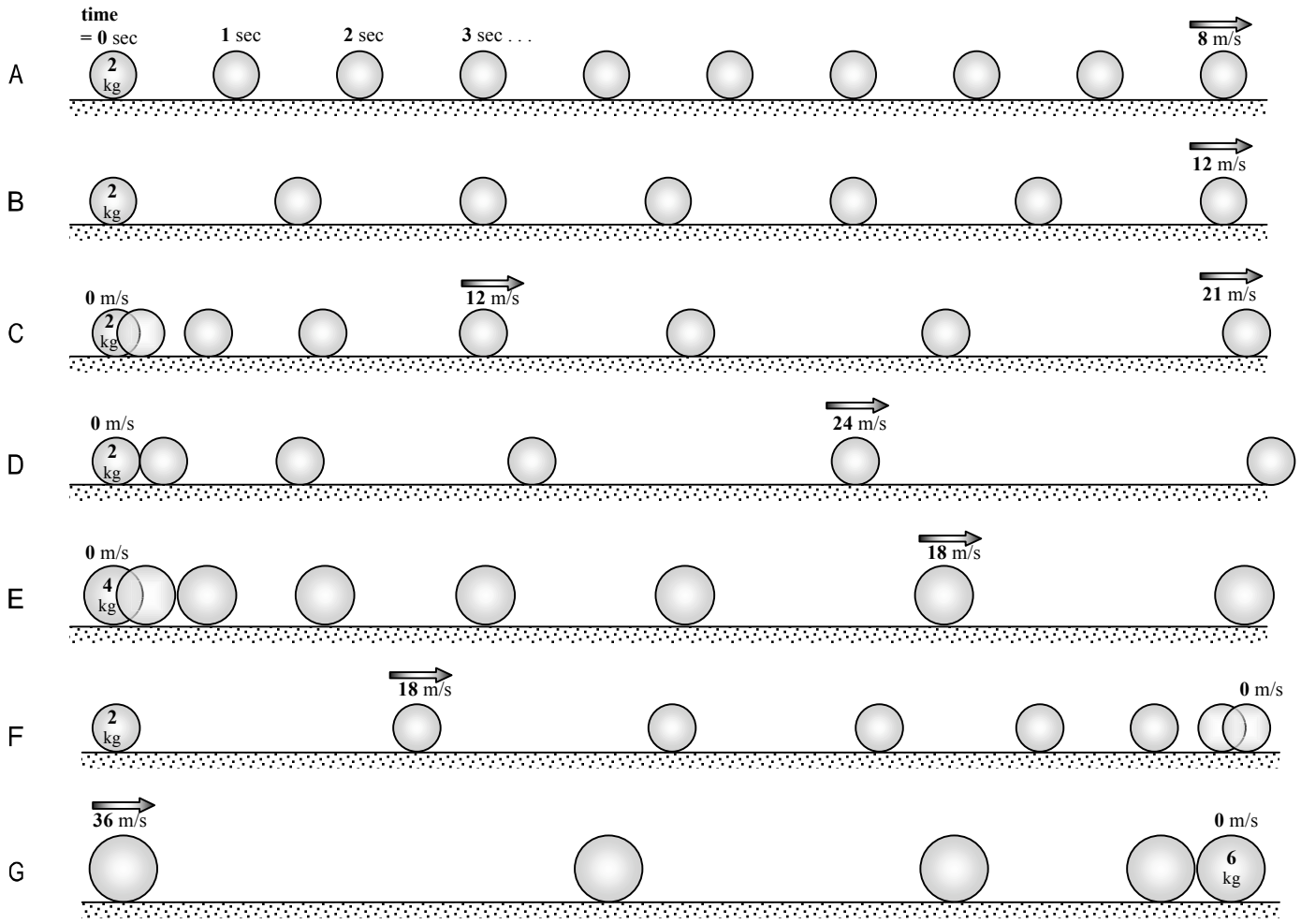
Name: _____

Period: ____

Irresistable Net Force

1. Here are some bowling balls rolling toward the right. The balls are shown at **1-second intervals**. There are some forces acting on these bowling balls, though none of the forces are drawn in the pictures. Notice that the speed of each ball is shown at certain moments of time.

- For some of the balls, all the forces acting on it sum up to ***zero***; there is ***no net force***. Which balls are these?
- For other balls, the forces do not cancel. Which balls are feeling a ***net force***? In what ***direction***?



2. The chart at the right describes the seven rolling balls shown above (balls **A** through **G**). Fill in column ① in the chart by writing in the ***MASS*** of each ball.

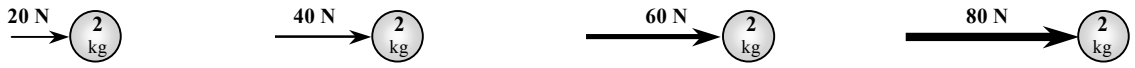
3. In the pictures above, each rolling ball is shown at **1**-second intervals. Use the speeds to calculate the ***ACCELERATION*** of each ball. Write your answers into column ② of the chart.

4. Column ③ is the ***NET FORCE*** acting on each ball. The chart shows that the net force on ball **C** is **6** Newtons. Use the example of ball **C** to calculate the ***net force*** acting on the other balls. Write your answers into column ③ .

5. How did you calculate the ***NET FORCE*** for column ③ ? In other words, what is the relationship between the ***acceleration*** of the ball and the ***net force*** acting on the ball? Write this relationship as a mathematical equation.

ball	① Mass ***m***	②	③
A	**2** kg		
B			
C			**6** N
D			
E			
F			
G			

6. a) In the diagrams below, calculate the ***acceleration*** of each mass, and state the ***direction*** of the acceleration.



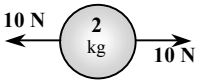
b) Notice that all four balls above have the same ***mass***. Do they all have the same ***acceleration****?*
If not, which one has the ***greatest*** acceleration? Why does it?

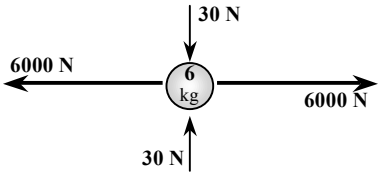
c) In the diagrams below, calculate the ***acceleration*** of each mass, and state the ***direction*** of the acceleration.

d) Notice that all four balls above have the same ***net force***. Do they all have the same ***acceleration****?*
If not, which one has the ***greatest*** acceleration? Why does it?

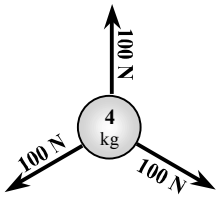
7. a) In the six diagrams at the right, calculate the ***acceleration*** of each mass, and state the ***direction*** of the acceleration.

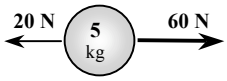
b) As best as you can tell, which of the six objects at the right must be ***at rest****?*
Explain your answer.

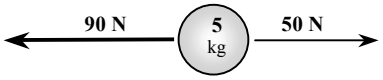




c) As best as you can tell, which of the six objects at the right must be moving at the ***fastest speed****?*
Explain your answer.







d) See the **3**-kg mass at the lower right.
If the forces stay constant…

…how much time would this mass need to speed up from rest to **60** meters/sec? _____

…how much time would this mass need to speed up from **40** m/sec to **100** m/sec? _____