# LMC Midterm Practice for Physics 015 Spring 2016

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

1. A rock is thrown upward at 40 m/s. What is its velocity after 6 seconds?
   a. 60 m/s   b. 0 m/s   c. -20 m/s   d. 40 m/s

2. A car is already moving at 20 m/s when it begins DECELERATING at -4 m/s/s for 3 seconds. Compute its final speed.
   a. 43 m/s   b. 22 m/s   c. 12 m/s   d. 8 m/s

3. What is the reaction to the force of your body leaning against a wall?
   a. The wall feels nothing.
   b. You do not fall down.
   c. Gravity pulls you down with a force equal to your weight.
   d. The wall pushes back on you.

4. A 45 N box is on the floor and a 20 N container is placed on top of it. What is the normal force on the container from the box?
   a. 20 N   b. 25 N   c. 65 N   d. 45 N

5. As a ramp increases in tilt, the downhill fraction of its weight (what we call the downhill force)
   a. increases   b. decreases   c. stays the same

6. Which of the following is not a vector?
   a. velocity   b. mass   c. force   d. acceleration

7. Which law of motion starts: "For every action..."
   a. The law of gravity
   b. The first law
   c. The second law
   d. The third law

8. Look at the graph shown. Which equation best matches the information in the graph? The y-axis is labeled 'Q' and the x-axis is labeled 'B'. Unknown constants are labeled M.
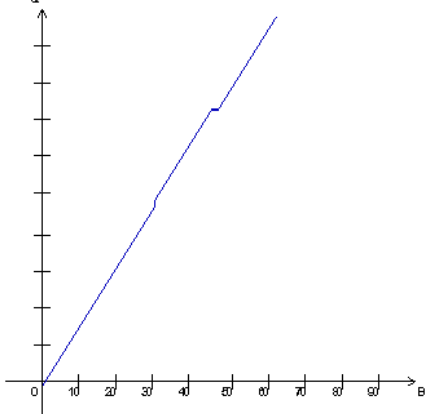
   a. $Q = -B$ b. $B = (MQ)^{1/2}$ c. $Q = M B$,   d. $Q = MB^2$

9. What kind of relationship exists between force and acceleration in Newton's Second law?
   a. inverse   b. direct   c. quadratic   d. indirect

10. Which of the following equations represents average velocity?

    a. $\bar{v} = \dfrac{\Delta x}{\Delta t}$ b. $\bar{v} = 2\left(v_0 + v_f\right)$ c. $\bar{v} = \left(\dfrac{v_o - v_f}{2}\right)$ d. $v_f = v_o + at$

11. The reason that we sometimes split projectile motion into x- and y- motion is because
    a. it's easier that way
    b. gravity doesn't pull sideways
    c. tradition
    d. friction doesn't act vertically

12. What is the mass of an arrow shot from a bow which accelerates at 200 m/s² if the arrow is pushed with a force of 20 N?
    a. 4.0 kg   b. 4000.0 kg   c. 1.0 kg   d. 0.1 kg

13. Which metric unit measures the same thing as feet per second?
    a. meters per second   b. Newtons   c. kilograms   d. m/s/s

14. In which of the following situations is the normal force on a box exactly equal to its weight?
    a. When the box is pinned against the side wall of a truck turning left.
    b. When the box is sitting on a flat table
    c. When the box has another container sitting on top of it.
    d. When the box is sitting on a tilted ramp.

15. What is the difference between average velocity and instantaneous velocity?
    a. average velocity cannot change while instantaneous velocity can.
    b. average velocity is computed over longer time intervals.
    c. instantaneous velocity is always greater.
    d. average velocity is always greater.

16. What force is required to accelerate a 2 kg object at 20 m/s²?
    a. 20 Newtons   b. 40 Newtons   c. 0.10 Newtons   d. 4 Newtons

17. If you drop a rock for 1 second, it will fall a certain distance. If you let it fall for 6 seconds, how far will it fall in comparison?
    a. 36 times farther   b. six times as far   c. 6 meters   d. 60 times farther

18. If you double the velocity of an object spinning in a circle how many times more centripetal force will that require?
    a. 10   b. 20   c. 4   d. 1/2

19. Kepler's Second Law of Planetary Motion basically says that
    a. bigger orbits take longer   c. planets go faster when closer to the sun
    b. planets move in ellipses   d. bigger planets have more moons

20. If the electricity rate is $0.20 per kWh, how much does it cost to operate a 700 W microwave oven one hour per week for a month?
    a. 2800 cents   c. 5.6 cents
    b. 2.8 cents   d. 56 cents

21. In a cliff problem if you launch a marble from a cliff that is twice as tall as one previously used, it will land
    a. twice as far away
    b. more than twice as far away
    c. less than twice as far away
    d. in the same place it did before. Which is less than twice as far away, but only pick this if it is exactly the same as before. Otherwise just pick c. If it's less.

22. Suppose you move to a planet where the gravitational force is five times stronger. You're the same mass, and the planet is the same size as the sun. How does the planet's mass compare to earth?
    a. it's also the same.
    b. it's 5 x bigger.
    c. it's 25 times bigger.
    d. it's the square root of 5 times bigger.

23. What is the momentum of a 1 kg mass moving at 1 m/s on a table 1 meter from the floor?
    a. 1 kg m/s
    b. 1 kg m^2/s
    c. 1 kg m^2/s^2
    d. 10 Joules

24. Why are dashboards padded?
    a. To increase the time it takes to stop your head when it hits the dashboard.
    b. To reduce the force required to stop your head when it hits the dashboard
    c. To manipulate the impulse so the damage to your head is less when it hits the dashboard.
    d. These are all pretty good reasons.

Short Answer

The practice test will not display an answer for this item.

1. A toy car rolls off a table moving at 4 m/s. The table is 1.4 meters tall. Predict where the car will land (how far from the edge of the table, along the floor.)

2. A merry go round is whirling a 40 kg wooden horse in a circle of radius 3 meters at a speed of 3 m/s.

   a) Find the centripetal force on the horce.
   b) Find the centripetal acceleration of the horse. (hint, F = ma.)
   c) If 1 "g" = 10 m/s/s, how many "g's" does the horse experience due to centripetal acceleration alone?
   d) Considering the force of gravity acts on the horse AND the centripetal force acts on it, how much force is that combined?

3. A 50 kg ice skater is standing on a frictionless pond on skates when someone throws a 5 kg bag at her, which she catches. Find her speed after she catches the bag. Assume she was initially at rest.

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Answer Section

MULTIPLE CHOICE

  1. ANS: C   PTS: 1
  2. ANS: D   PTS: 1
  3. ANS: D   PTS: 1
  4. ANS: A   PTS: 1
  5. ANS: A   PTS: 1
  6. ANS: B   PTS: 1
  7. ANS: D   PTS: 1
  8. ANS: C   PTS: 1
  9. ANS: B   PTS: 1
10. ANS: A   PTS: 1
11. ANS: B   PTS: 1
12. ANS: D   PTS: 1
13. ANS: A   PTS: 1
14. ANS: B   PTS: 1
15. ANS: B   PTS: 1
16. ANS: B   PTS: 1
17. ANS: A   PTS: 1
18. ANS: C   PTS: 1
19. ANS: C   PTS: 1
20. ANS: D   PTS: 1
21. ANS: C   PTS: 1
22. ANS: B   PTS: 1
23. ANS: A   PTS: 1
24. ANS: D   PTS: 1

SHORT ANSWER

  1. ANS:
      fdsas

      PTS: 1
  2. ANS:
      f

      PTS: 1
  3. ANS:
      s

      PTS: 1