

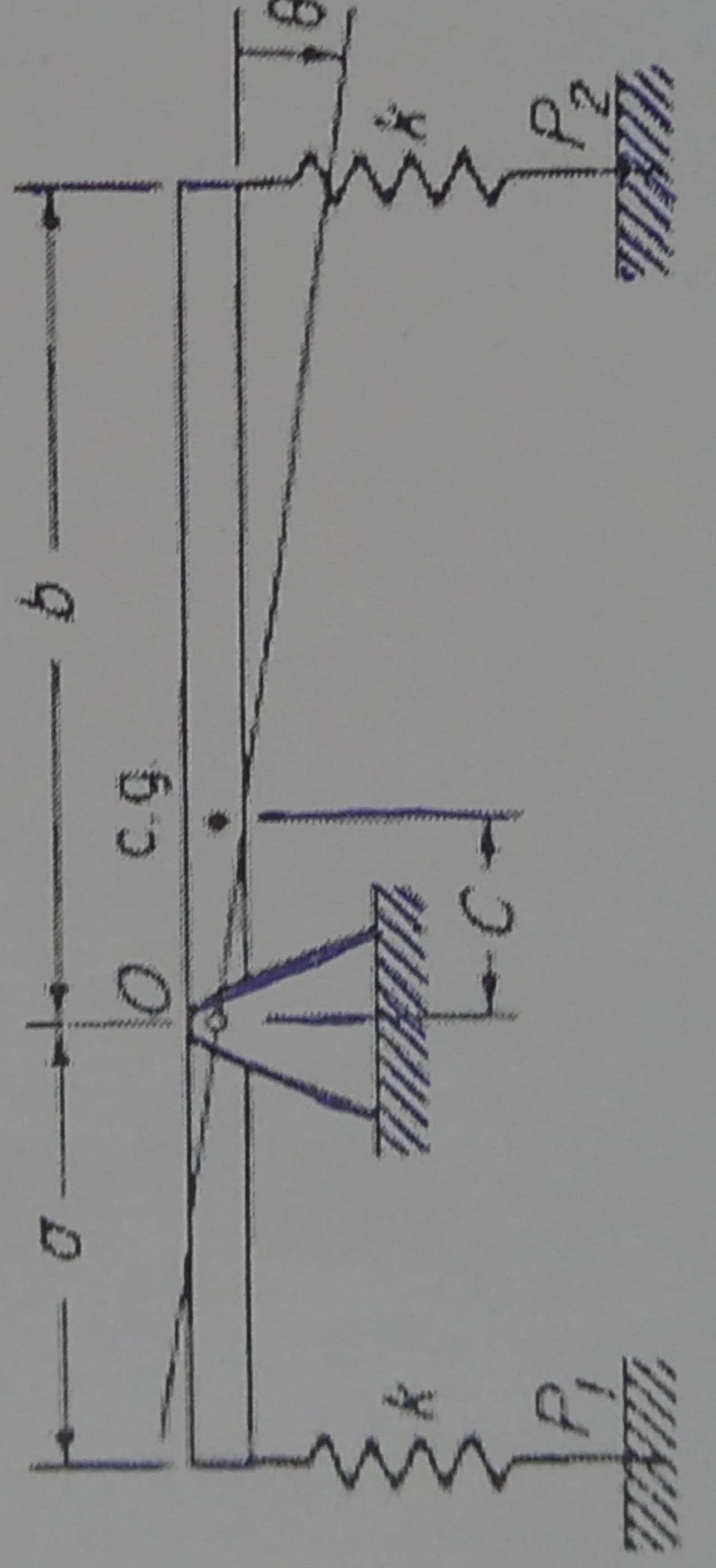
الإمتحان النهائي ربيع 2022	كلية الهندسة – جامعة مصراتة
التاريخ: 2022/06/15 ف	إسم المقرر: اهتزازات ميكانيكية 1
الزمن : 3 ساعات	رقم المقرر: هـ . مك 409
	القسم : الهندسة الميكانيكية

(10 points for each question)

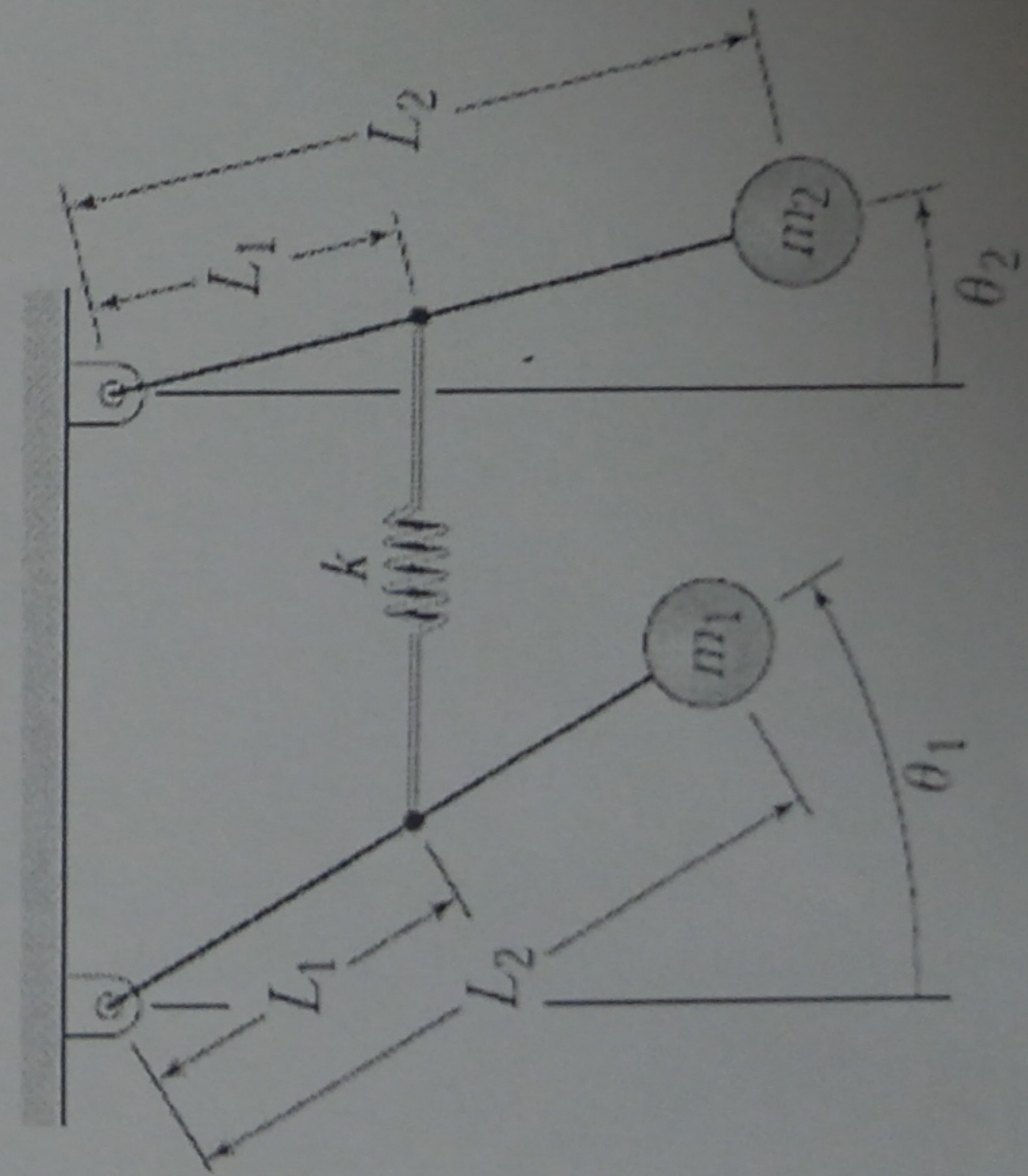
1. An accelerometer indicates that a structure is vibrating harmonically at 82 cps with a maximum acceleration of  $50g$ . Determine the amplitude of vibration?  
 حلها  
 اكتب  
 اقل  
 اكبر  
 مقياس الاهتزاز  
 $w = 82 \text{ cps}$   
 $f(A)$   
 توافق

2. A harmonic motion has a frequency of 10 cps and its maximum velocity is  $4.57 \text{ m/s}$ . Determine its amplitude, its period, and its maximum acceleration?  
 $w = 10 \text{ cps}$   
 $U_{\text{max}} = 4.57 \text{ m/s}$   
 مقياس الاهتزاز  
 الزمن الدوري  
 $a_{\text{max}}$

3. The figure below shows a uniform bar pivoted about point O with spring of equal stiffness k at each end. The bar is horizontal in the equilibrium position with spring forces P1 and P2. Determine the equation of motion and its natural Frequency?



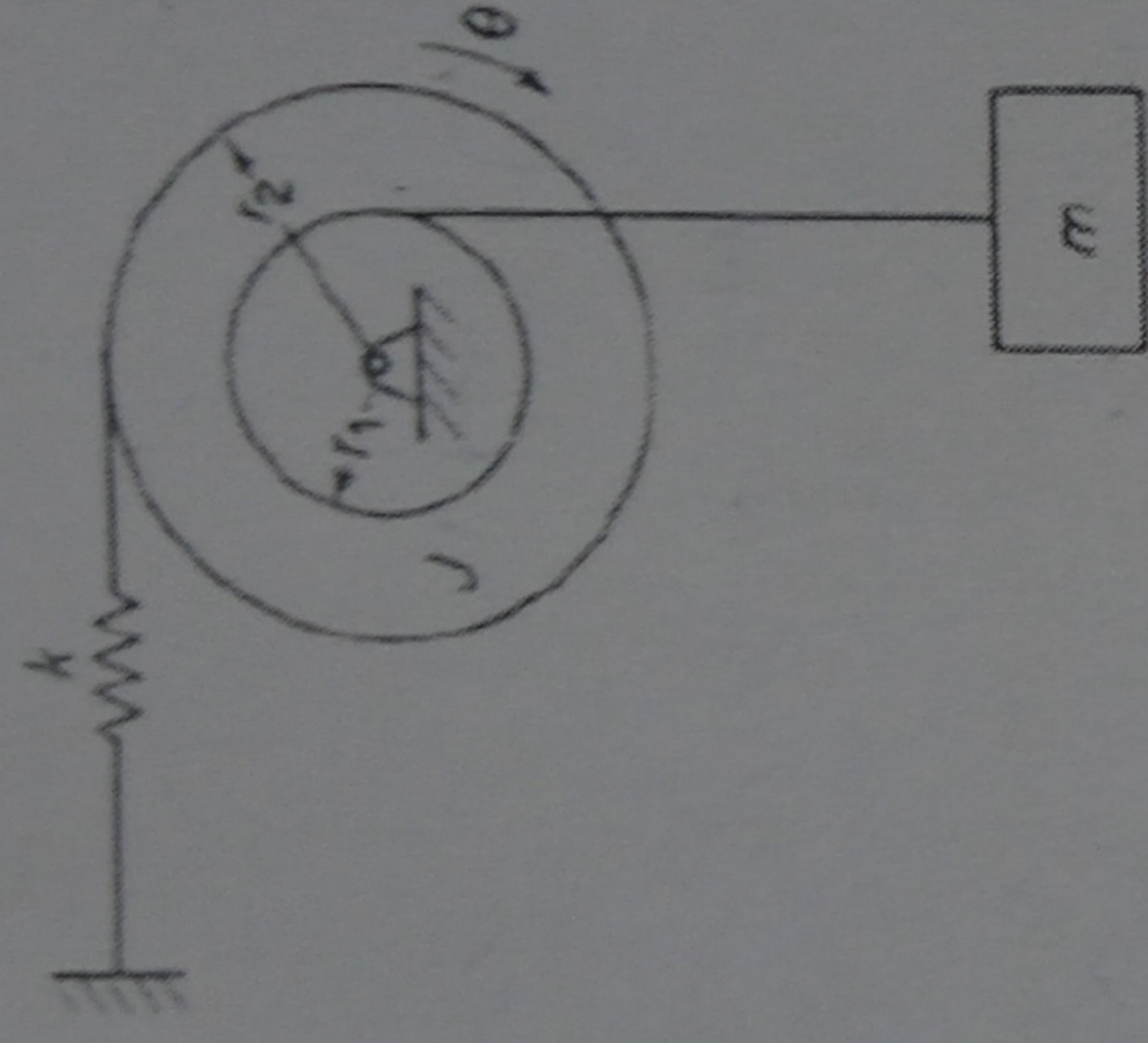
4. In the Figure below, when  $\theta_1 = \theta_2 = 0$  the spring is at its free length. Derive the equations of motion, assuming small angles?



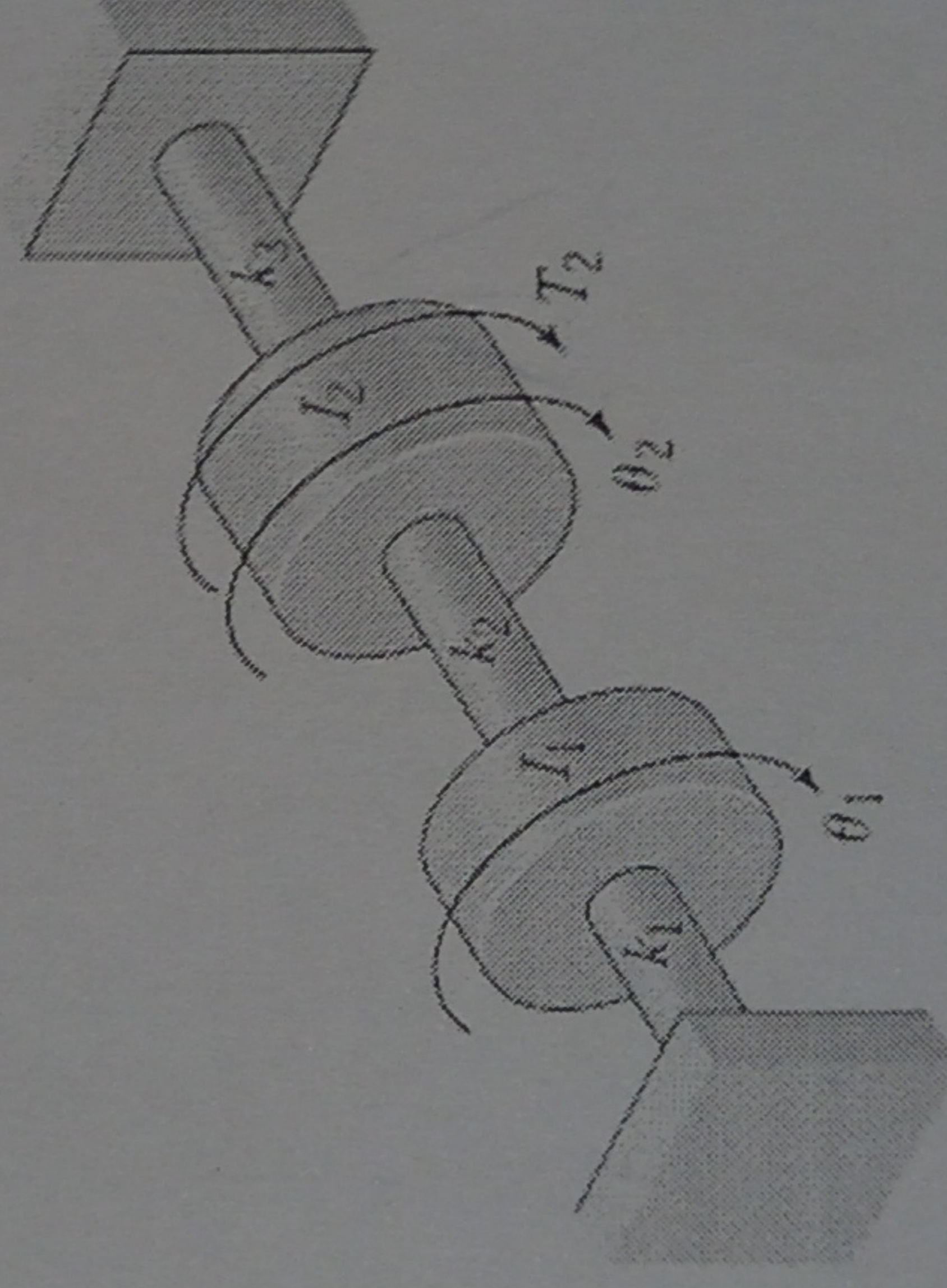


April 16, 2022

5. Determine the natural frequency of the system shown in Figure below using the energy method?



6. In the figure below model the three shafts as massless torsional springs. When  $\theta_1 = \theta_2 = 0$  the springs are at their free lengths. Derive the equations of motion with the torque  $T_2$  as the input.



انتهت الأسئلة