What is the magnitude of the force of gravity of the earth on the sun?
2. What is the gravitational attraction between two masses, 50 kg and 10⁴ kg, which are 2m apart?
3. Given a spring constant of k = 30 N/m, what is the magnitude of the spring force (F_s) when the spring is stretched 8 cm?
4. Find the spring constant (k) for a spring which stretches vertically .20m when a mass of 500g is attached to it.
5.  The block on the floor just slips when T = 15N. Find μ_s .
6.  Given $\mu_s = .5$, we notice the block does not move when T = 20N. Find \mathcal{F}_s .
7. Given $\mu_k = .4$, what force will push a 4 kg block across the floor at a constant speed?
8. Given $\mu_k = .3$, a block whose weight is 60N, and a rope with a tension of 48N pulling the block level with the ground across the floor, what is the acceleration of the block?