$$f = \frac{1}{T} = \frac{1}{3} = 1.5 \text{ Hz}$$

d) 
$$x = 4\cos(3\pi(0.250) + \pi)$$
  
 $x = 2.83m$ 

$$7 = 12 = 2.49$$

b) 
$$f = 1 = 1$$
  
 $T = 2.4$   
 $f = 0.417 Hz$ 

c) 
$$\omega = 2\pi \hat{s}$$
  $\omega = 2.62 \text{ ad/s}$   $\omega = 2.62 \text{ ad/s}$ 

(3) A 200g block is attached to a horizontal spring and executes simple harmonic motion with a period of 0.250s. Total energy is 2.00 J.

a) the force constant of the spring.

W= 1K

W= 2X

 $W = 2\pi$  T  $W = 2\pi = 25.13 \text{ ad/s}$  6.25  $W = 25.13 = \frac{k}{\sqrt{0.2}}$ 

K= 126.3 N/m

b) E = 1 K xm² 2

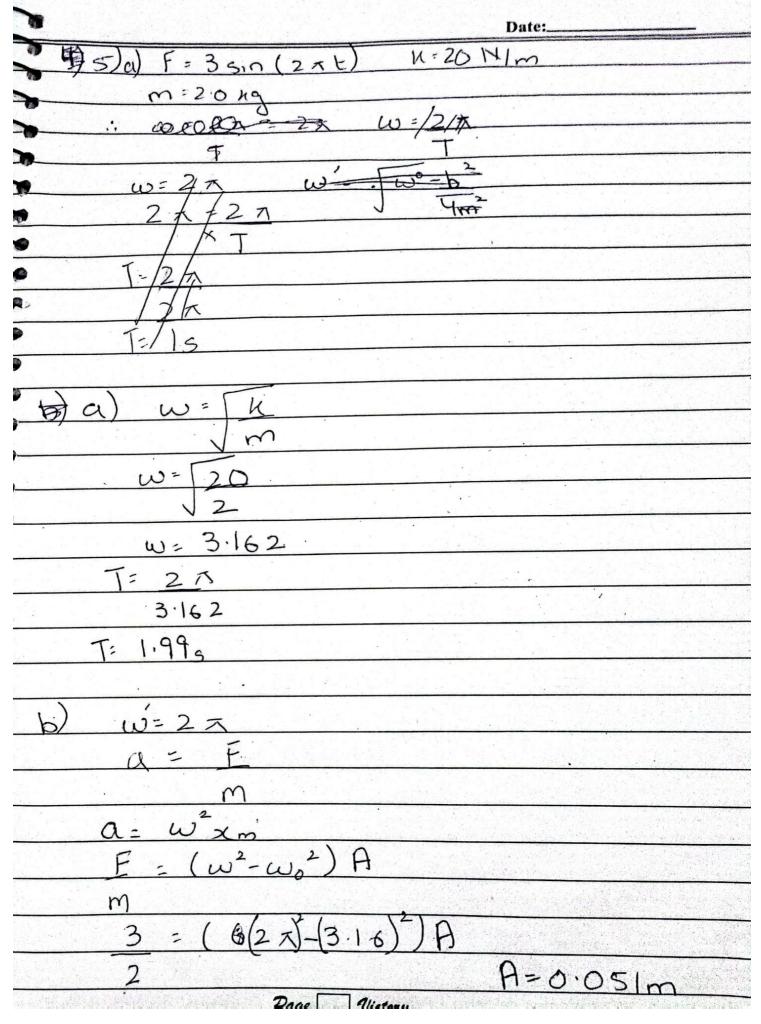
 $2 = 1 (126.3) (x_m)^2$ 

(xm)= 003167 xm=0178m

4

21 = 0.200m amplifude m= 2 kg F = 20. N F= Koc a) 20 = k (0.200) 6 w= 7.07 rad/s 7.07=2x} 2 \* V= Xmw V = 0.2 (7.07) there is maximum velocity Dage Wictory

Date: · a= - xmw a = - 0.2 (7.07 a=-9.996 = 10m/s Maximum acceleration occurs at maximum displacement i.e x=±0.2m



6 1 a) w= 2xf 43.977 = f f = 6.999 = 7 Hz = 1 ( 1 KA2 E: 10.58 = 10.65

2(= xm (05 (Wt + Ø) Vs=4. V=5 V=-xmw sin (wt+Ø) in wsin (wt + 1) =5 sin (w/6)+ Ø 4 = sin(0) 0=53.0.927 rad At capuilibrium position 8) 1 (2) (85) 85 cm/s = 0.85 m/s K (-=1 (2) (0.85) = 0.7225 J  $^{2}$  2=  $b(20)^{2}$ b = 5x10-3 J/cm2 U= 0.7225 = 5×10-3×2 x=12.cm a) The mass does turn back before reaching 15cm

b) It torns beck at x=12 cm