

Conceptual Physics Semester I Mixed Review I

Multiple Choice

Identify the choice that best completes the statement or answers the question.

Show work to justify your answers!

- _____ 1. A table tennis ball moving forward with 6 units of momentum strikes and bounces backward off a heavy bowling ball that is initially at rest and free to move. The bowling ball is set in motion with a momentum of
- not enough information.
 - more than 6 units.
 - 6 units.
 - less than 6 units.
- _____ 2. A ball is thrown straight up. At the top of its path its acceleration is
- 0 m/s^2 .
 - about 5 m/s^2 .
 - about 10 m/s^2 .
 - about 20 m/s^2 .
 - about 50 m/s^2 .
- _____ 3. Two people pull on a rope in a tug-of-war. Each pulls with 350 N of force. What is the tension in the rope?
- 0 N
 - 350 N
 - 525 N
 - 700 N
 - none of the above
- _____ 4. Which of the following has the largest momentum?
- A large truck parked in a parking lot
 - A tightrope walker crossing Niagara Falls
 - The science building at your school
 - A pickup truck traveling down the highway
 - A dog running down the street
- _____ 5. A scalar is a quantity that has
- direction.
 - magnitude.
 - time.
 - color.
- _____ 6. At what part of a path does a projectile have minimum speed?
- When it returns to the ground
 - Halfway to the top
 - At the top of its path
 - When it is thrown
 - There's not enough information to say.
- _____ 7. Which best approximates the resultant of a pair of 9-unit vectors at right angles to each other?
- 18 units.
 - 13 units.
 - 0 units.

- d. 9 units.
- ___ 8. A cyclist travels 6 meters in the first second of travel, 6 meters again during the second second of travel, and 6 meters again during the third second. Its acceleration is
- 0 m/s².
 - 6 m/s².
 - 12 m/s².
 - 18 m/s².
 - none of the above
- ___ 9. A station wagon starts from rest and after 7 seconds it is moving at 42 m/s. What is the station wagon's average acceleration?
- 0.17 m/s²
 - 1.67 m/s²
 - 6 m/s²
 - 7 m/s²
 - none of the above
- ___ 10. In the absence of air resistance, objects fall at constant
- speed.
 - velocity.
 - acceleration.
 - distances each successive second.
 - all of the above
- ___ 11. Bronco the skydiver falls toward Earth. The attraction of Earth on Bronco pulls him down. The reaction to this force is
- Bronco finally pushing against Earth's surface.
 - Bronco pulling up on Earth.
 - Earth's surface finally pushing against Bronco.
 - neither A, B, nor C
- ___ 12. Suppose you take a trip that covers 180 km and takes 3 hours to make. Your average speed is
- 60 km/h.
 - 540 km/h.
 - 180 km/h.
 - 30 km/h.
 - 360 km/h.
- ___ 13. A freely falling object starts from rest. After falling for 1 second, it will have a speed of about
- 5 m/s.
 - 10 m/s.
 - 20 m/s.
 - 40 m/s.
 - none of the above
- ___ 14. A 2-kg ball is thrown at 3 m/s. What is the ball's momentum?
- 2 kg·m/s
 - 3 kg·m/s
 - 6 kg·m/s
 - 9 kg·m/s
 - none of the above

- _____ 15. A 4.0-kg ball has a momentum of 20.0 kg·m/s. What is the ball's speed?
- 0.2 m/s
 - 5.0 m/s
 - 20.0 m/s
 - 80.0 m/s
 - none of the above

Problem

Show all equations used (with onyl variables), all work, and correct units.

16. What is the average momentum of a 50-kg skateboarder who covers 400 m in 50 s?
17. A 10-kg cement block moving horizontally at 6 m/s plows into a bank of sand and comes to a stop in 2 s. What is the average impact force on the bank?
18. A 40-kg football player leaps through the air to collide with and tackle a 50-kg player heading toward him, also in the air. If the 40-kg player is heading to the right at 9 m/s and the 50-kg player is heading toward the left at 2 m/s, what is the speed and direction of the tangled players?
19. A 10-kg bowling ball moving at 4 m/s bounces off a spring at about the same speed that it had before bouncing. What is the change in momentum of the bowling ball?
20. A 30-kg girl and a 50-kg boy face each other on friction-free roller skates. The girl pushes the boy, who moves away at a speed of 3 m/s. What is the girl's speed?
21. Assume that a 15-kg ball moving at 8 m/s strikes a wall perpendicularly and rebounds elastically at the same speed. What is the amount of impulse given to the wall?