

Name:

Physics 2130: Example Exam Chapters 1-5
Real Exam Date 24 September 2003
20 multiple choice questions worth 5 points each.

1. On planet Q the standard unit of volume is called the guppy. Space travelers from Earth have determined that one liter = 38.2 guppies. How many guppies are in 150 liters?
 - a. 5 730 guppies
 - b. 0.255 guppies
 - c. 3.93 guppies
 - d. 188 guppies
2. If the displacement of an object, x , is related to velocity, v , according to the relation $x = Av$, the constant, A , has the dimension of which of the following?
 - a. acceleration
 - b. length
 - c. time
 - d. area
3. Which one of the choices below represents the preferred practice regarding significant figures when multiplying the following: $10.5 \times 8.8 \times 3.14$?
 - a. 290
 - b. 290.136
 - c. 290.1
 - d. 300
4. Suppose an equation relating position, x , to time, t , is given by $x = bt^3 + ct^4$, where b and c are constants. The dimensions of b and c are respectively
 - a. T^3, T^4 .
 - b. $1/T^3, 1/T^4$.
 - c. $L/T^3, L/T^4$.
 - d. $L^2 \times T^3, L^2 \times T^4$.

5. A railroad train travels forward along a straight track at 80.0 m/s for 1 000 m and then travels at 50.0 m/s for the next 1 000 m. What is the average velocity?
- 65.0 m/s
 - 61.5 m/s
 - 63.7 m/s
 - 70.0 m/s
6. A baseball catcher throws a ball vertically upward and catches it in the same spot when it returns to his mitt. At what point in the ball's path does it experience zero velocity and non-zero acceleration at the same time?
- midway on the way up
 - at the top of its trajectory
 - the instant it leaves the catcher's hand
 - the instant before it arrives in the catcher's mitt
7. A rock is thrown straight down with an initial velocity of 14.5 m/s from a cliff. What is the rock's displacement after 2.0 s? (Acceleration due to gravity is 9.80 m/s².)
- 28 m
 - 49 m
 - 55 m
 - 64 m
8. A vehicle designed to operate on a drag strip accelerates from zero to 30 m/s while undergoing a straight line path displacement of 45 m. What is the vehicle's acceleration if its value may be assumed to be constant?
- 2.0 m/s²
 - 5.0 m/s²
 - 10 m/s²
 - 15 m/s²

9. Which type of quantity is characterized by both magnitude and direction?
- a. scalar
 - b. vector
 - c. trigonometric
 - d. algebraic variable
10. A string attached to an airborne kite is maintained at an angle of 40° with the horizontal. If a total of 120 m of string is reeled in while bringing the kite back to the ground, what is the horizontal displacement of the kite in the process (assume the kite string doesn't sag)?
- a. 100 m
 - b. 84 m
 - c. 77 m
 - d. 92 m
11. I walk six miles in a straight line in a direction north of east and I end up two miles east and several miles north. How many degrees north of east have I walked?
- a. 19
 - b. 45
 - c. 60
 - d. 71
12. A ball is rolled horizontally off a table with an initial speed of 0.24 m/s. A stopwatch measures the ball's trajectory time from table to the floor to be 0.30 s. What is the height of the table? ($g = 9.8 \text{ m/s}^2$ and air resistance is negligible)
- a. 0.11 m
 - b. 0.22 m
 - c. 0.33 m
 - d. 0.44 m

13. A 7.0-kg bowling ball experiences a net force of 5.0 N. What will be its acceleration?
- a. 35 m/s^2
 - b. 7.0 m/s^2
 - c. 5.0 m/s^2
 - d. 0.71 m/s^2
14. A 2 000-kg sailboat experiences an eastward force of 3 000 N by the ocean tide and a wind force against its sails with magnitude of 6 000 N directed toward the northwest (45° N of W). What is the magnitude of the resultant acceleration?
- a. 2.2 m/s^2
 - b. 2.1 m/s^2
 - c. 1.5 m/s^2
 - d. 3.0 m/s^2
15. A 100-kg box is placed on a ramp. As one end of the ramp is raised, the box begins to move downward just as the angle of inclination reaches 15° . What is the coefficient of static friction between box and ramp?
- a. 0.15
 - b. 0.27
 - c. 0.77
 - d. 0.95
16. An automobile of mass 2 000 kg moving at 30 m/s is braked suddenly with a constant braking force of 10 000 N. How far does the car travel before stopping?
- a. 45 m
 - b. 90 m
 - c. 135 m
 - d. 180 m

17. A rock is thrown straight up with an initial velocity of 15.0 m/s. Ignore energy lost to air friction. How high will the rock rise?
- a. 1.53 m
 - b. 22.9 m
 - c. 6.50 m
 - d. 11.5 m
18. A 20-N crate starting at rest slides down a rough 5.0-m long ramp, inclined at 25° with the horizontal. 20 J of energy is lost to friction. What will be the speed of the crate at the bottom of the incline?
- a. 0.98 m/s
 - b. 1.9 m/s
 - c. 3.2 m/s
 - d. 4.7 m/s
19. A jet engine develops 1.0×10^5 N of thrust in moving an airplane forward at a speed of 900 km/h. What is the power developed by the engine?
- a. 500 kW
 - b. 10 MW
 - c. 25 MW
 - d. 50 MW
20. A simple pendulum, 1.00 m in length, is released from rest when the support string is at an angle of 35.0° from the vertical. What is the speed of the suspended mass at the bottom of the swing? (Ignore air resistance, $g = 9.80$ m/s²)
- a. 0.67 m/s
 - b. 0.94 m/s
 - c. 1.33 m/s
 - d. 1.88 m/s