**1. Units and dimensions**

1. The standard of time is based on:

A) the daily rotation of the Earth

B) the frequency of light emitted by Kr86 （Krypton 氪）

C) the yearly revolution of the Earth about the sun

D) a precision pendulum clock

E) none of these

2. A nanosecond is:

A) 109 s B)10–9 s C)10–10 s D)10–10 s E)10–12 s

3. The standard of length is based on:

A) the distance from the north pole to the equator along a meridian (子午线) passing through Paris

B) wavelength of light emitted by Hg198 (mercury 汞)

C) wavelength of light emitted by Kr86

D) a precision meter stick in Paris

E) the speed of light

4. In 1866, the U. S. Congress defined the U. S. yard as exactly 3600/3937 international meter. This was done primarily because:

A) length can be measured more accurately in meters than in yards

B) the meter is more stable than the yard

C) this definition relates the common U. S. length units to a more widely used system

D) there are more wavelengths in a yard than in a meter

E) the members of this Congress were exceptionally intelligent

5. Which of the following is closest to your height?

A) 0.02 m B)0.2 m C)2 m D)200 m E)2000 m

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 ft2 in terms of m

D) area can be expressed in terms of m2

E) area is not an important physical quantity

7. The SI base unit for mass is:

A) gram B)pound C)kilogram D)ounce E)kilopound

8. A gram is: A) 10–6 kg B)10–3 kg C)1 kg D)103 kg E)106 kg

9. Which of the following is closest to your mass?

A) 0.06 kg B)0.6 kg C)6 kg D)60 kg E)600 kg

10. 5.0  104  3.0  106 =

A)1.5  109 B)1.5  1010 C)1.5  1011 D)1.5  1012 E)1.5  1013

11. 5.0  104  3.0  10–6 =

A) 1.5  10–3 B)1.5  10–1 C)1.5  101 D)1.5  103 E)1.5  105

12. 5.0  105 + 3.0  106 =

A) 8.0  105 B)8.0  106 C)5.3  105 D)3.5  105 E)3.5  106

13. 7.0  106/2.0  10–6 =

A) 3.5  10–12 B)3.5  10–6 C)3.5 D) 3.5  106 E)3.5  1012

14. The number of significant figures in 0.00150 is:

A) 2 B)3 C)4 D)5 E)6

15. The number of significant figures in 15.0 is:

A) 1 B) 2 C) 3 D) 4 E) 5

16. 3.2  2.7 =

A) 9 B) 8 C) 8.6 D) 8.64 E) 8.640

17. 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

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

A) 2.1  10–5 m3 B)9.1  10–4 m3 C)3.6  10–3 m3 D)0.11 m3 E)21 m3

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

A) 2.1  10–5 m2 B) 9.1  10–4 m2 C) 3.6  10–3 m2

D) 0.11 m2 E) 36 m2

20. 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 m3 B) 0.14 m3 C) 9.3  10–3 m3

D) 2.3  10–3 m3 E) 7.4  10–4 m3

21. 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  10–3 m2 B) 3.2  10–3 m2 C) 2.0  10–3 m3

D) 5.3  10–3 m2 E) 7.4  10–3 m2

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

A) 10–9 m3 B)10–6 m3 C)10–3 m3 D)103 m3 E)106 m3

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

A) 10–6 m2 B)10–4 m2 C)102 m2 D)104 m2 E)106 m2

24. 1 m is equivalent to 3.281 ft. A cube with an edge of 1.5 ft has a volume of:

A) 1.2  102 m3 B) 9.6  10–2 m3 C) 10.5 m3

D) 9.5  10–2 m3 E) 0.21 m3

25. During a short interval of time the velocity *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) ms2; ms4 B) s3/m; s4/m C) m/s2; m/s3 D) m/s3; m/s4

E) m/s4; m/s5

26. Suppose *A* = *BC*, where *A* has the dimensions L/M and *C* has the dimensions L/T. Then *B* has dimension:

A) T/M B)L2/TM C)TM/L2 D)L2T/M E)M/L2T

27. Suppose *A* = *BnCm*, where *A* has dimensions LT, *B* has dimensions L2T–1, and *C* has dimensions LT2. 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