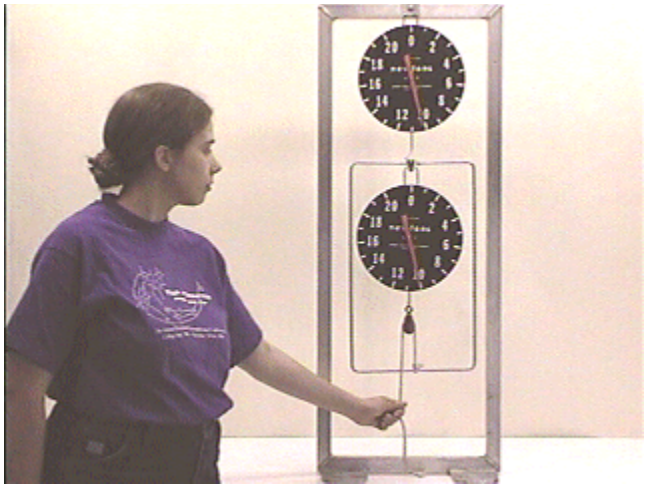
Answer #26

The answer is (b): the upper spring scale will read 10 Newtons, as seen in the photograph below.



When the free end of the rope is pulled, exerting a force of 10 Newtons on the lower spring scale, *three* additional force components are actually involved. Tension applied to the end of the rope is transmitted to both sides of the rope, so there is a force of twice the applied force on the lower spring scale. This means that in order to apply a force of 10 Newtons downward on the lower spring scale you must apply a force of 5 Newtons to the end of the rope. There is also a force of 5 Newtons pulling *up* on the lower part of the frame. The net force applied on the upper scale due to the pull at the free end of the rope is therefore 5+5-5=5 Newtons downward. This adds to the 5 Newton weight of the frame and its contents, causing a force of 10 Newtons on the upper scale when the lower scale reads 10 Newtons.

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