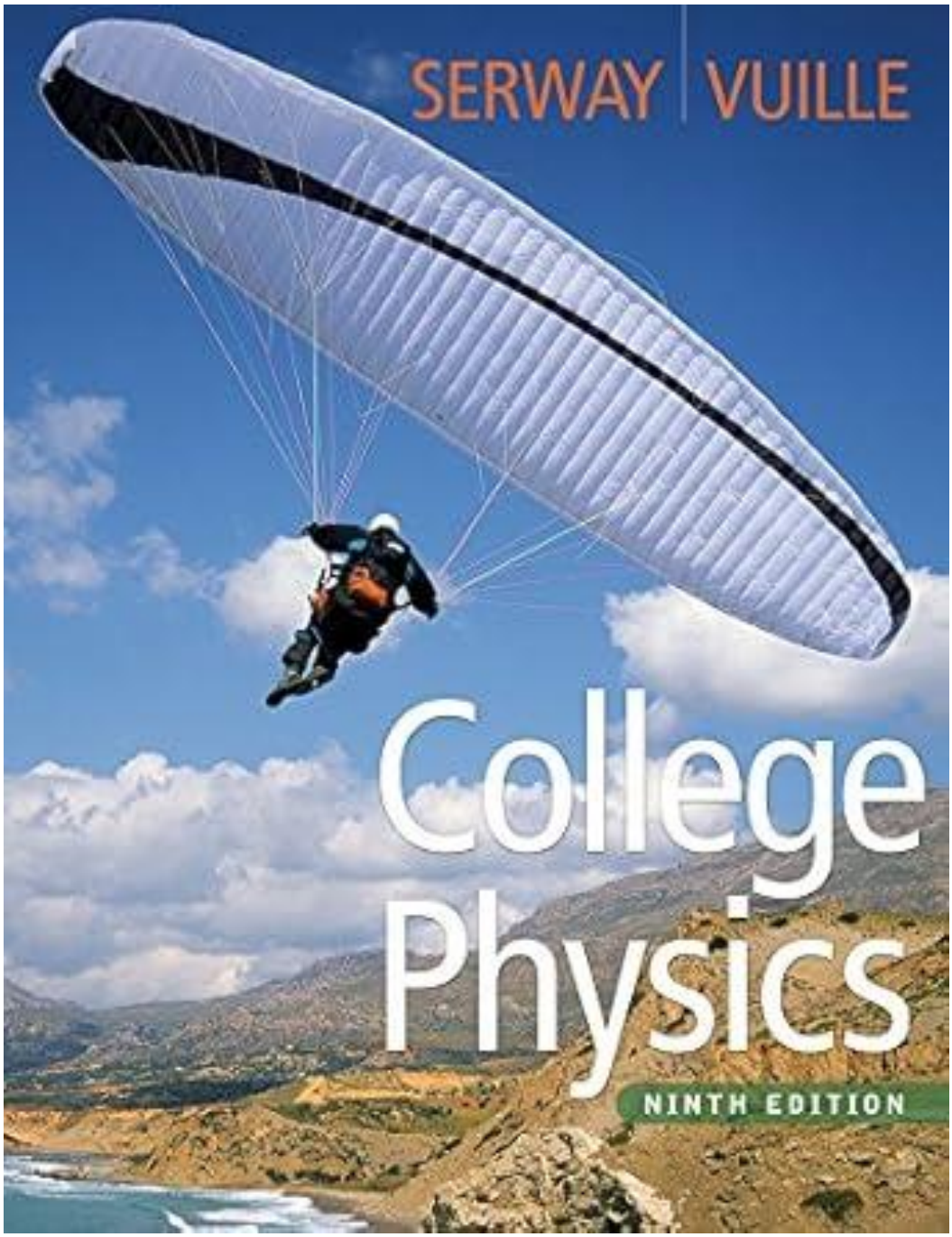
TEST BANK

College Physics

Raymond Serway, Chris Vuille

9th Edition



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Chapter 1—Introduction

MULTIPLE CHOICE

1. Since 1983 the standard meter has been defined in terms of which of the following?

a.specific alloy bar housed at Sevres, France
b.wavelength of light emitted by krypton-86
c.distance from the Earth's equator to the North Pole
d.the distance light travels in a certain fraction of a second

ANS: D PTS: 1 DIF: 1
TOP: 1.1 Standards of Length, Mass, and Time

2. Since 1967 the standard definition for the second has been based on which of the following?

a.characteristic frequency of the cesium-133 atom
b.average solar day
c.sidereal day
d.Greenwich Civil Time

ANS: A PTS: 1 DIF: 1
TOP: 1.1 Standards of Length, Mass, and Time

3. In mechanics, physicists use three basic quantities to derive additional quantities. Mass is one of the three quantities. What are the other two?

a.length and force
b.power and force
c.length and time
d.force and time

ANS: C PTS: 1 DIF: 1
TOP: 1.1 Standards of Length, Mass, and Time

4. The prefixes which are abbreviated p, n, and G represent which of the following?

a.10^{-2}, 10^{-6}, and 10^{15}
b.10^{-9}, 10^{6}, and 10^{10}
c.10^{-12}, 10^{-9}, and 10^{9}
d.10^{-15}, 10^{-6}, and 10^{12}

ANS: C PTS: 1 DIF: 1
TOP: 1.1 Standards of Length, Mass, and Time

5. The ratio M/m of the prefixes M and m has what value?

a.10^{3}
b.10^{6}
c.10^{9}
d.10^{18}

ANS: C PTS: 1 DIF: 2
TOP: 1.1 Standards of Length, Mass, and Time

6. One year is about ____ seconds while one day is exactly ____ seconds.

a.3.16 ´ 10^7, 86 400
b.5.26 ´ 10^5, 86 400
c.3.16 ´ 10^7, 8 640
d.1.04 ´ 10^6, 36 000

ANS: A PTS: 1 DIF: 2
TOP: 1.1 Standards of Length, Mass, and Time

7. The nuclei of atoms contain

a.electrons only. b.neutrons
only. c.protons and
electrons. d.protons and
neutrons.

ANS: D PTS: 1 DIF: 1
TOP: 1.2 The Building Blocks of Matter

8. When was the existence of the neutron confirmed?

a.in ancient times
b.in 1895
c.in 1932
d.in 1969

ANS: C PTS: 1 DIF: 1
TOP: 1.2 The Building Blocks of Matter

9. The proton contains which of the following combination of quarks?

a.two up quarks and one down quark
b.one up quark and two down quarks
c.one top quark and two bottom quarks
d.two top quarks and one bottom quark

ANS: A PTS: 1 DIF: 2
TOP: 1.2 The Building Blocks of Matter

10. Which formula is dimensionally consistent with an expression yielding a value for velocity? (*a* is acceleration, *x* is distance, and *t* is time)

a.v/t^2
b.vx^2
c.v^2/t
d.at

ANS: D PTS: 1 DIF: 1 TOP: 1.3 Dimensional Analysis

11. Which expression is dimensionally consistent with an expression that would yield a value for time^{-1}? (*v* is velocity, *x* is distance, and *t* is time)

a.v/x
b.v^2/x
c.x/t
d.v^2t

ANS: A PTS: 1 DIF: 1 TOP: 1.3 Dimensional Analysis

12. 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

ANS: C PTS: 1 DIF: 1 TOP: 1.3 Dimensional Analysis

13. The speed of a boat is often given in knots. If a speed of 5 knots were expressed in the SI system of units, the units would be:

a.m. b.s.
c.m/s.
d.kg/s.

ANS: C PTS: 1 DIF: 1 TOP: 1.3 Dimensional Analysis

14. If a is acceleration, v is velocity, x is position, and t is time, then which equation is not dimensionally correct?

a.$t = x/v$ b.a
$= v^2/x$ c.$v =$
a/t d.$t^2 =$
$2x/a$

ANS: C PTS: 1 DIF: 1 TOP: 1.3 Dimensional Analysis

15. Suppose an equation relating position, x, to time, t, is given by $x = b\,t^3 + c\,t^4$, 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.$L^2 \times T^3$,
$L^2 \times T^4$.

ANS: C PTS: 1 DIF: 2 TOP: 1.3 Dimensional Analysis

16. Areas always have dimensions ____ while volumes always have dimensions ____.

a.m^2, m^3
b.L^2, L^3
c.Both a and b are correct.
d.No answer is correct because of the "always."

ANS: B PTS: 1 DIF: 1 TOP: 1.3 Dimensional Analysis

17. Which one of the choices below represents the preferred practice regarding significant figures when adding the following: 12.4 + 11 + 67.37 + 4.201?

a.94.971
b.94.97
c.95.0 d.95

ANS: D PTS: 1 DIF: 1
TOP: 1.4 Uncertainty in Measurement and Significant Figures

18. Which one of the choices below represents the preferred practice regarding significant figures when multiplying the following: 10.5 ´ 8.8 ´ 3.14?

a.290
b.290.136
c.290.1
d.300

ANS: A PTS: 1 DIF: 1
TOP: 1.4 Uncertainty in Measurement and Significant Figures

19. Calculate (0.82 + 0.042) ´ (4.4 ´ 10^3), keeping only significant figures.

a.3 800
b.3 784
c.3 793
d.3 520

ANS: A PTS: 1 DIF: 1
TOP: 1.4 Uncertainty in Measurement and Significant Figures

20. The length and width of a standard sheet of paper is measured, and then the area is found by calculation to be 93.50 in^2. The number of significant figures in the width measurement must be at least:

a.1.
b.2.
c.3.
d.4.

ANS: D PTS: 1 DIF: 1
TOP: 1.4 Uncertainty in Measurement and Significant Figures

21. The number 0.000 17 has how many significant figures?

a.2
b.3
c.5
d.6

ANS: A PTS: 1 DIF: 2
TOP: 1.4 Uncertainty in Measurement and Significant Figures

22. Multiplying a 2 significant figure number by a 3 significant figure number and then dividing the product by a six significant figure number yields a number with how many significant figures?

a.5/6
b.1 c.2
d.11

ANS: C PTS: 1 DIF: 3
TOP: 1.4 Uncertainty in Measurement and Significant Figures

23. Assume when using a meter stick measuring can be done so that the last significant figure is in the tenth of a millimeter digit. If you are measuring an object with length between 6 and 7 cm, how many significant figures will result if you only use the part of the meter stick between the 1-cm and 9-cm positions?

a.2
b.3
c.4
d.more than 4

ANS: B PTS: 1 DIF: 1
TOP: 1.4 Uncertainty in Measurement and Significant Figures

24. Assume when using a meter stick measuring can be done so that the last significant figure is in the tenth of a millimeter digit. If you are measuring an object with length between 6 and 7 cm, how many significant figures will result if you only use the part of the meter stick between the 82- and 95-cm positions?

a.2
b.3
c.4
d.more than 4

ANS: B PTS: 1 DIF: 2
TOP: 1.4 Uncertainty in Measurement and Significant Figures

25. Assume when using a meter stick measuring can be done so that the last significant figure is in the tenth of a millimeter digit. If you are measuring an object with length between 25 and 57 cm, how many significant figures will result if you only use the part of the meter stick between the 2- and 95-cm positions?

a.2
b.3
c.4
d.more than 4

ANS: C PTS: 1 DIF: 2
TOP: 1.4 Uncertainty in Measurement and Significant Figures

26. How many significant figures does the number 1 700 have?

a.2
b.3
c.4

d.One cannot tell with certainty when the number is written in the given form, but it will be one of the other given answers.

ANS: D PTS: 1
TOP: 1.4 Uncertainty in Measurement and Significant Figures

27. In the text are the following conversion factors:
i. 1 mi = 1 609 m
ii. 1 m = 39.37 in.
iii. 1 ft = 30.48 cm
iv. 1 in. = 2.54 cm
The 1 on the left hand side is assumed to have the same number of significant figures as the number on the right hand side of each of these equations. However, 2 of these conversion factors are exact, and this means they have the equivalent of an unlimited number of significant figures when used in calculations. Which 2 are the exact conversion factors?

a.i and ii b.i
and iii c.ii
and iii d.iii
and iv

ANS: D PTS: 1
TOP: 1.4 Uncertainty in Measurement and Significant Figures | 1.5 Conversion of Units

28. 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

ANS: A PTS: 1 DIF: 1 TOP: 1.5 Conversion of Units

29. On planet Z, the standard unit of length is the foose. Ann the Astronaut is 5.90 feet tall on earth. She lands on planet Z and is measured to be 94 foosi tall. Her partner Rachael is 88 foosi tall. How tall is Rachael on Earth?

a.5.2 feet
b.5.5 feet
c.5.8 feet
d.6.3 feet

ANS: B PTS: 1 DIF: 2 TOP: 1.5 Conversion of Units

30. A furlong is a distance of 220 yards. A fortnight is a time period of two weeks. A race horse is running at a speed of 5.00 yards per second. What is his speed in furlongs per fortnight?

a.27 500 furlongs/fortnight
b.13 700 furlongs/fortnight
c.6 220 furlongs/fortnight d.2
750 furlongs/fortnight

ANS: A PTS: 1 DIF: 2 TOP: 1.5 Conversion of Units

31. A cereal box has the dimensions of 0.19 m ´ 0.28 m ´ 0.070 m. If there are 3.28 feet per meter, then what is the volume of the box in cubic feet?

a.0.13 cubic feet
b.0.040 cubic feet
c.0.012 cubic feet
d.0.003 7 cubic feet

ANS: A PTS: 1 DIF: 1 TOP: 1.5 Conversion of Units

32. The distance to the Andromeda Galaxy is estimated at about 2×10^6 light years. A light year is the distance traveled by light in one year; if the speed of light is 3×10^8 m/s, about how far is it from our galaxy to Andromeda? (1 year = 3.15×10^7 s)

a.10×10^{15} m
b.1×10^{18} m c.2
$\times 10^{22}$ m d.6 ´
10^{12} m

ANS: C PTS: 1 DIF: 2 TOP: 1.5 Conversion of Units

33. A cement truck can pour 20 cubic yards of cement per hour. Express this in ft^3/min.

a.1/3 ft^3/min
b.1.0 ft^3/min
c.3 ft^3/min d.9
ft^3/min

ANS: D PTS: 1 DIF: 1 TOP: 1.5 Conversion of Units

34. Water flows into a swimming pool at the rate of 8.0 gal/min. The pool is 16 ft wide, 32 ft long and 8.0 ft deep. How long does it take to fill? (1 U.S. gallon = 231 cubic inches)

a.32 hours
b.64 hours
c.48 hours
d.24 hours

ANS: B PTS: 1 DIF: 2 TOP: 1.5 Conversion of Units

35. When NASA was communicating with astronauts on the moon, the time from sending on the Earth to receiving on the moon was 1.28 s. Find the distance from Earth to the moon. (The speed of radio waves is 3.00×10^8 m/s.)

a.240 000 km
b.384 000 km
c.480 000 km
d.768 000 km

ANS: B PTS: 1 DIF: 2 TOP: 1.5 Conversion of Units

36. The mass of the sun is 2.0×10^{30} kg, and the mass of a hydrogen atom is 1.67×10^{-27} kg. If we assume that the sun is mostly composed of hydrogen, how many atoms are there in the sun?

a.1.2×10^{56} atoms

b.3.4 ´ 10^{56} atoms
c.1.2 ´ 10^{57} atoms
d.2.4 ´ 10^{57} atoms

ANS: C PTS: 1 DIF: 2 TOP: 1.5 Conversion of Units

37. The information on a one-gallon paint can is that the coverage, when properly applied, is 450 ft^2. One gallon is 231 in^3. What is the average thickness of the paint in such an application?

a.0.003 6 in
b.0.009 0 in
c.0.043 in
d.0.051 in

ANS: A PTS: 1 DIF: 3 TOP: 1.5 Conversion of Units

38. Assume everyone in the United States consumes one soft drink in an aluminum can every two days. If there are 270 million Americans, how many tons of aluminum need to be recycled each year if each can weighs 1/16 pound and one ton = 2000 pounds?

a.750 000 tons b.1.5
million tons c.1.75
million tons d.3
million tons

ANS: B PTS: 1 DIF: 2
TOP: 1.6 Estimates and Order-of-Magnitude Calculations

39. A physics class in a large lecture hall has 150 students. The total mass of the students is about ____ kg.

a.10^2
b.10^3
c.10^4
d.10^5

ANS: C PTS: 1 DIF: 2
TOP: 1.6 Estimates and Order-of-Magnitude Calculations

40. An apartment has 1100 ft^2 of floor space. What is the approximate volume of the apartment?

a.10^3 ft^3
b.10^4 ft^3
c.10^5 ft^3
d.10^6 ft^3

ANS: B PTS: 1 DIF: 2
TOP: 1.6 Estimates and Order-of-Magnitude Calculations

41. Which point is nearest the *x*-axis?

a.(-3, 4)
b.(4, 5)
c.(-5, 3)
d.(5, -2)

ANS: D PTS: 1 DIF: 2 TOP: 1.7 Coordinate Systems

42. Each edge of a cube has a length of 25.4 cm. What is the length of a diagonal of the cube going through the center of the cube?

a.25.4 in
b.17.3 in
c.14.4 in
d.10.0 in

ANS: B PTS: 1 DIF: 3 TOP: 1.7 Coordinate Systems

43. If point A is located at coordinates (5, 3) and point B is located at coordinates (-3, 9), what is the distance from A to B if the units of the coordinated system are meters?

a.14 m
b.10 m
c.8 m
d.17 m

ANS: B PTS: 1 DIF: 2 TOP: 1.7 Coordinate Systems

44. A high fountain of water is in the center of a circular pool of water. You walk the circumference of the pool and measure it to be 150 meters. You then stand at the edge of the pool and use a protractor to gauge the angle of elevation of the top of the fountain. It is 55°. How high is the fountain?

a.17 m
b.23 m
c.29 m
d.34 m

ANS: D PTS: 1 DIF: 3 TOP: 1.8 Trigonometry

45. A right triangle has sides 5.0 m, 12 m, and 13 m. The smallest angle of this triangle is nearest:

a.21°.
b.23°.
c.43°.
d.Not attainable since this is not a right triangle.

ANS: B PTS: 1 DIF: 2 TOP: 1.8 Trigonometry

46. If $j = 90° - q$, what is the value of $\sin^2 j + \sin^2 q$?

a.0
b.1 c.-
1
d.The answer depends on q.

ANS: B PTS: 1 DIF: 2 TOP: 1.8 Trigonometry

47. A triangle has sides of length 7.0 cm and 25 cm. If the triangle is a right triangle, which of the following could be the length of the third side?

a.18 cm

b.24 cm
c.27 cm
d.32 cm

ANS: B PTS: 1 DIF: 2 TOP: 1.8 Trigonometry

48. A train slowly climbs a 500-m mountain track which is at an angle of 10.0° with respect to the horizontal. How much altitude does it gain?

a.86.8 m
b.88.2 m
c.341 m
d.492 m

ANS: A PTS: 1 DIF: 2 TOP: 1.8 Trigonometry

49. Note the expression: $y = x^2$. Which statement is most consistent with this expression?

a.If *y* doubles, then *x* quadruples.
b.*y* is greater than *x*.
c.If *x* doubles, then *y* doubles. d.If *x*
doubles, then *y* quadruples.

ANS: D PTS: 1 DIF: 1 TOP: Additional Problems

50. Note the expression: $y = A/x^3$. Which statement is most consistent with this expression?

a.*y* is less than *A*.
b.If *x* is halved, *y* is multiplied by eight. c.If *x*
is doubled, *y* is multiplied by a factor of 8.
d.*y* is greater than *x*.

ANS: B PTS: 1 DIF: 1 TOP: Additional Problems

51. For which of the values below is $x > x^3$?

a.$x = -1.5$
b.$x = 0$ c.x
$= 1.0$ d.$x =$
1.5

ANS: A PTS: 1 DIF: 1 TOP: Additional Problems

52. Modern electroplaters can cover a surface area of 60.0 m^2 with one troy ounce of gold (volume = 1.611 cm^3). What is the thickness of the electroplated gold?

a.2.68×10^{-8} m
b.1.34×10^{-9} m
c.1.67×10^{-6} m
d.3.33×10^{-7} m

ANS: A PTS: 1 DIF: 2 TOP: Additional Problems