NAME: *1ères 7et 9*

Test on "Worlds, big and small"

I) The microcosmos

1. a. What is the smallest distance visible to the naked eye? 1
   b. Why cannot the eye distinguish a detail smaller than this distance? 1

2. *"To observe smaller bodies in the microcosmos, we need electron microscopes which use smaller wavelength than those of visible light…"*

a. What is the range of the visible wavelengths, in nm? Which radiations stand at the limits? 2
b. Fill in the following table which sums up the size and the kind of wave we need to "see" smaller bodies:

bodies	size or wavelength in metre	kind of wave
viruses		2
molecules		2

b. Calculate the energy carried by gamma rays ($\lambda = 10^{-14}$ m) 2
c. Why do we need even larger energies to "see" even smaller things? 1

c = 3.0×10 ^{8} m. s^{-1}
h = 6.67×10 $^{-34}$ ISU

3. a. Which device allowed studying deeper layers of matter than nuclei? 1
   b. What did we discover in the nucleus? 1
   c. What did we discover in the nucleons? 1
   d. Are there even smaller things? Which size are they? 2

II) The macrocosmos

1. a. Which unit do we have to use to express astronomic distances? 1
   b. Give a definition for this unit. 1
   c. How much is it in km? 1

2. Put in the right order the following celestial bodies according to their distance from the Earth:

   Alpha Centauri – the Sun – quasars – the centre of the Milky Way. 1