PHYS 215-MECH - I_Question Bank 1

2019-2020

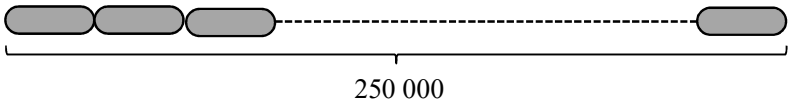
Full Name:……..….

1- Earth is approximately a sphere of radius 6.37×10^6 m. What are
a) its circumference in kilometers,
b) its surface area in square kilometers, and
c) its volume in cubic kilometers?

2- The fastest growing plant on record is a *Hesperoyucca whipplei* that grew 3.7 m in 14 days. What was its growth rate in micrometers per second?

3- a) A thick human hair is about 120 μm wide. Express this distance in meters.
b) The speed limit on a highway is 80 miles/h. What is it in km/min? (Take 100 miles = 160 km)
c) The thickness of a wire is $0.15\ 10^{-3}$ m. Convert this thickness into nm (nanometers).
d) A computer circuit element is 0.05 cm^2. Convert this area in square meters.

4- The length of a cell is about 80 nm. If 250 000 cells are lined up end to end, what will be the total length in m?



5- Write down the dimensional analysis for,

a) acceleration b) volume c) area d) force

6- The volume V of an object as a function of time is calculated by $V = \frac{A}{B}t^4 + Bt$, where t is measured in seconds and V is in cubic meters. Determine the dimension of the constant A.

7- What is the dimension of the constant G in the equation: $F = G\frac{m_1 m_2}{r^2}$, where F is force, m_1 and m_2 are masses and r is the distance between the two masses.

8- Copper has a density of 8.96 g/cm^3, and the mass of a copper atom is 1.06×10^{-25} kg. If the atoms are spherical and tightly packed, what is the radius of a copper atom? *The formula for the volume of a sphere is:* $V = \frac{4}{3}\pi r^3$