

Old Exam. Questions Ch.1

T072:

Q1.: The position y of a particle moving along the y axis depends on the time t according to the equation $y = At - Bt^2$. The dimensions of the quantities A and B are respectively: (Ans: L/T , L/T^2)

T071:

Q1.: A swimming pool is filled with 16,500 ft^3 of water. What is the volume of water in m^3 ? (12 inch = 1 ft and 2.54 cm = 1 inch). (Ans: 467 m^3)

Q2.: The position x of a particle is given by $x = B t^2 + \frac{C}{B} t$, where x is in meters and t is in seconds. The dimension of C is: (Ans: $\frac{L^2}{T^3}$)

T062:

Q1: From the fact that the average density of the Earth is 5.50 g/cm^3 and its mean radius is $6.37 \times 10^6 \text{ m}$, the mass of the Earth is: (Ans: $5.95 \times 10^{24} \text{ kg}$)

Q2: Suppose $A = B^n / C^m$ where A has dimensions LT , B has dimensions $L^2 T^{-1}$, and C has dimensions LT^2 . Then the exponents n and m have the values: (Ans: $n = 1/5$; $m = -3/5$)

T061

Q1: An aluminum cylinder of density 2.70 g/cm^3 , a radius of 2.30 cm, and a height of 1.40 m has the mass of: (Ans: 6.28 kg)

T052:

Q1. A nucleus of volume $3.4 \times 10^3 \text{ fm}^3$ and mass of $1.0 \times 10^2 \text{ u}$ has a density of: (1 fm = 10^{-15} m , 1 u = $1.7 \times 10^{-27} \text{ kg}$) (Ans: $5.0 \times 10^{16} \text{ kg/m}^3$)

T051:

Q1. The mass of 1.0 cm^3 of gold is 19.3 g. What is the mass of a solid cube of gold having a side of 0.70 cm ? (Ans: $6.6 \times 10^{-3} \text{ kg}$)

T042:

Q1 Express speed of sound, 330 m/s in miles/h . (1 mile = 1609 m)(**Ans:** A1 738 miles/h)

Q2 A cylindrical can, 6.00 inches high and 3.00 inches in diameter is filled with water. Density of water is 1.00 g/cm³. What is the mass of water in the can in gram ? (1 inch = 2.54 cm . (**Ans:** 695 g)

T041:

Q1 1 shake = 10⁻⁸ seconds. Find out how many nano seconds (ns) are there in 1 shake.(1 nano = 10⁻⁹) (**Ans:** 10 ns)

Q2 A drop of oil (mass = 0.90 milligram and density = 918 kg/m³) spreads out on a surface and forms a circular thin film of radius = 41.8 cm and thickness h (see Fig 8). Find h in nano meter (nm). (1 nano = 10⁻⁹) (**Ans:**1.8 nm)

T032:

Q1 A solid lead cylinder has a mass of 56.5 kg and radius of 35 cm. Find the height of the cylinder. (The density of lead is 11.3 g/cm³) (**Ans:** 1.3 cm)

T031:

Q1 An empty fuel tank of a car needs 50 liters of gasoline to fill up. Find the volume of the fuel tank in m³. (1 milliliter = 1 cm³) (**Ans:** 0.050)

T022:

Q4 Dimension of an atom is often measured in a unit called Angstrom which is equal to 0.1 nm. 1 mm is equal to: (1 nm = 10⁻⁹ m) (**Ans:**10 000 000 Angstrom)

Q5 A student remembers that it takes roughly 8.4 minutes for the sun's light to reach the earth. Using this information and the fact that the speed of light is (3.0 x10⁸) m/s, estimate the distance to the sun in km (**Ans:** 1.50 x 10⁸ km)

T021:

Q1 The standard kilogram is a platinum-iridium cylinder 39 mm in height and 19.5 mm in radius. What is the density of the material? (**Ans:** 21 g/cm³)

Q3 The speed of sound in air is about 350 m/s. Express this speed in miles per hour (mi/h). (1 mile = 1.61 km) (**Ans:** 783 mi/h)

T012:

Q1 Speed of sound is 340 m/s. Express this in millimeters per nanosecond [1 ns = 10⁻⁹ s]. (**Ans:** 3.40 x 10⁻⁴ mm/ns)

T011:

Q1 Speed of sound is 330 m/s. Express this in miles per hour (1 mile = 1609 m). (**Ans:** 738 miles/h)

Q2 The average radius of a nucleus is R = 10.0 fm. Find the density of the nucleus which has a mass of 15u [1 fm = 10⁻¹⁵ m, 1 u = 1.66 x 10⁻²⁷ kg]. (**Ans:** 5.94 x 10¹⁵ kg/m³)

T992:

Q1 A cube of copper has a mass m = 126 g. Find the number of copper atoms in this cube. Atomic mass of copper = 63.0 g/mole; Avogadro number = 6.02 x 10²³ atoms/mole (**Ans:** 1.20 x 10²⁴)

T991:

Q2 How many molecules of water are there in a cup containing 250 cm³ of water? Molecular mass of H₂O = 18 g/mole; Density of water = 1.0 g/cm³; Avogadro's number = 6.02 x 10²³ molecules/mole (**Ans:** 8.4 x 10²⁴)

Q3 Using the fact that the speed of light in space is about 3.00 x 10⁸ m/s, determine how many miles light will travel in one hour. (1 mile = 1.61 km) (**Ans:** 6.71 x 10⁸ miles)