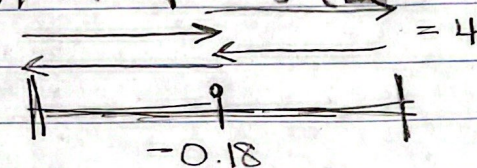


PHYSICS HOMEWORK: Pg. 3/7 #'s 1-3

#1: SHM AMPLITUDE - 0.18 m

$$0.18 \text{ m} \times 4 = 0.72 \text{ m} \quad \checkmark$$


The diagram shows a horizontal spring with a central equilibrium point. Two arrows above the spring indicate the amplitude of 0.18 m on both sides. Below the spring, a horizontal line with vertical end caps is labeled '-0.18'. Above this line, four arrows pointing left and right are labeled '= 4', representing four full cycles of oscillation.

#2: USE HOOKE'S LAW FOR SPRING CONSTANT

$$F = -kx \rightarrow k = \frac{-F}{x} \rightarrow$$

$$(\Delta W) = 180 \text{ N} - 75 \text{ N} = 105 \text{ N} \quad (\text{force})$$

$$(\Delta x) = 85 \text{ cm} - 65 \text{ cm} = 20 \text{ cm} \rightarrow 0.2 \text{ m} \quad (\text{disp.})$$

$$\rightarrow k = \frac{105 \text{ N}}{0.2 \text{ m}} = k = 525 \rightarrow \text{~~5.25} \times 10^2 \text{ N/m} \quad \checkmark~~$$

$$5.3 \times 10^2 \text{ N/m}$$

#3: MASS ^(CAR) = 1500 kg (m)
COMPRESSION = -5×10^{-3} m
MASS (driver) = 68 kg (m)

(USE HOOKE'S LAW FOR SPRING CONSTANT!)

$$\frac{F}{-x} = \frac{-kx}{-x} \rightarrow k = \frac{-F}{x} \rightarrow \frac{-(68 \text{ kg} \cdot 9.81 \text{ N})}{(5 \times 10^{-3})}$$

$$k = -1.33 \times 10^5 \text{ N/m} \quad \checkmark$$

$$\text{FREQUENCY: } f = \frac{1}{2\pi} \sqrt{k/m} \rightarrow \frac{1}{2\pi} \sqrt{\frac{1.33 \times 10^5}{(1500 + 68)}} \text{ Hz}$$
$$\approx f = 1.5 \text{ Hz}$$