Physics 2nd Edition by Robert C. Richardson, Betty Richardson, Alan Giambattista Test Bank

Chapter 01
Introduction

Multiple Choice Questions

1. Physics is relevant to which of the following fields?
A. Chemistry
B. Biology C.
Medicine D.
Architecture
E. all of these choices are correct

Section: 1.1 Why Study Physics?

2. In everyday language, speed and velocity are synonyms, but in physics
A. velocity has only magnitude.
B. speed has only direction.
C. velocity has magnitude and direction.
D. speed has magnitude and direction.
E. velocity has only direction.

Section: 1.2 Talking Physics

3. In everyday language, power and force are similar, but in physics
A. force has only magnitude.
B. power has only direction.
C. force has magnitude and direction.
D. power has magnitude and direction.
E. none of these choices are correct

Section: 1.2 Talking Physics

4. Algebraic symbols in physics equations represent physical quantities; therefore
A. the symbols represent numbers only.
B. the symbols represent numbers and units.
C. the symbols consist of units only.
D. the symbols are only abstract.
E. the symbols are only imaginary.

Section: 1.2 Talking Physics

5. The last page of a book is numbered 814 and the book is 3.00 cm thick. What is the average thickness of each page?
A. $2.54 \ 10^{3}$ cm
B. $2.54 \ 10^{-3}$ cm
C. $7.37 \ 10^{-3}$ cm
D. $3.92 \ 10^{-3}$ cm

Section: 1.3 The Use of Mathematics

6. The diameter of a circle is doubled. By what factor is the area changed?
A. 2
B. 2
C. 4
D. 4
E. 1

Section: 1.3 The Use of Mathematics

7. The radius of a circle is increased by 5%. The percentage increase of the circumference is
A. 5%.
B. 10%.
C. 12%.
D. 16%.

Section: 1.3 The Use of Mathematics

8. The radius of a circle is increased by 5%. The percentage increase of the area is
A. 5%.
B. 10%.
C. 12%.
D. 16%.

Section: 1.3 The Use of Mathematics

9. The radius of a circle is tripled. By what factor is the area changed?
A. 3
B. 6
C. 9
D. 12

Section: 1.3 The Use of Mathematics

10. The area of a circle is found to be half of its original value after the radius is multiplied by a certain factor. What is the factor?
A. 1/4
B. 1/2
C. 2 **D.**
1/ 2

Section: 1.3 The Use of Mathematics

11. What is the percentage increase in size when ordering a 14-inch rather than a 12-inch pizza?
A. 16%
B. 26%
C. 36%
D. 46%

Section: 1.3 The Use of Mathematics

12. By what factor larger is a 12-inch pizza than a 10-inch pizza?
A. 1.2
B. 1.1
C. 1.4
D. 1.6

Section: 1.3 The Use of Mathematics

13. If the surface area of a sphere is increased by a factor of 3, by what factor does the radius of the sphere change?
A. 1.14
B. 1.73
C. 2.00
D. 2.24

Section: 1.3 The Use of Mathematics

14. If the surface area of a sphere is increased by 16%, by what percentage has the radius been changed?
A. 16%
B. 8.1%
C. 7.7%
D. 12%

Section: 1.3 The Use of Mathematics

15. The volume of a sphere is 8.00 m^3. The radius of the sphere is **A.** 1.24 m.
B. 2.00 m.
C. 2.65 m.
D. 3.00 m.

Section: 1.3 The Use of Mathematics

16. The radius of a sphere is 2.00 m. The surface area of the sphere is A. 36.7 m^2.
B. 50.3 m^2.
C. 72.5 m^2.
D. 75.0 m^2.

Section: 1.3 The Use of Mathematics

17. By what factor does the volume of a cube increase if the length of the edges are doubled?
A. 2
B. 4
C. 6
D. 8

Section: 1.3 The Use of Mathematics

18. By what factor does the volume of a cube increase if the length of the edges are tripled?
A. 6
B. 9
C. 3
D. 27

Section: 1.3 The Use of Mathematics

19. The side of a cube is decreased by 6%. The percentage decrease of the volume of the cube is
A. 6%.
B. 9%.
C. 12%.
D. 17%.

Section: 1.3 The Use of Mathematics

20. If the length of a box is reduced by one-third and the width and height are doubled, by what factor has the volume changed?
A. 4/3
B. 2/3
C. 3/4
D. 3/2

Section: 1.3 The Use of Mathematics

21. The side of a cube is increased by 5%. The percentage increase of the surface area of the cube is
A. 5%.
B. 10%.
C. 12%.
D. 16%.
E. 18%.

Section: 1.3 The Use of Mathematics

22. The price of gasoline goes up 6% on Monday night and then goes down 7% today. What is the net percentage change in the price of gasoline from Monday?
A. 1.0%
B. 2.0%
C. 1.4%
D. -1.0%

Section: 1.3 The Use of Mathematics

23. 1.0 kilometer equals _____ nanometers.
A. $1.0\ 10^{+12}$
B. $1.0\ \ 10^{+6}$
C. $1.0\ \ 10^{+4}$
D. $1.0\ 10^{-3}$

Section: 1.4 Scientific Notation and Significant Figures

24. 1.0 centimeter equals _____ micrometers.
A. $1.0\ 10^{+12}$
B. $1.0\ \ 10^{+6}$
C. $1.0\ \ 10^{+4}$
D. $1.0\ 10^{-3}$

Section: 1.4 Scientific Notation and Significant Figures

25. 1.0 micrometer equals _____ millimeters.
A. $1.0\ 10^{-6}$
B. $1.0\ \ 10^{-3}$
C. $1.0\ \ 10^{+3}$
D. $1.0\ 10^{+6}$

Section: 1.4 Scientific Notation and Significant Figures

26. The number of significant figures in 3.24 cm is
A. 2.
B. 3.
C. 4.
D. 5.

Section: 1.4 Scientific Notation and Significant Figures

27. The precision and number of significant figures in 1.003 km is
A. precision = .0001 km, significant figure = 4.
B. precision = .001 km, significant figure = 4.
C. precision = .0001 km, significant figure = 3.
D. precision = .001 km, significant figure = 3.
E. precision = .0001 km, significant figure = 2.

Section: 1.4 Scientific Notation and Significant Figures

28. The precision and number of significant figures in 0.0045 mm is
A. precision = .0001 mm, significant figures = 4.
B. precision = .001 mm, significant figures = 4. C.
precision = .0001 mm, significant figures = 3. D.
precision = .001 mm, significant figures = 3. **E.**
precision = .0001 mm, significant figures = 2.

Section: 1.4 Scientific Notation and Significant Figures

29. The length 4.221 cm is added to 0.01 cm. The appropriately rounded sum is
A. 4.22 cm.
B. 4.2301 cm.
C. 4.23 cm.
D. 4.2 cm.
E. 4.21 cm.

Section: 1.4 Scientific Notation and Significant Figures

30. The length 3.76 mm is multiplied by 0.05 mm. The appropriately rounded product is
A. 0.18 mm^2.
B. 0.2 mm^2. C.
0.19 mm^2. D.
0.1881 mm^2. E.
0.29 mm^2.

Section: 1.4 Scientific Notation and Significant Figures

31. The length 3.76 mm is multiplied by 0.0232 mm. The appropriately rounded product is
A. 0.082 mm^2.
B. 0.09 mm^2. C.
0.087 mm^2. **D.**
0.0872 mm^2. E.
0.08723 mm^2.

Section: 1.4 Scientific Notation and Significant Figures

32. The length 3.76 mm is divided by 6 mm. The appropriately rounded ratio is
A. 0.627.
B. 0.63.
C. 0.6.
D. 0.62666.
E. 0.6267.

Section: 1.4 Scientific Notation and Significant Figures

33. The length 3.76 mm is divided by 0.0232 mm. The rounded ratio is
A. 160.
B. 162. C.
162.1. D.
162.07. E.
162.069.

Section: 1.4 Scientific Notation and Significant Figures

34. A cube is 1.0 inch in length on the side (1 in. = 2.540 cm). The volume of the cube is A. $1.64\ 10^{+1}\ cm^3$.
B. $1.6387\ 10^{+1}\ cm^3$.
C. $1.6\ 10^{+1}\ cm^3$.
D. $1.639\ \ 10^{+1}\ cm^3$.

Section: 1.4 Scientific Notation and Significant Figures

35. The number of seconds in a 30-day month is
A. $2.59\ 10^{+6}$.
B. $2.592\ 10^{+6}$. C.
$2.5920\ 10^{+6}$. **D.**
$2.592000\ 10^{+6}$.

Section: 1.4 Scientific Notation and Significant Figures

36. The population of the United States is approximately 290,000,000. Write this in scientific notation.
A. $2.9\ 10^{7}$ B. $290\ \ 10^{7}$ C. $2.90\ \ 10^{7}$ **D.** $2.9\ 10^{8}$

Section: 1.4 Scientific Notation and Significant Figures

37. Using the following unit conversions: 1.00 fluid ounce = 29.573 ml, 1.00 L = 1000 cm^3, density of water = 1.00 gm/cm^3, the number of fluid ounces in a kg of water is
A. 48.8 fluid ounces.
B. 40.1 fluid ounces.
C. 33.8 fluid ounces.
D. 25.7 fluid ounces.

Section: 1.5 Units

38. If the radius of the Earth is 6400.0 km, and the atmosphere is 10.0 km high, then the volume of air around the Earth is
A. $5.135\ \ 10^{+18}$ m3.
B. $3.605\ \ 10^{+16}$ m3.
C. $5.14\ 10^{+18}\ m^3$.
D. $6.211\ \ \ 10^{+12}\ m^3$.

Section: 1.5 Units

39. How many square centimeters are there in 1 square foot (1 in. = 2.540 cm)?
A. $9.290\ 10^{3}\ cm^2$
B. $929.0\ cm^2$
C. $9.290\ 10^{4}\ cm^2$
D. $92.90\ cm^2$
E. $9.3\ \ \ 10^{2}\ cm^2$

Section: 1.5 Units

40. One angstrom = 10^{-10} m and one fermi = 10^{-15} m. What is the relationship between these units?
A. 1 angstrom = 10^{5} fermi
B. 1 angstrom = 10^{-5} fermi
C. 1 angstrom = 10^{-25} fermi
D. 1 angstrom = 10^{25} fermi

Section: 1.5 Units

41. Which of the SI prefixes is used to indicate 10^{9}?
A. kilo
B. mega
C. giga
D. tera
E. nano

Section: 1.5 Units

42. Which of the following is not a SI base unit?
A. kelvin
B. kilogram
C. newton
D. second
E. meter

Section: 1.5 Units

43. To be dimensionally consistent, distance [L], velocity [L/T], and time [T] must be related as
A. distance = time/velocity.
B. distance = velocity/time.
C. distance = time/velocity^{2}.
D. distance = velocity time^{2}.
E. distance = velocity time.

Section: 1.6 Dimensional Analysis

44. To be dimensionally consistent, distance [L], velocity [L/T], and acceleration [L/T^2] must be related as

A. distance = velocity^2/acceleration.

B. distance = velocity/acceleration.

C. distance = velocity^2 acceleration.

D. distance = velocity acceleration^2.

E. distance = velocity^2/acceleration.

Section: 1.6 Dimensional Analysis

45. To be dimensionally consistent, the formula velocity = frequency wavelength must be related as follows where velocity [L/T], frequency [1/T], and wavelength [L]

A. velocity = frequency^2 wavelength.

B. velocity = frequency wavelength. C.
velocity = frequency/wavelength.

D. velocity = frequency/wavelength^2.

Section: 1.6 Dimensional Analysis

46. To be dimensionally consistent, velocity [L/T], pressure [M/LT^2], and density [M/L^2] must be related as

A. velocity = pressure/density. B.
velocity^2 = pressure/density^2. C.
velocity = pressure/density^2. **D.**
velocity^2 = pressure/density.

Section: 1.6 Dimensional Analysis

47. To be dimensionally consistent, velocity [L/T], force [ML/T^2], mass [M], and length [L] must be related as

A. velocity^2 = force length/mass.

B. velocity^2 = force length/mass^2.

C. velocity = force length^2/mass.

D. velocity = force length/mass.

Section: 1.6 Dimensional Analysis

48. To be dimensionally consistent, pressure [M/LT^2], density [M/L^3], and velocity [L/T] must be related as

A. pressure^2 = density velocity^2.

B. pressure = density velocity^2.

C. pressure = density velocity.

D. pressure = density^2 velocity.

Section: 1.6 Dimensional Analysis

49. To be dimensionally consistent, force [ML/T^2], pressure [M/LT^2], and length [L] must be related as

A. force = pressure^2 length^2.

B. force = pressure^2 length.

C. force = pressure length^2.

D. force = pressure length.

Section: 1.6 Dimensional Analysis

50. To be dimensionally consistent, distance [L], acceleration [L/T^2], and time [T] must be related as

A. distance = acceleration^2 time^2.

B. distance = acceleration time. **C.**

distance = acceleration time^2. D.

distance = acceleration^2 time.

Section: 1.6 Dimensional Analysis

51. To be dimensionally consistent, velocity [L/T], acceleration [L/T^2], and time [T] must be related as

A. velocity = acceleration time. B.

velocity = acceleration time^2. C.

velocity = acceleration^2 time^2. D.

velocity = acceleration^2 time.

Section: 1.6 Dimensional Analysis

52. The equation for potential is U = mgh where U is in $kg \cdot m^2 \cdot s^{-2}$, m is in kg, and g is in $m \cdot s^{-2}$. What are the units of h?
A. s^2
B. s
C. k*g*
D. m

Section: 1.6 Dimensional Analysis

53. Assume everyone in the United States consumes one soft drink in an aluminum can every two days. If there are 270 million Americans, estimate how many tons of Aluminum needs 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 E.
1,600,000 tons

Section: 1.8 Approximation

54. Estimate how many textbooks of 1000 pages stacked on top of each other it takes to make a stack of books 10 feet high.
A. 60
B. 50
C. 40
D. 30
E. 20

Section: 1.8 Approximation

55. What is the order of magnitude of the number of seconds in a year?
A. $4\ 10^{+7}$
B. $2\ 10^{+7}$
C. $3\ 10^{+7}$
D. $1\ 10^{+7}$

Section: 1.8 Approximation

56. A kilometer is approximately
A. ¼ mile.
B. 2 miles.
C. ½ mile.
D. 1 mile.

Section: 1.8 Approximation

57. What is the order of magnitude of the number of seconds in one year?
A. $3\ 10^{7}$
B. $4\ 10^{6}$
C. $3\ 10^{6}$
D. $4\ 10^{7}$

Section: 1.8 Approximation

58. Estimate the number of dollar bills (15.5 cm) put end to end it would take to circle the Earth (radius = $6.40\ 10^{3}$ km).
A. $9.5\ 10^{+8}$
B. $2.6\ 10^{+8}$
C. $3.7\ 10^{+7}$
D. $1.2\ 10^{+7}$
E. $8.5\ 10^{+6}$

Section: 1.8 Approximation

59. Find the equation $x = at + b$ that fits the following data.

t(sec)	0	2	4	6	8	10
x(m)	20	90	160	230	300	370

A. $x = 45\,t + 20$
B. $x = 35\,t + 20$
C. $x = 35\,t + 15$
D. $x = 25\,t + 45$

Section: 1.9 Graphs

60. Find the equation $x = at^2 + b$ that fits the following data.

t(sec)	0	1	2	3	4	5
x(m)	-16	-12	0	20	48	84

t(sec) 0 1 2 3 4 5
x(m) -16 -12 0 20 48 84
A. $x = 4t^2 + 16$
B. $x = 2t^2 - 16$
C. $x = 4t^2 - 16$
D. $x = 2t^2 + 16$

Section: 1.9 Graphs

61. Find the equation $x = at^2 + b$ that fits the following data.

t(sec)	1	3	5	7	9	11
x(m)	2	18	50	98	162	242

A. $x = t^2 + 18$
B. $x = 2t^2 - 2$
C. $x = t^2 + 3$
D. $x = 2t^2 + 0$

Section: 1.9 Graphs

62. Find the equation $v^2 = ah + b$ that fits the following data.

h(m)	2	4	6	8	10	12
v(m/s)	2.83	4.00	4.90	5.66	6.32	6.93

A. $v^2 = 4h + 0$
B. $v^2 = 2h + 4$
C. $v^2 = 4h + 4.90$
D. $v^2 = 2h + 0$

Section: 1.9 Graphs

63. Find the equation $x = at + b$ that fits the following data.

t(sec)	0	2	4	6	8	10
x(m)	80	40	0	-40	-80	-120

A. $x = 20t - 80$
B. $x = -20t + 80$
C. $x = 40t + 80$
D. $x = -40t + 20$

Section: 1.9 Graphs

64. Find the equation $x = at^2 + b$ that fits the following data.

t(sec)	0	1	2	3	4	5
x(m)	60	58	52	42	28	10

A. $x = -4t^2 + 60$
B. $x = 5t^2 + 60$
C. $x = -2t^2 + 60$
D. $x = 3t^2 + 60$

Section: 1.9 Graphs

65. Find the equation $x = at^2 + bt$ that fits the following data.

t(sec)	1	3	5	7	9	11
x(m)	3	21	55	105	171	253

A. $x = 2t^2 + 0$
B. $x = 6t^2 - 3t$
C. $x = 2t^2 + 2t$
D. $x = t^2 + t$

Section: 1.9 Graphs

66. Find the equation $v^2 = ah + b$ that fits the following data.

h(m)	2	4	6	8	10	12
v(m/s)	0	2.00	2.83	3.46	4.00	4.47

A. $v^2 = 2h - 6$
B. $v^2 = h - 4$
C. $v^2 = 2h + 4$
D. $v^2 = 2h - 4$

Section: 1.9 Graphs