

## Conceptual Physics Projectile Motion Exam R1

### DO NOT WRITE ON THIS EXAM

Please select the best answer from the choices provided.

#### Problem

1. A skateboarder starting from rest accelerates down a ramp at  $2 \text{ m/s}^2$  for 3 s. What is the final speed of the skateboarder?
  - A. 6 m/s
  - B. 1.5 m/s
  - C. 5 m/s
  - D. 3.6 m/s
2. A pear falls from a tree and 1 second later hits the ground. How fast is the pear falling when it hits the ground?
  - A. 1 m/s
  - B. 10 m/s
  - C. 5 m/s
  - D. 5 m
3. A crate falls from an airplane flying horizontally at an altitude of 1550 m. Neglecting air drag, how long will the crate take to strike the ground?
  - A. 15.5 s
  - B. 20.0 s
  - C. 17.6 s
  - D. 27.8 s
4. What speed must you toss a ball straight up so that it takes 2 s to return to you?
  - A. 1 m/s
  - B. 5 m/s
  - C. 20 m/s
  - D. 10 m/s
5. A jet on an aircraft carrier can be launched from 0 to 50 m/s in 2 seconds. What is the acceleration of the jet?
  - A.  $.25 \text{ m/s}^2$
  - B.  $12.5 \text{ m/s}^2$
  - C.  $100 \text{ m/s}^2$
  - D.  $25 \text{ m/s}^2$
6. A motorboat is driven across a river at 8.0 km/h at right angles to a current that is flowing at 6.0 km/h. What is the resulting speed of the motorboat?
  - A. 6.0 km/hr
  - B. 48 km/hr
  - C. 10 km/hr
  - D. 14 km/hr

7. You toss a ball at 5 m/s straight upward. How much time will the ball take to reach the top of its path?
- A. 5 s
  - B. .5 s
  - C. .25 s
  - D. Not enough information
8. A chestnut rolls off the edge of a horizontal roof at a velocity of 5.0 m/s. What is the speed of the chestnut 1.0 s later?
- A. 11.2 m/s
  - B. 5.0 m/s
  - C. 10 m/s
  - D. 15 m/s
9. What is the hang time of a person who can jump a vertical distance of 0.5 m?
- A. .63 s
  - B. .5 s
  - C. .32 s
  - D. Not enough info
10. What is the average speed of a cheetah that runs 63 m in 4 seconds?
- A. 7.88 m/s
  - B. 15.75 m/s
  - C. 252 m/s
  - D. 0.06 m/s
11. What vertical distance can a person with a 0.7 s hang time jump?
- A. 0.31 m
  - B. 0.37 m
  - C. 0.61 m
  - D. 2.45m
12. How much time does a car with an acceleration of  $5 \text{ m/s}^2$  take to go from 5 m/s to 40 m/s?
- A. 0.14 s
  - B. 175 s
  - C. 39.0 s
  - D. 7.00 s
13. A ball is thrown horizontally from the top of a tall cliff. Neglecting air drag, what vertical distance has the ball fallen 2.0 seconds later?
- A. 40 m
  - B. 10 m
  - C. 200 m
  - D. 20 m

14. Starting from rest, a minivan undergoes a constant acceleration of  $6 \text{ m/s}^2$ . How far will the minivan travel in the first second?
- A. 0.5 m
  - B. 1.5 m
  - C. 3.0 m
  - D. 6.0 m
15. A stone is dropped from a cliff. After it has fallen 35 m, what is the stone's velocity?
- A. 2.65 m/s
  - B. 26.5 m/s
  - C. 8.37 m/s
  - D. Not enough information
16. A football is thrown upward. Its initial vertical component of velocity is 35 m/s and its initial horizontal component of velocity is 9 m/s. What is the football's speed 2.0 s later?
- A. 17.5 m/s
  - B. 15.0 m/s
  - C. 9.0 m/s
  - D. 24.0 m/s
17. A package falls out of a helicopter that is traveling horizontally at 90 m/s. It falls into the water below 7.0 seconds later. Assuming no air resistance, what is the horizontal distance it travels while falling?
- A. 630 m
  - B. 12.9 m
  - C. 245 m
  - D. 315 m
18. Michael throws a ball horizontally from the top of a building that is 20.0 m high. He hopes the ball will reach a swimming pool that is at the bottom of the building, 14.0 m horizontally from the edge the building. If the ball is to reach the pool, with what initial speed must Michael throw it with?
- A. 2.0 m/s
  - B. 7.0 m/s
  - C. 28.0 m/s
  - D. 1.43 m/s
19. An airplane whose airspeed is 205 km/h flies parallel to the direction of a wind with a speed of 80.0 km/h. What are the two possible speeds of the plane relative to the ground?
- A. 220 km/hr ; 189 km/hr
  - B. 205 km/hr; 0 km/hr
  - C. 125 km/hr ; 285 km/hr
  - D. Not enough information
20. A projectile shot with an initial velocity of 98 m/s at an angle of  $45^\circ$  follows a parabolic path and hits a stationary balloon at the top of its trajectory. With what speed does the projectile hit the balloon?
- A. 0 m/s
  - B. 2.2 m/s
  - C. 98 m/s
  - D. 69 m/s

