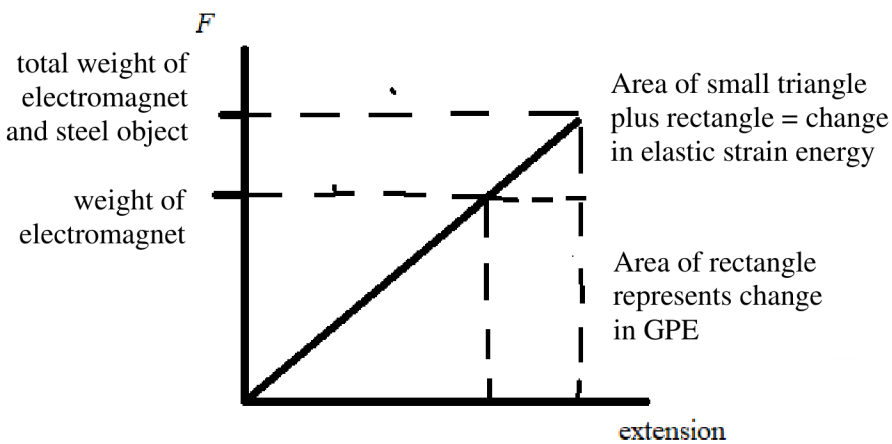
Question Number	Answer	Mark
16(a)	They act on the same object **(1)** They are not the same type of force **(1)**	**2**
16(b)(i)	Use of $\varepsilon = \frac{\Delta x}{x}$ **(1)** Use of $F = k\Delta x$ **and** $\sigma = \frac{F}{A}$ **(1)** Use of $E = \frac{\sigma}{\varepsilon}$ [allow a method using $E = \frac{kx}{A}$ for 3 marks] **(1)** $E = 2.1 \times 10^{11}$ Pa **(1)** Example calculation $\Delta x = 3 \times 10^{-4} \times 3.8$ m $= 1.14 \times 10^{-3}$ m $F = 2.8 \times 10^{7}$ N m^{-1} $\times 1.14 \times 10^{-3}$ m $= 3.19 \times 10^{4}$ N $\sigma = \frac{3.19 \times 104 \text{ N}}{5.1 \times 10^{-4} \text{ m}^2} = 6.26 \times 10^{7}$ Pa $E = \frac{6.26 \times 10^{7} \text{ Pa}}{3.0 \times 10^{-4}} = 2.09 \times 10^{11}$ Pa	**4**
16(b)(ii)	Area under graph = elastic strain energy (can be indicated on graph) **(1)** Weight of electromagnet is still exerted on cable after object falls (can be indicated on graph) **(1)** So change in elastic strain energy = area under graph between total weight (of electromagnet and steel object) and weight of electromagnet (can be shown on graph or given as an algebraic equivalent using $E_{el} = \frac{1}{2}F\Delta x$) **(1)** And change in gravitational potential energy of electromagnet is weight of electromagnet × change in extension (can be indicated on graph) **(1)** So the change in elastic strain energy stored > change in gravitational potential energy of the electromagnet **(1)** Example of graph  	**5**
	Total for question 16	**11**