

Ch 6 P2 and 7 P1 Review

6.1 Conceptual Questions

- _____ 1) You slam on the brakes of your car in a panic, and skid a certain distance on a straight level road. If you had been traveling twice as fast, what distance would the car have skidded, under the same conditions?
A) It would have skidded 4 times farther. B) It would have skidded twice as far. C) It would have skidded 1.4 times farther. D) It would have skidded one half as far. E) It is impossible to tell from the information given.
- _____ 2) A stone is held at a height h above the ground. A second stone with four times the mass of the first one is held at the same height. The gravitational potential energy of the second stone compared to that of the first stone is
A) one-fourth as much. B) one-half as much. C) twice as much. D) four times as much. E) the same.
- _____ 3) You and your friend, who weighs the same as you, want to go to the top of the Eiffel Tower. Your friend takes the elevator straight up. You decide to walk up the spiral stairway, taking longer to do so. Compare the gravitational potential energy of you and your friend, after you both reach the top.
A) It is impossible to tell, since the times you both took are unknown. B) It is impossible to tell, since the distances you both traveled are unknown. C) Your friend's gravitational potential energy is greater than yours, because he got to the top faster. D) Both of you have the same amount of gravitational potential energy at the top. E) Your gravitational potential energy is greater than that of your friend, because you traveled a greater distance in getting to the top.
- _____ 4) When you throw a pebble straight up with initial speed V , it reaches a maximum height H with no air resistance. At what speed should you throw it up vertically so it will go twice as high?
A) $16V$ B) $8V$ C) $4V$ D) $2V$ E) $\sqrt{2}V$
- _____ 5) When you drop a pebble from height H , it reaches the ground with kinetic energy K if there is no air resistance. From what height should you drop it so it will reach the ground with twice as much kinetic energy?
A) $\sqrt{2}H$ B) $2H$ C) $4H$ D) $8H$ E) $16H$
- _____ 6) Two objects, one of mass m and the other of mass $2m$, are dropped from the top of a building. If there is no air resistance, when they hit the ground
A) both will have the same kinetic energy. B) the heavier one will have twice the kinetic energy of the lighter one. C) the heavier one will have four times the kinetic energy of the lighter one. D) the heavier one will have half the kinetic energy of the lighter one. E) the heavier one will have one-fourth the kinetic energy of the lighter one.

- 7) Swimmers at a water park have a choice of two frictionless water slides, as shown in the figure. Although both slides drop over the same height h , slide 1 is straight while slide 2 is curved, dropping quickly at first and then leveling out. How does the speed v_1 of a swimmer reaching the bottom of slide 1 compare with v_2 , the speed of a swimmer reaching the end of slide 2?



- A) $v_1 > v_2$ B) $v_1 < v_2$ C) $v_1 = v_2$ D) The heavier swimmer will have a greater speed than the lighter swimmer, no matter which slide he uses. E) No simple relationship exists between v_1 and v_2 .

- 8) Joe and Bill throw identical balls vertically upward. Joe throws his ball with an initial speed twice as high as Bill. If there is no air resistance, the maximum height of Joe's ball will be

- A) four times that of Bill's ball. B) two times that of Bill's ball. C) equal to that of Bill's ball. D) eight times that of Bill's ball. E) roughly 1.4 times that of Bill's ball.

- 9) A heavy frog and a light frog jump straight up into the air. They push off in such away that they both have the same kinetic energy just as they leave the ground. Air resistance is negligible. Which of the following statements about these frogs are correct? (There could be more than one correct choice.)

- A) Just as they leave the ground, the heavier frog is moving faster than the lighter frog. B) Just as they leave the ground, the lighter frog is moving faster than the heavier frog. C) They both leave the ground with the same speed. D) The lighter frog goes higher than the heavier frog. E) The heavier frog goes higher than the lighter frog. F) Both frogs reach the same maximum height.

- 10) If the units of your answer are $\text{kg} \cdot \text{m}^2/\text{s}^3$, which of the following types of quantities could your answer be? (There could be more than one correct choice.)

- A) kinetic energy B) potential energy C) force D) power E) work

7.1 Conceptual Questions

- 11) A rubber ball and a lump of clay have equal mass. They are thrown with equal speed against a wall. The ball bounces back with nearly the same speed with which it hit. The clay sticks to the wall. Which one of these objects experiences the greater momentum change?

- A) the ball B) the clay C) Both of them experience the same non-zero momentum change. D) Both of them experience zero momentum change.

- 12) Which of the following quantities are units of momentum? (There could be more than one correct choice.)

- A) $\text{N} \cdot \text{m}$ B) $\text{kg} \cdot \text{s}/\text{m}$ C) $\text{kg} \cdot \text{m}/\text{s}$ D) $\text{N} \cdot \text{s}$ E) $\text{kg} \cdot \text{m}^2/\text{s}^2$

- 13) A tiger is running in a straight line. If we double both the mass and speed of the tiger, the magnitude of its momentum will increase by what factor?

- A) $\sqrt{2}$ B) 2 C) 4 D) 8 E) 16

- ___ 14) Which of the following quantities are units of impulse? (There could be more than one correct choice.)
A) $\text{N} \cdot \text{m}$ B) $\text{kg} \cdot \text{s}/\text{m}$ C) $\text{kg} \cdot \text{m}/\text{s}$ D) $\text{N} \cdot \text{s}$ E) $\text{kg} \cdot \text{m}^2/\text{s}^2$
- ___ 15) If a quantity you calculated had units of $\text{kg} \cdot \text{m}/\text{s}$, what type of quantity could it be? (There could be more than one correct choice.)
A) momentum B) kinetic energy C) work D) impulse E) force

7.2 Problems

- ___ 16) What is the magnitude of the momentum of a 0.140 kg baseball traveling at 45.0 m/s?
- ___ 17) A 100-g ball falls from a window that is 12 m above ground level and experiences no significant air resistance as it falls. What is its momentum when it strikes the ground?
A) $3.3 \text{ kg} \cdot \text{m}/\text{s}$ B) $4.8 \text{ kg} \cdot \text{m}/\text{s}$ C) $1.8 \text{ kg} \cdot \text{m}/\text{s}$ D) $1.5 \text{ kg} \cdot \text{m}/\text{s}$ E) $2.4 \text{ kg} \cdot \text{m}/\text{s}$
- ___ 18) A 0.10-kg ball, traveling horizontally at 25 m/s, strikes a wall and rebounds at 19 m/s. What is the magnitude of the change in the momentum of the ball during the rebound?
A) $1.2 \text{ kg} \cdot \text{m}/\text{s}$ B) $1.8 \text{ kg} \cdot \text{m}/\text{s}$ C) $4.4 \text{ kg} \cdot \text{m}/\text{s}$ D) $5.4 \text{ kg} \cdot \text{m}/\text{s}$ E) $72 \text{ kg} \cdot \text{m}/\text{s}$