

Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) Approximately how many pennies would you have to stack to reach an average 8-foot ceiling? 1) _____
A) 2×10^3 B) 2×10^2 C) 2×10^6 D) 2×10^4 E) 2×10^5

Answer: A

Diff: 0 Type: MC

- 2) What is $\frac{0.674}{0.74}$ to the proper number of significant figures? 2) _____
A) 0.91 B) 0.9108 C) 0.911 D) 0.9

Answer: A

Diff: 0 Type: MC

- 3) If, in a parallel universe, π has the value 3.14149, express π in that universe to four significant figures. 3) _____
A) 3.141 B) 3.142 C) 3.1415 D) 3.1414

Answer: A

Diff: 0 Type: MC

- 4) Express $(4.3 \times 10^6)^{-1/2}$ in scientific notation. 4) _____
A) 2.1×10^4 B) 2.1×10^3 C) 4.8×10^{-4} D) 2.1×10^{-5}

Answer: C

Diff: 0 Type: MC

- 5) If an operatic aria lasts for 5.75 min, its length expressed in seconds is x s, where x is 5) _____
A) less than 5.75. B) greater than 5.75.

Answer: B

Diff: 0 Type: MC

- 6) The wavelength of a certain laser is 0.35 micrometers, where 1 micrometer = 1×10^{-6} m. Express this wavelength in nanometers. 6) _____
A) 3.5×10^4 nm B) 3.5×10^1 nm C) 3.5×10^2 nm D) 3.5×10^3 nm

Answer: C

Diff: 0 Type: MC

- 7) Estimate the number of pennies that would fit in a box one foot long by one foot wide by one foot tall. 7) _____
A) 5×10^6 B) 5×10^5 C) 5×10^3 D) 5×10^2 E) 5×10^4

Answer: E

Diff: 0 Type: MC

8) The period of a pendulum is the time it takes the pendulum to swing back and forth once. If the only dimensional quantities that the period depends on are the acceleration of gravity, g , and the length of the pendulum, ℓ , what combination of g and ℓ must the period be proportional to? (Acceleration has SI units of $\text{m} \cdot \text{s}^{-2}$).

- A) g/ℓ B) $g\ell^2$ C) $\sqrt{g\ell}$ D) $\sqrt{\ell/g}$ E) $g\ell$

Answer: D

Diff: 0 Type: MC

8) _____

9) The shortest wavelength of visible light is approximately 400 nm. Express this wavelength in centimeters.

- A) 4×10^{-11} cm
B) 400×10^{-11} cm
C) 4×10^{-7} cm
D) 4×10^{-5} cm
E) 4×10^{-9} cm

Answer: D

Diff: 0 Type: MC

9) _____

10) What is the difference between 103.5 and 102.24 written with the correct number of significant figures?

- A) 1 B) 1.3 C) 1.26 D) 1.260 E) 1.2600

Answer: B

Diff: 0 Type: MC

10) _____

11) Estimate the number of times the earth will rotate on its axis during a human's lifetime.

- A) 3×10^4 B) 3×10^5 C) 3×10^6 D) 3×10^8 E) 3×10^7

Answer: A

Diff: 0 Type: MC

11) _____

12) The exhaust fan on a typical kitchen stove pulls 600 CFM (cubic feet per minute) through the filter. Given that 1.00 in. = 2.54 cm, how many cubic meters per second does this fan pull?

- A) 32.8 m^3/sec B) 3.05 m^3/sec C) 0.283 m^3/sec D) 0.328 m^3/sec

Answer: C

Diff: 0 Type: MC

12) _____

13) What is $34 + (3) \times (1.2465)$ written with the correct number of significant figures?

- A) 37.74 B) 37.7 C) 38 D) 4×10^1 E) 37.7395

Answer: C

Diff: 0 Type: MC

13) _____

14) Convert 1.2×10^{-3} to decimal notation.

- A) 1.200 B) 0.1200 C) 0.0120 D) 0.0012 E) 0.00012

Answer: D

Diff: 0 Type: MC

14) _____

- 15) Convert a speed of 4.50 km/h to units of ft/min. (1.00 m = 3.28 ft) 15) _____
A) 246 ft/min
B) 82.3 ft/min
C) 0.246 ft/min
D) 165 ft/min
E) 886 ft/min
Answer: A
Diff: 0 Type: MC
- 16) Write out the number 7.35×10^{-5} in full with a decimal point and correct number of zeros. 16) _____
A) 0.00000735
B) 0.0000735
C) 0.000735
D) 0.00735
E) 0.0735
Answer: B
Diff: 0 Type: MC
- 17) A certain CD-ROM disk can store approximately 6.0×10^2 megabytes of information, where 10^6 bytes = 1 megabyte. If an average word requires 9.0 bytes of storage, how many words can be stored on one disk? 17) _____
A) 2.0×10^9 words B) 6.7×10^7 words C) 2.1×10^7 words D) 5.4×10^9 words
Answer: B
Diff: 0 Type: MC
- 18) When determining the number of significant figures in a number, zeroes to the left of the decimal point are never counted. 18) _____
A) True B) False
Answer: B
Diff: 0 Type: MC
- 19) A marathon is 26 mi and 385 yd long. Estimate how many strides would be required to run a marathon. Assume a reasonable value for the average number of feet/stride. 19) _____
A) 4.5×10^5 strides B) 4.5×10^3 strides C) 4.5×10^6 strides D) 4.5×10^4 strides
Answer: D
Diff: 0 Type: MC
- 20) The position x , in meters, of an object is given by the equation $x = A + Bt + Ct^2$, where t represents time in seconds. What are the SI units of A , B , and C ? 20) _____
A) m, s, s^2
B) m/s, m/s², m/s³
C) m, s, s
D) m, m/s, m/s²
E) m, m, m
Answer: E
Diff: 0 Type: MC

- 21) What is the sum of $1.53 + 2.786 + 3.3$ written with the correct number of significant figures? 21) _____
A) 8 B) 7.6 C) 7.62 D) 7.616 E) 7.6160
Answer: B
Diff: 0 Type: MC

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 22) Albert uses as his unit of length (for walking to visit his neighbors or plowing his fields) the albert (A), the distance Albert can throw a small rock. One albert is 92 meters. How many square alberts is equal to one acre? ($1 \text{ acre} = 43,560 \text{ ft}^2 = 4050 \text{ m}^2$) 22) _____
Answer: 1.29 A^2
Diff: 0 Type: SA

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 23) If a woman weighs 125 lb, her mass expressed in kilograms is $x \text{ kg}$, where x is 23) _____
A) greater than 125. B) less than 125.
Answer: B
Diff: 0 Type: MC
- 24) In addition to $1 \text{ m} = 39.37 \text{ in.}$, the following exact conversion equivalents are given: 24) _____
 $1 \text{ mile} = 5280 \text{ ft}$, $1 \text{ ft} = 12 \text{ in}$, $1 \text{ hour} = 60 \text{ min}$, and $1 \text{ min} = 60 \text{ s}$. If a particle has a velocity of 8.4 miles per hour, its velocity, in m/s, is closest to
A) 3.0 m/s. B) 4.5 m/s. C) 4.1 m/s. D) 3.4 m/s. E) 3.8 m/s.
Answer: E
Diff: 0 Type: MC
- 25) If a flower is 6.5 cm wide, its width expressed in millimeters is $x \text{ mm}$, where x is 25) _____
A) greater than 6.5. B) less than 6.5.
Answer: A
Diff: 0 Type: MC
- 26) If a tree is 15 m tall, its height expressed in feet is $x \text{ ft}$, where x is 26) _____
A) greater than 15. B) less than 15.
Answer: A
Diff: 0 Type: MC
- 27) Add 3685 g and 66.8 kg and express your answer in milligrams (mg). 27) _____
A) $7.05 \times 10^6 \text{ mg}$ B) $7.05 \times 10^7 \text{ mg}$ C) $7.05 \times 10^5 \text{ mg}$ D) $7.05 \times 10^4 \text{ mg}$
Answer: B
Diff: 0 Type: MC
- 28) The number 0.003010 has 28) _____
A) 7 significant figures. B) 6 significant figures.
C) 4 significant figures. D) 2 significant figures.
Answer: C
Diff: 0 Type: MC

- 29) What is the result of $1.58 \div 3.793$ written with the correct number of significant figures? 29) _____
- A) 4.2×10^{-1}
 B) 4.1656×10^{-1}
 C) 4×10^{-1}
 D) 4.17×10^{-1}
 E) 4.166×10^{-1}
- Answer: D
 Diff: 0 Type: MC
- 30) The current definition of the standard meter of length is based on 30) _____
- A) the length of a particular object kept in France.
 B) the distance traveled by light in a vacuum.
 C) the distance between the earth and the sun.
 D) the distance between the earth's equator and north pole.
- Answer: B
 Diff: 0 Type: MC
- 31) What is $56 + (32.00)/(1.2465 + 3.45)$ written with the correct number of significant figures? 31) _____
- A) 62.8
 B) 62.812
 C) 62.8123846
 D) 62.81
 E) 63
- Answer: E
 Diff: 0 Type: MC
- 32) The height of the ceiling in a typical home, apartment, or dorm room is closest to 32) _____
- A) 100 cm. B) 200 cm. C) 400 cm. D) 500 cm.
- Answer: B
 Diff: 0 Type: MC
- 33) 0.0001776 can also be expressed as 33) _____
- A) 1.776×10^{-3} .
 B) 1.776×10^{-4} .
 C) 17.72×10^4 .
 D) 1772×10^5 .
 E) 177.2×10^7 .
- Answer: B
 Diff: 0 Type: MC
- 34) The speed of a wave pulse on a string depends on the tension, F , in the string and the mass per unit length, μ , of the string. Tension has SI units of $\text{kg} \cdot \text{m} \cdot \text{s}^{-2}$ and the mass per unit length has SI units of $\text{kg} \cdot \text{m}^{-1}$. What combination of F and μ must the speed of the wave be proportional to? 34) _____
- A) $\sqrt{\mu / F}$ B) F / μ C) $\sqrt{F / \mu}$ D) $\sqrt{\mu F}$ E) μ / F
- Answer: B
 Diff: 0 Type: MC

- 35) Scientists use the metric system chiefly because it is more accurate than the English system. 35) _____
 A) True B) False
 Answer: B
 Diff: 0 Type: MC
- 36) The following exact conversion equivalents are given: 1 m = 100 cm , 1 in = 2.54 cm, and 1 ft = 12 in. 36) _____
 If a computer screen has an area of 1.27 ft², this area is closest to
 A) 0.00284 m².
 B) 4.65 m².
 C) 0.118 m².
 D) 0.284 m².
 E) 0.0465 m².
 Answer: C
 Diff: 0 Type: MC
- 37) What is the value of $\pi(8.104)^2$, written with the correct number of significant figures? 37) _____
 A) 206.324 B) 206.323 C) 206.3 D) 206 E) 200
 Answer: C
 Diff: 0 Type: MC
- 38) A plot of land contains 5.8 acres. How many square meters does it contain? [1 acre = 43,560 ft²] 38) _____
 A) 2.3×10^4 m² B) 5.0×10^4 m² C) 7.1×10^3 m² D) 7.0×10^4 m²
 Answer: A
 Diff: 0 Type: MC
- 39) Approximately how many times does an average human heart beat in a year? 39) _____
 A) 4×10^7 B) 4×10^9 C) 4×10^8 D) 4×10^6 E) 4×10^5
 Answer: A
 Diff: 0 Type: MC
- 40) A person on a diet loses 1.6 kg in a week. How many micrograms/second ($\mu\text{g/s}$) are lost? 40) _____
 A) 44 $\mu\text{g/s}$ B) 1.6×10^5 $\mu\text{g/s}$ C) 2.6×10^3 $\mu\text{g/s}$ D) 6.4×10^4 $\mu\text{g/s}$
 Answer: C
 Diff: 0 Type: MC
- 41) 0.00325×10^{-8} cm can also be expressed in mm as 41) _____
 A) 3.25×10^{-12} mm.
 B) 3.25×10^{-11} mm.
 C) 3.25×10^{-10} mm.
 D) 3.25×10^{-9} mm.
 E) 3.25×10^{-8} mm.
 Answer: C
 Diff: 0 Type: MC

- 42) The current definition of the standard kilogram of mass is based on _____
A) the mass a particular object kept in France.
B) the mass of the sun.
C) the mass of a cesium-133 atom.
D) the mass of the earth.
Answer: A
Diff: 0 Type: MC
- 43) When adding two numbers, the number of significant figures in the sum is equal to the number of significant figures in the least accurate of the numbers being added. _____
A) True
B) False
Answer: B
Diff: 0 Type: MC
- 44) The length and width of a rectangle are 1.125 m and 0.606 m, respectively. Multiplying, your calculator gives the product as 0.68175. Rounding properly to the correct number of significant figures, the area should be written as _____
A) 0.7 m².
B) 0.68 m².
C) 0.682 m².
D) 0.6818 m².
E) 0.68175 m².
Answer: C
Diff: 0 Type: MC
- 45) What is the product of 11.24 and 1.95 written with the correct number of significant figures? _____
A) 22
B) 21.9
C) 21.92
D) 21.918
E) 21.9180
Answer: B
Diff: 0 Type: MC
- 46) How many nanoseconds does it take for a computer to perform one calculation if it performs 6.7×10^7 calculations per second? _____
A) 11 ns
B) 67 ns
C) 15 ns
D) 65 ns
Answer: C
Diff: 0 Type: MC
- 47) Approximately how many times does an average human heart beat in a lifetime? _____
A) 3×10^9
B) 3×10^8
C) 3×10^{10}
D) 3×10^7
E) 3×10^{11}
Answer: A
Diff: 0 Type: MC
- 48) A weight lifter can bench press 171 kg. How many milligrams (mg) is this? _____
A) 1.71×10^8 mg
B) 1.71×10^9 mg
C) 1.71×10^7 mg
D) 1.71×10^6 mg
Answer: A
Diff: 0 Type: MC

- 49) The mass of a typical adult woman is closest to _____
A) 75 kg. B) 20 kg. C) 35 kg. D) 150 kg.
Answer: A
Diff: 0 Type: MC
- 50) The current definition of the standard second of time is based on _____
A) the oscillation of a particular pendulum kept in France.
B) the earth's rotation rate.
C) the duration of one year.
D) the frequency of radiation emitted by cesium atoms.
Answer: D
Diff: 0 Type: MC
- 51) What is $0.205^{2/3}$, expressed to the proper number of significant figures? _____
A) 0.348 B) 0.3477 C) 0.3 D) 0.35
Answer: A
Diff: 0 Type: MC
- 52) What is the sum of 1123 and 10.3 written with the correct number of significant figures? _____
A) 1133 B) 1133.3 C) 1133.3000 D) 1.13×10^3 E) 1.1×10^3
Answer: A
Diff: 0 Type: MC