

## Chapter 1: MEASUREMENT

- The SI standard of time is based on:
  - the daily rotation of the earth
  - the frequency of light emitted by  $\text{Kr}^{86}$
  - the yearly revolution of the earth about the sun
  - a precision pendulum clock
  - none of theseAns: E
- A nanosecond is:
  - $10^9$  s
  - $10^{-9}$  s
  - $10^{-10}$  s
  - $10^{-10}$  s
  - $10^{-12}$Ans: B
- The SI standard of length is based on:
  - the distance from the north pole to the equator along a meridian passing through Paris
  - wavelength of light emitted by  $\text{Hg}^{198}$
  - wavelength of light emitted by  $\text{Kr}^{86}$
  - a precision meter stick in Paris
  - the speed of lightAns: E
- In 1866, the U. S. Congress defined the U. S. yard as exactly 3600/3937 international meter. This was done primarily because:
  - length can be measured more accurately in meters than in yards
  - the meter is more stable than the yard
  - this definition relates the common U. S. length units to a more widely used system
  - there are more wavelengths in a yard than in a meter
  - the members of this Congress were exceptionally intelligentAns: C
- Which of the following is closest to a yard in length?
  - 0.01 m
  - 0.1 m
  - 1 m
  - 100 m
  - 1000 mAns: C

6. There is no SI base unit for area because:
- A. an area has no thickness; hence no physical standard can be built
  - B. we live in a three (not a two) dimensional world
  - C. it is impossible to express square feet in terms of meters
  - D. area can be expressed in terms of square meters
  - E. area is not an important physical quantity

Ans: D

7. The SI base unit for mass is:

- A. gram
- B. pound
- C. kilogram
- D. ounce
- E. kilopound

Ans: C

8. A gram is:

- A.  $10^{-6}$  kg
- B.  $10^{-3}$  kg
- C. 1 kg
- D.  $10^3$  kg
- E.  $10^6$  kg

Ans: B

9. Which of the following weighs about a pound?

- A. 0.05 kg
- B. 0.5 kg
- C. 5 kg
- D. 50 kg
- E. 500 kg

Ans: D

10.  $(5.0 \times 10^4) \times (3.0 \times 10^6) =$

- A.  $1.5 \times 10^9$
- B.  $1.5 \times 10^{10}$
- C.  $1.5 \times 10^{11}$
- D.  $1.5 \times 10^{12}$
- E.  $1.5 \times 10^{13}$

Ans: C

11.  $(5.0 \times 10^4) \times (3.0 \times 10^{-6}) =$

- A.  $1.5 \times 10^{-3}$
- B.  $1.5 \times 10^{-1}$
- C.  $1.5 \times 10^1$
- D.  $1.5 \times 10^3$
- E.  $1.5 \times 10^5$

Ans: B

12.  $5.0 \times 10^5 + 3.0 \times 10^6 =$

A.  $8.0 \times 10^5$

B.  $8.0 \times 10^6$

C.  $5.3 \times 10^5$

D.  $3.5 \times 10^5$

E.  $3.5 \times 10^6$

Ans: E

13.  $(7.0 \times 10^6)/(2.0 \times 10^{-6}) =$

A.  $3.5 \times 10^{-12}$

B.  $3.5 \times 10^{-6}$

C. 3.5

D.  $3.5 \times 10^6$

E.  $3.5 \times 10^{12}$

Ans: E

14. The number of significant figures in 0.00150 is:

A. 2

B. 3

C. 4

D. 5

E. 6

Ans: B

15. The number of significant figures in 15.0 is:

A. 1

B. 2

C. 3

D. 4

E. 5

Ans: C

16.  $3.2 \times 2.7 =$

A. 9

B. 8

C. 8.6

D. 8.64

E. 8.640

Ans: C

17.  $1.513 + 27.3 =$

- A. 29
- B. 28.8
- C. 28.9
- D. 28.81
- E. 28.813

( )Ans: B

18. 1 mi is equivalent to 1609 m so 55 mph is:

- A. 15 m/s
- B. 25 m/s
- C. 66 m/s
- D. 88 m/s
- E. 1500 m/s

Ans: B

19. A sphere with a radius of 1.7 cm has a volume of:

- A.  $2.1 \times 10^{-5} \text{ m}^3$
- B.  $9.1 \times 10^{-4} \text{ m}^3$
- C.  $3.6 \times 10^{-3} \text{ m}^3$
- D.  $0.11 \text{ m}^3$
- E.  $21 \text{ m}^3$

Ans: A

20. A sphere with a radius of 1.7 cm has a surface area of:

- A.  $2.1 \times 10^{-5} \text{ m}^2$
- B.  $9.1 \times 10^{-4} \text{ m}^2$
- C.  $3.6 \times 10^{-3} \text{ m}^2$
- D.  $0.11 \text{ m}^2$
- E.  $36 \text{ m}^2$

Ans: C

21. A right circular cylinder with a radius of 2.3 cm and a height of 1.4 m has a volume of:

- A.  $0.20 \text{ m}^3$
- B.  $0.14 \text{ m}^3$
- C.  $9.3 \times 10^{-3} \text{ m}^3$
- D.  $2.3 \times 10^{-3} \text{ m}^3$
- E.  $7.4 \times 10^{-4} \text{ m}^3$

Ans: D

22. A right circular cylinder with a radius of 2.3 cm and a height of 1.4 cm has a total surface area of:

- A.  $1.7 \times 10^{-3} \text{ m}^2$
- B.  $3.2 \times 10^{-3} \text{ m}^2$
- C.  $2.0 \times 10^{-3} \text{ m}^3$
- D.  $5.3 \times 10^{-3} \text{ m}^2$
- E.  $7.4 \times 10^{-3} \text{ m}^2$

Ans: D

23. A cubic box with an edge of exactly 1 cm has a volume of:

- A.  $10^{-9} \text{ m}^3$
- B.  $10^{-6} \text{ m}^3$
- C.  $10^{-3} \text{ m}^3$
- D.  $10^3 \text{ m}^3$
- E.  $10^6 \text{ m}^3$

Ans: B

24. A square with an edge of exactly 1 cm has an area of:

- A.  $10^{-6} \text{ m}^2$
- B.  $10^{-4} \text{ m}^2$
- C.  $10^2 \text{ m}^2$
- D.  $10^4 \text{ m}^2$
- E.  $10^6 \text{ m}^2$

Ans: B

25. 1 m is equivalent to 3.281 ft. A cube with an edge of 1.5 ft has a volume of:

- A.  $1.2 \times 10^2 \text{ m}^3$
- B.  $9.6 \times 10^{-2} \text{ m}^3$
- C.  $10.5 \text{ m}^3$
- D.  $9.5 \times 10^{-2} \text{ m}^3$
- E.  $0.21 \text{ m}^3$

Ans: B

26. During a short interval of time the speed  $v$  in m/s of an automobile is given by  $v = at^2 + bt^3$ , where the time  $t$  is in seconds. The units of  $a$  and  $b$  are respectively:

- A.  $\text{m} \cdot \text{s}^2$ ;  $\text{m} \cdot \text{s}^4$
- B.  $\text{s}^3/\text{m}$ ;  $\text{s}^4/\text{m}$
- C.  $\text{m}/\text{s}^2$ ;  $\text{m}/\text{s}^3$
- D.  $\text{m}/\text{s}^3$ ;  $\text{m}/\text{s}^4$
- E.  $\text{m}/\text{s}^4$ ;  $\text{m}/\text{s}^5$

Ans: D

27. Suppose  $A = BC$ , where  $A$  has the dimension L/M and  $C$  has the dimension L/T. Then  $B$  has the dimension:

- A. T/M
- B.  $\text{L}^2/\text{TM}$
- C.  $\text{TM}/\text{L}^2$
- D.  $\text{L}^2\text{T}/\text{M}$
- E.  $\text{M}/\text{L}^2\text{T}$

Ans: A

28. Suppose  $A = B^n C^m$ , where  $A$  has dimensions  $LT$ ,  $B$  has dimensions  $L^2T^{-1}$ , and  $C$  has dimensions  $LT^2$ . Then the exponents  $n$  and  $m$  have the values:
- A.  $2/3; 1/3$
  - B.  $2; 3$
  - C.  $4/5; -1/5$
  - D.  $1/5; 3/5$
  - E.  $1/2; 1/2$
- Ans: D