TOSHKENT KIMYO-TEXNOLOGIYA INSTITUTI

SHAHRISABZ FILIALI

FIZIKA

Fanidan amaliy mashg’ulot

Mexanik tebranishlar. Mexanik to’lqinlar. To’lqin jarayonlari.

Shahrisabz-2020

Bahromova Anzura

1. 6.1. $x=A\sin\omega(t+\tau)$ tenglama bilan berilgan tebranishning davri T, Chastotasi υ va boshlang'ich fazasi φ aniqlansin. Bunda $\omega=2{,}5\pi\ s^{-1}$, $\tau=0{,}4$ s.

Berilgan

$x = A\sin\omega(t+\tau)$

$\tau = 0{,}4$ s

$\omega=2{,}5\pi\ s^{-1}$

T-?

υ-?

φ-?

Yechilishi

$T = \frac{2\pi}{\omega}$ (1) $T= \frac{2\pi}{2{,}5\ \pi\ s^{-1}} = 0{,}8$ s

$\upsilon = \frac{1}{T}$ (2) $\upsilon = \frac{1}{0{,}8\ \text{s}} = 1{,}25\ s^{-1}$

$\varphi = \omega t + \omega\tau$, $t=0$

$\varphi = \omega\tau$ (3) $\varphi = 2{,}5\pi\ s^{-1} 0{,}4\text{s} = \pi$

2. 6. 32 m=50 g massali moddiy nuqta tenglamasi x=Acosωt ko'rinishga ega bo'lgan tebranishlarni amalga oshiradi. Bunda A=10 sm, ω=5 s^{-1}. Quyidagi ikki hol uchun nuqtaga ta'sir etuvchi kuch topilsin: 1) faza ωt= $\frac{\pi}{3}$ bo'lgan moment uchun 2)nuqtaning eng ko'p siljigan holati uchun.

Berilgan

m=50 g = 50 ·10^{-3} kg

x=Acosωt

A=10 sm = 0,1

ω=5 s^{-1}

1) ωt= $\frac{\pi}{3}$; F_1-?

2) x_{max}; F_2-?

Yechilishi

1) ωt= $\frac{\pi}{3}$

a = x″= -Aω²cos (ωt)

F_1= ma = -mAω²cos (ωt)

2) x_{max}=A; a_{max}=- Aω²

F_2= - mAω²

F_1= - 50·10^{-3}·0,1·5^2 cos$\frac{\pi}{3}$ = -62,5 ·10^{-3} N

F_2= - 50·10^{-3}·0,1·5^2= -125·10^{-3} N

3. 6. 37 Urama prujinaga yukcha osdilar, buning natijasida prujina x = 9 s
ga cho'zildi. Agar yukcha pastga ozroq tortib qo'yib yuborilsa, unin
tebranish davri T qanday bo'ladi?

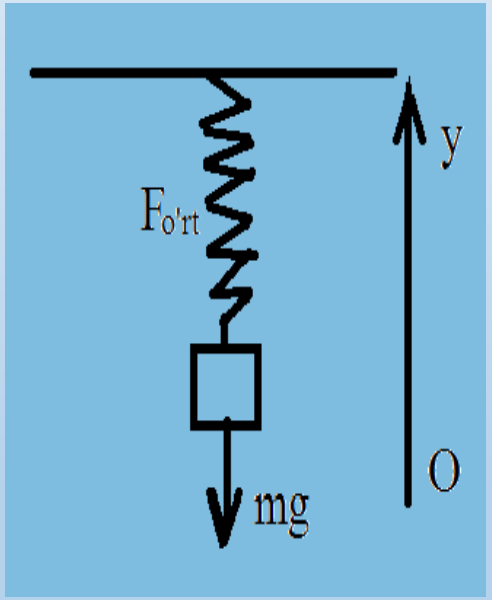
Berilgan

x=9 sm = 0,09 m

$g = 9{,}8\ \frac{m}{s^2}$

T-?

Chizma



Yechilishi

$$T = 2\pi\sqrt{\frac{m}{k}} \qquad (1)$$

oy: $F_{o`rt} - mg = 0$ (2)

$kx = mg;\ \frac{m}{k} = \frac{x}{g}$ (3)

$$T = 2\pi\sqrt{\frac{x}{g}} \qquad (4)$$

$$T = 2\cdot 3{,}14\sqrt{\frac{0{,}09}{9{,}8}} = 0{,}6\ s$$

Topshiriq

1. x=Asinω(t+τ) tenglama bilan berilgan tebranishning davri T, Chastotasi υ va boshlang’ich fazasi φ aniqlansin. Bunda ω=2,5π s^{-1} , τ = **n** s.

2. Agar **n** min da 150 tebranish bo’lib, tebranishlarning boshlang’ich fazasi 45^0 ga teng va amplitudasi 5 sm bo’lgan garmonik tebranma harakat tenglamasini yozing.

3. Massasi 10 g bo’lgan moddiy nuqta x= **n** $\sin(\frac{\pi t}{3}+\frac{\pi}{4})$ sm tenglama bo’yicha tebranadi. Nuqtaga ta’sir etuvchi maksimal kuchni va tebranayotgan nuqtaning to’la energiyasini toping.

Izoh**:** **n** sonining o’rniga har bir talaba o’zining jurnaldagi nomerini masalaga qo’yib ishlaydi.

E’tiboringiz uchun rahmat!