Name: _____

Intro to Momentum and Impulse Regents Problems

1) Two cars having different weights are traveling on a level surface at different constant velocities. Within the same time interval, greater force will *always* be required to stop the car that has the greater

A) kinetic energy B) weight C) momentum D) velocity

2) The magnitude of the momentum of an object is 64.0 kilogram • meter per second. If the velocity of the object is doubled, the magnitude of the momentum of the object will be

3) What is the speed of a 1.0×10^3-kilogram car that has a momentum of 2.0×10^4 kilogram • meters per second east?

4) A force of 6.0 newtons changes the momentum of a moving object by 3.0 kilogram • meters per second. How long did the force act on the mass?

5) Which of the following is an acceptable unit for impulse?

A) J/s B) kg • m/s C) J • s D) N • m

6) Which two quantities can be expressed using the same units?

A) impulse and force
B) momentum and energy
C) energy and force
D) impulse and momentum

7) A mother pushes her 120-newton child, who is sitting on a swing. If the mother exerts a 10.-newton force on the child for 0.50 second, what is the magnitude of the impulse imparted to the child by the mother?

8) A 50.-kilogram student threw a 0.40-kilogram ball with a speed of 20. meters per second. What was the magnitude of the impulse that the student exerted on the ball?

A) 8.0 N • s B) 1.0×10^3 N • s C) 78 N • s D) 4.0×10^2 N • s

9) A 0.10-kilogram model rocket's engine is designed to deliver an impulse of 6.0 newton-seconds. If the rocket engine burns for 0.75 second, what average force does it produce?

A) 45 N B) 80. N C) 8.0 N D) 4.5 N

10) A manufacturer's advertisement claims that their 1,250-kilogram (12,300-newton) sports car can accelerate on a level road from 0 to 60.0 miles per hour (0 to 26.8 meters per second) in 3.75 seconds.

(a) Determine the acceleration, in meters per second^2, of the car according to the advertisement.

(b) Calculate the net force required to give the car the acceleration claimed in the advertisement. [*Show all work, including the equation and substitution with units.*]

(c) What is the normal force exerted by the road on the car?

(d) The coefficient of friction between the car's tires and the road is 0.80. Calculate the maximum force of friction between the car's tires and the road. [*Show all work, including the equation and substitution with units.*]

(e) Using the values for the forces you have calculated, explain whether or not the manufacturer's claim for the car's acceleration is possible.