



Princess Sumaya جامعة  
University الأميرة سميرة  
for Technology للتكنولوجيا

## PHYSICS LAB

(20147)

### Experiment No. 7

#### Simple Harmonic Motion II Combination of Two Springs

Name: ..... Reg. No. ( )

Partner Name: ..... Class ( )

Date / / 20 Mark ( )

## Simple Harmonic Motion. Combination of two springs

### 1. Objectives:

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### 2. Apparatus:

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### 3. Data:

a. Complete the following tables

#### 1. Single spring 1

Original Length of the spring  $L_o =$  \_\_\_\_\_ cm

No.	Mass M (gm)	Length of the spring L (cm)	Elongation of the spring $X = L - L_o$ (cm)
1			
2			
3			
4			
5			
6			
7			
8			
9			

## 1. Single spring 2

Original Length of the spring  $L_o =$  \_\_\_\_\_ cm

No.	Mass M (gm)	Length of the spring L (cm)	Elongation of the spring $X = L - L_o$ (cm)
1			
2			
3			
4			
5			
6			
7			
8			
9			

b) Plot a graph of M against x on a graph paper for spring 1. From the graph, find the spring constant  $k_1$

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c) Plot a graph of  $M$  against  $x$  on a graph paper for spring 2. From the graph, find the spring constant  $k_2$

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d) Complete the following table for the two springs in series:

No.	Mass $M$ (gm)	Length of the spring $L$ (cm)	Elongation of the spring $X = L - L_0$ (cm)
1			
2			
3			
4			
5			
6			
7			
8			
9			

e) Complete the following table for the two springs in **parallel**:

No.	Mass M (gm)	Length of the spring L (cm)	Elongation of the spring $X = L - L_0$ (cm)
1			
2			
3			
4			
5			
6			
7			
8			
9			

f) Plot a graph of F against x on a graph paper for two springs in series. From the graph, find the equivalent spring constant  $k_e$ .

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g) Plot a graph of F against x on a graph paper for two springs in parallel. From the graph, find the equivalent spring constant  $k_e$ .

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**e)** Calculate the theoretical values of  $k_e$ :

1. In case of series connection.

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2. In case of parallel connection.

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**f)** Calculate the percentage error in the value of  $k_e$  in each case.

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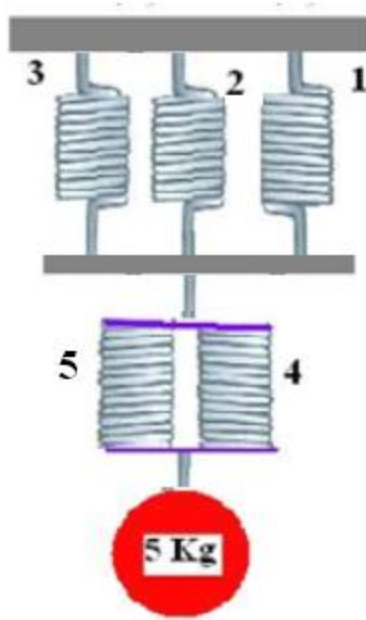
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## Questions:

1. A spring of force constant 10000 dyne/cm is cutting into 5 identical pieces and rearranged as shown in the figure below. A mass of 5 kg is hanged at the lower end and set to vibrate about its equilibrium position.



a) Find the equivalent force constant ( $k_{eq}$ ) of the combination.

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b) Find the period of vibration.

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