1. Which principle is used to check the dimensional correctness of an equation?
   A. Principle of relativity
   B. Principle of homogeneity of dimensions
   C. Law of conservation of energy
   D. Newton's first law (B)

Explanation : Only similar dimensional quantities can be added or subtracted in an equation; this is called the principle of homogeneity of dimensions

2. The conversion factor from joule to erg is:
   A. 1 J = 10^5 erg
   B. 1 J = 10^6 erg
   C. 1 J = 10^7 erg
   D. 1 J = 10^8 erg (C)

Explanation: Using dimensional analysis between SI and CGS, 1 joule= 10^7 erg

3. Which of the following equations is dimensionally correct?
   A. V= U + at^2
   B. s= ut+1/2 at^2
   C. K.E. = mgh^2
   D. F = ma^2 (B)

Explanation: In s= ut + 1/2at^2 every term has dimension of length [L]; hence it is correct .

4. Which of the following quantities cannot be derived using dimensional analysis?
   A. Time period of a simple pendulum
   B. Energy of a photon
   C. Equation involving logarithmic functions
   D. Velocity of sound in air (B)

Explanation : The method of dimensions was applied to deduce T = $2\pi\sqrt{1/g}$ for a simple pendulum

5. Which of the following cannot be checked using dimensional analysis?
   A. Equations involving logarithms
   B. Equations involving constants
   C. Equations with three variables
   D. Conversion of units (A)

Explanation: Dimensional analysis cannot be used where logarithmic, trigonometric, or exponential functions appear

6. The limitation of dimensional analysis is that it cannot provide:
   A. The units of a derived quantity
   B. Numerical constants and pure numbers
   C. Consistency check of an equation
   D. Conversion between SI and CGS (B)

Explanation: Dimensional analysis cannot give values of constants or dimensionless numbers like 2π2\pi

7. Which dimensional formula pair is correct for van der Waals constants a and b?
   A. [M0L0T3] and [M1L2T−2]
   B. [M0L0T5] and [M1L6T−2]
   C. [M1L5T−2] and [M0L3T0]
   D. [M2L5T−2] and [M0L6T0] (C)

Explanation: For van der Waals equation, a has dimension [M1L5T−2] and b has [M0L3T0] .

8. Which conversion is correct?
   A. 9.8 m/s^2 = 980 cm/s^2
   B. 9.8 m/s^2 = 9.8 * 10^3 cm/s^2
   C. 9.8 m/s^2 = 98 cm/s^2
   D. 9.8 m/s^2 = 9.8 * 10^2 cm/s^2 (A)

Explanation: 1 m = 100 cm. So, 9.8 m/s^2 = 9.8*100= 980 cm/s^2

9. The correct conversion is:
   A. 1 gm/cm3 = 1 kg/m^3
   B. 1 gm/cm^3=10^2 kg/m^3
   C. 1 gm/cm^3=10^3 kg/m^3
   D. 1 gm/cm^3=10^4 kg/m^3 (C)

Explanation: 1 gm/ cm^3= 1000 kg/m^3 after converting g to kg and cm to m.

10. Which of the following is NOT a correct use of dimensional analysis?
    A. Checking correctness of physical equations
    B. Converting units from one system to anothe
    C. Determining whether a quantity is scalar or vector
    D. Deriving approximate relations between physical quantities (C)

Explanation : Dimensional analysis cannot determine whether a physical quantity is scalar or vector .