3 When a force F is applied to a spring with stiffness k, the elastic potential energy stored is E.

What is the elastic potential energy stored when a force $2F$ is applied to a spring with stiffness $2k$?

☒ **A** $\frac{E}{2}$

☒ **B** E

☒ **C** $2E$

☒ **D** $8E$

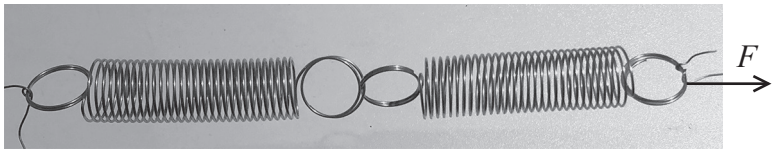
(Total for Question 3 = 1 mark)

Questions 3 and 4 refer to the following information.

A horizontal force F is applied to a horizontal spring, fixed at one end.

The stiffness of the spring is k and the elastic strain energy stored is E.

A second, identical spring is added and the same force is applied to the combination of springs, as shown.



3 What is the stiffness of the combination of springs?

- ☒ **A** $\frac{k}{2}$
- ☒ **B** k
- ☒ **C** $2k$
- ☒ **D** $4k$

(Total for Question 3 = 1 mark)

4 What is the elastic strain energy stored for the combination of springs?

- ☒ **A** $\frac{E}{2}$
- ☒ **B** E
- ☒ **C** $2E$
- ☒ **D** $8E$

(Total for Question 4 = 1 mark)

5 A mass of 24 kg is suspended from a steel wire of length 1.5 m. The wire has cross-sectional area $3.1 \times 10^{-6}\,m^2$.

The Young modulus of steel is 1.8×10^{11} Pa.

Which of the following gives the extension of the wire?

☒ **A** $\dfrac{24 \times 1.5}{1.8 \times 10^{11} \times 3.1 \times 10^{-6}}$

☒ **B** $\dfrac{24 \times 9.81 \times 1.5}{1.8 \times 10^{11} \times 3.1 \times 10^{-6}}$

☒ **C** $\dfrac{1.8 \times 10^{11} \times 3.1 \times 10^{-6}}{24 \times 1.5}$

☒ **D** $\dfrac{1.8 \times 10^{11} \times 3.1 \times 10^{-6}}{24 \times 9.81 \times 1.5}$

(Total for Question 5 = 1 mark)

6 The diagram shows a source of sound waves and an observer.