B: Newton's Model 1

Newton's First Law (restated)
Any object whose velocity is constant has a net force of zero acting on it.
Any object whose velocity is not constant has a net force greater than zero acting on it.

B.1. For each item, say whether *net force = 0* or *net force is not 0*. [6 points total]

1a. Anything that is not moving

1b. Anything that is moving at a constant velocity.

1c. A car, when the driver is pressing on the accelerator

1d. A glass of water resting on a table

1e. A ball rolling down a ramp

1f. A car driving down the highway at a constant speed of 60 mph

1g. A ball that has been dropped off of a building

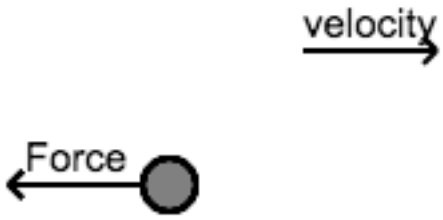
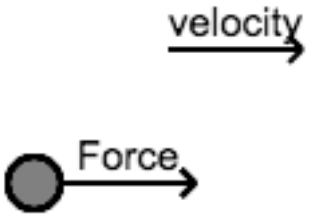
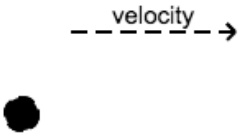
1h. A car when the driver has pushed the breaks

Newton's Model (Newton's First and Second Laws, applied to specific cases)

When Isaac Newton first wrote his Laws, he chose to represent them in poetic language. At times it is difficult to apply this language to physics situations. To simplify things, I decided to restate Newtons Laws in terms of how they *qualitatively* affect the motion of an object.

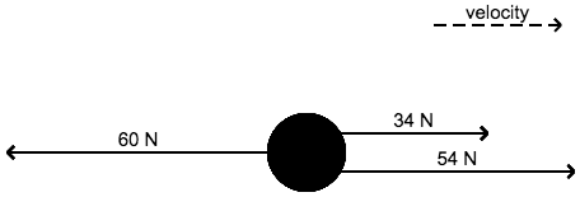
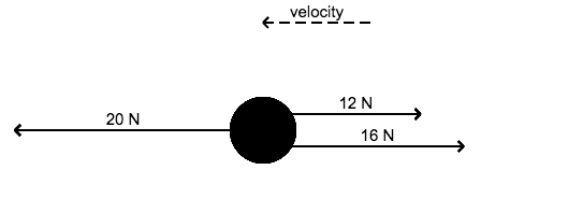
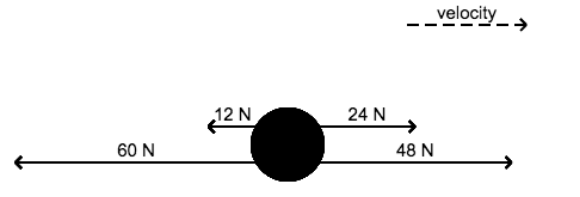
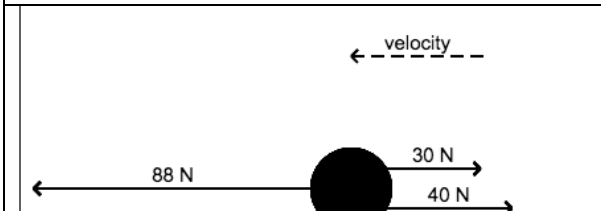
Situation	**Motion**
An object is not moving, and no net force acts on the object.	The object remains not moving.
An object is moving, and no net force acts on the object.	The object continues moving without changing speed.
An object is moving and the net force is in the *same direction* as the velocity of the object.	The object moves faster.
The object is moving and the net force is in the *opposite direction* as the velocity of the object.	The object slows down.

2. Multiple choice, examine what each object will do [2 points each]

 **2a.**	A) move at a constant velocity B) increase in speed (positive acceleration) C) decrease in speed (negative acceleration)
 **2b.**	A) move at a constant velocity B) increase in speed (positive acceleration) C) decrease in speed (negative acceleration)
2c. No forces present 	A) move at a constant velocity B) increase in speed (positive acceleration) C) decrease in speed (negative acceleration)

Qualitative Analysis of Forces and Motion Name _____

If more than one force acts on an object, the forces must be combined and the *net force* determines the motion of the object. In each of the following examples, first find the *net force* acting on the object, and then determine the motion of the object.

	A) move at a constant velocity B) increase in speed (positive acceleration) C) decrease in speed (negative acceleration)
	A) move at a constant velocity B) increase in speed (positive acceleration) C) decrease in speed (negative acceleration)
	A) move at a constant velocity B) increase in speed (positive acceleration) C) decrease in speed (negative acceleration)
	A) move at a constant velocity B) increase in speed (positive acceleration) C) decrease in speed (negative acceleration)

Answers
1a) 0
1b) 0
1c) not 0
1d) 0
1e) not 0
1f) 0
1g) not 0
1h) not 0
2a) C
2b) B
2c) A
2d) B
2e) C
2f) A
2g) B