QUIZ: HOOKE'S LAW

1. True or false: Elasticity is defined as the tendency of an object to regain its original shape after being stretched or compressed.
2. True or false: Every single data point must fall exactly on your line, or your data are not valid.
3. True or false: The more data you take, the more reliable your results become.
4. True or false: Every straight line graph has to pass exactly through the origin.
5. Why are some data points not exactly on your best−fit line?
   A) Sometimes the spring stretches randomly, and you can't predict when this will occur.
   B) Any measurements will always have some unavoidable error; this is why more data make better results!
   C) Probably because the scale of the graph is incorrect. A better graph would have all points on the line.

The data below were collected using the same technique as you used in the lab. Use this data to answer the following questions.

MASS (kg)	FORCE (N)	STRETCH (cm)	STRETCH (m)
0.100	0.980	3.9	
0.250		9.8	0.098

6. What is the applied force when the 250g mass is hung from the spring?
   A) 0.250 N B) 2.45 N C) 24.5 N D) 25 N E) 250 N
7. What is the stretch of the spring when the 100 g mass is hung from it?
   A) 0.039 m B) 0.39 m C) 3.9 m D) 39 m E) 390 m
8. If these are two data points on your line, what is the slope of that line?
   A) 18.6 N/m B) 20.9 N/m C) 24.9 N/m D) 32.1 N/m
9. If you double the mass from 250 to 500 grams, the stretch of the spring should be closest to
   A) 3.9 cm B) 4.9 cm C) 9.8 cm D) 19.6 cm
10. True or false: If you hung 200g from this spring, it would stretch by exactly the same amount as your actual lab spring at the same load.
11. The y-intercept of this particular graph is not zero, but very close to zero. It is about 0.8g. This means that
    A) whoever took the data really screwed up, because the intercept has to be exactly zero.
    B) whoever graphed the data really screwed up, because all lines pass through the origin.
    C) whoever put the apparatus together really screwed up, because the spring was permanently stretched by 0.8cm before any mass was added.
    D) nobody really screwed up. The uncertainty in the measurements and the graph scale result in a line that misses the origin.
12. True or false: If you replaced the 50g masses with a set of 75g masses and repeated the experiment, the slope of the resulting graph would change.
13. True or false: Continuing to stretch the spring past its elastic limit will permanently damage it.
14. How would permanent damage to the spring show up on your graph?
    A) It wouldn't. You could not tell until you unloaded the spring and saw the damage.
    B) None of the data points would be linear, they would look like random dots.
    C) The data would start out linear, but then curve away from the line when the damage starts to occur.
15. You have two springs, and you have tested both and graphed the results. Spring A has a slope k_A = 30g/cm, and spring B has a slope k_B = 50 g/cm.
    A) Spring A is a shorter spring than B when they are both unstretched.
    B) Spring A will stretch more than B if you hang the same amount of mass on each spring.
    C) No! Spring B will stretch more than A if you hang the same amount of mass from each spring.