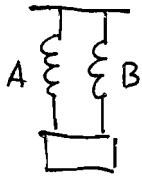


① (a) Spring A:  $F = k_A s$        $k_A = F/s = 10\text{N}/0.20\text{m} = 50\text{ N/m}$   
 Spring B:                       $k_B = F/s = 10\text{N}/0.10\text{m} = 100\text{ N/m}$

(b)



Let  $x =$  stretching of combination  
 $F_A \uparrow \uparrow F_B$   
 $\downarrow 10\text{N}$

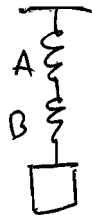
$$F_A + F_B = 10\text{N}$$

$$k_A x + k_B x = 10\text{N}$$

$$x = \frac{10\text{N}}{k_A + k_B} = \frac{10\text{N}}{150\text{N/m}} = 0.067\text{m}$$

(c)  $F = kx$        $k = \frac{F}{x} = \frac{10\text{N}}{0.067\text{m}} = 150\text{ N/m}$

(d)



The 10N force now stretches both strings

$$s_A = 0.20\text{m} \quad s_B = 0.10\text{m}$$

$$\text{total } s = s_A + s_B = 0.30\text{m}$$

$$k = F/s = 10\text{N}/0.30\text{m} = 33\text{ N/m}$$