

Physics 12 – Momentum and Energy – Problem Set

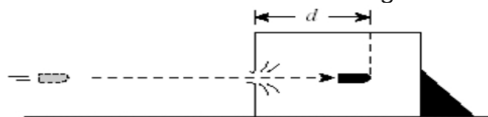
1. In order to use the joule as a unit of energy in an experiment, measurements must be converted to
 A. cm, g and s
 B. m, kg and s
 C. cm, N and s
 D. m, g and min

2. Which of the following best represents the work done by an adult in ascending a typical flight of stairs in a home?
 A. 10^0 J
 B. 10^1 J
 C. 10^2 J
 D. 10^3 J

3. An electric winch operates from a 120 V source at 3.5 A. The winch lifts a 360 kg object 2.5 m vertically in 45 s. What is the efficiency of the winch?
 A. 4.8%
 B. 17%
 C. 19%
 D. 47%

4. A 0.40 kg ball rolls at 8.5 m/s towards a player. The player kicks the ball so that it then travels at 15.2 m/s in the opposite direction. What is the magnitude of the impulse that the ball sustained?
 A. 1.3 Ns
 B. 2.7 Ns
 C. 4.7 Ns
 D. 9.5 Ns

5. A 0.055 kg bullet was fired at 250 m/s into a block of wood as shown in the diagram below.



Assuming an average force of 9 500 N brings the bullet to rest in the wood, what distance d did the bullet penetrate the block?

- A. 1.4×10^3 m
- B. 1.4×10^2 m
- C. 1.8×10^1 m
- D. 3.6×10^1 m

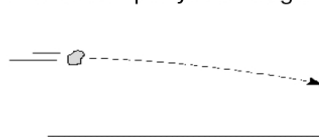
6. A cyclist increases his kinetic energy from 1100 J to 5 200 J in 12 s. His power output during this time is
 A. 92 W
 B. 260 W
 C. 340 W
 D. 430 W

7. Which of the following best represents the momentum of a small car travelling at a city speed limit?
 A. 1 000 kg m/s
 B. 10 000 kg m/s
 C. 100 000 kg m/s
 D. 1 000 000 kg m/s

8. A 0.080 kg tennis ball travelling east at 15 m/s is struck by a tennis racquet, giving it a velocity of 25 m/s, west. What are the magnitude and direction of the impulse given to the ball?

	MAGNITUDE	DIRECTION
A.	0.80 N·s	Eastward
B.	0.80 N·s	Westward
C.	3.2 N·s	Eastward
D.	3.2 N·s	Westward

9. A wad of putty is thrown against a wall as shown. The wad of putty sticks against the wall.



Which of the following statements best applies the application of the law of conservation of energy to this collision?

- A. All energy has been lost.
- B. Kinetic energy is converted to heat.
- C. Kinetic energy is converted to momentum.
- D. Kinetic energy is converted to potential energy.

10. A climber's gravitational potential energy increases from 14,000 J to 21,000 J while climbing a cliff. She expends 18,000 J of energy during this activity. What is the efficiency of this process?
 A. 3%
 B. 39%
 C. 61%
 D. 97%