Physics 100 Name: _____
Unit 1: Physics Basics
Practice Test

Helpful Information

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| Conversions: | 1 foot = 0.305 m | 1 m/s = 2.24 mph | |
| Formulas: | v = d/t | P = F/A | Fps = f/t |

Metric Base units: Name the basic metric units for each of the following…

1. Volume (size) : _____

2. Mass (amount of matter in something) : _____

3. Weight (how heavy something is; a measure of gravitational attraction) : _____

4. Length : _____

Metric Estimation: Provide the correct metric unit for each of the following.

Answer Choices: mm, cm, L, mL, kg, g, m, N

5. The width of a pinky fingernail = 1 _____

6. The length of a long step = 1 _____

7. The mass of a brick = 1 _____

8. The mass of a paper clip = 1 _____

9. The volume of a chocolate chip = 1 _____

10. The volume of a standard Nalgene water bottle = 1 _____

11. The thickness of a dime = 1 _____

12. The weight of an uncooked burger patty = 1 _____

Metric Ratios: Enter numbers that give the correct ratios

13. _____ m = _____ cm

14. _____ m = _____ km

Measuring/metric conversion:

15. Measure the line on the right and record the length in cm and mm.

Length = _____ cm = _____mm

16. Measure the line below, and record the length in m and km.

Length = _____ m = _____ km

17. Measure the mass of object A and record it in kg. Mass of A = _____ g

18. Measure the mass of object B and record it in g. Mass of B = _____ kg

Converting between Metric and Imperial Units: Use the ratios provided at the beginning of the test to convert these measurements.

19. 60mph = _____ m/s

20. 4m = _____ ft

Calculate:

21. A capped bottle is pressurized to 100psi (P=100psi). If the neck has an opening with an area of 0.75 $in^2$ (A=0.75$in^2$), how much force (F) must be applied to keep the cap on the bottle?

F = _____

22. If the frame rate of a slow motion video is 240 frames/second (240fps) , how much time (t) elapses during 27 frames (f= 27 frames).

t = _____

23. How long (t=?) does it take a car to drive a distance of 450m (d=450m) if it is traveling at a velocity of 25m/s (v=25m/s)?

t = _____

Measure Distance and Time to Calculate Speed:

24. Measure and record both the distance traveled by object C and the time it takes object C to travel that distance. Then calculate object C's average speed. Include correct units.

Distance (d) = _____ Time (t) = _____ Average Speed (v) = _____

Finding Speed From a Video:

25. Find the speed of the duct tape, in the provided video. The video frame rate = 240 frames/second (fps = 240f/s), and the BB-gun is 92cm long.

a. How many seconds (t) does it take for the tape to pass the BB-gun?

b. What is the length of the BB-gun, in meters?

c. What is the speed (v) of the duct tape, in meters per second?

How Water Rockets Work:

26. Use Newton's 3rd Law to explain how a water rocket flies.

27. Describe two different ways to make a rocket flight straight.

28. Explain why a water rocket won't fly as high if you don't add any extra mass to it.

29. Explain why a water rocket won't fly as high if you add too much extra mass to it.

30. Explain why a water rocket won't fly as high if you add too much water to it.

31. Give at least one reason why a water rocket won't fly as high if you don't add any water to it.

32. List three factors that affect the drag (wind resistance) that acts on a water rocket.