

Question of the human mind:

“What is the ultimate nature of matter in our universe?”

Read through the following questions ***BEFORE*** viewing the videotape.

- _____ 1. Two uses for quartz crystals.
- _____ 2.
- _____ 3. In what decade were atoms first imaged?
- _____ 4. How much magnification is required to see the atoms that make up a quartz crystal?

5. Underline the applications for the atom mentioned in the videotape.

medicine: imaging, nuclear reactors, in chemistry to predict rxns, alloys, ceramics - superconductors, drugs, paints
fertilizers, cosmetics, plastics

- _____ 6. First to propose the existence of atoms 2000 years ago.
- _____ 7. First to propose that atoms combined in definite amounts of starting and ending materials in reactions.
- _____ 8. Protons and neutrons are located in the _____.
- _____ 9. The number of _____ determine the identity of the atom.
- _____ 10. What type of forces hold the nucleus together?
- _____ 11. What is this region where the electrons are located called?
- _____ 12. Compared to the nucleus, how much bigger is the location of the electrons?
- _____ 13. When were atoms first “imaged” by IBM?
- _____ 14. Atoms of what elements were seen by the STM, scanning tunneling microscope?
- _____ 15. Early experiments studied what physical phenomenon?
- _____ 16. What are the two basic electric charges?
- _____ 17. What particles can be “seen” using a Crooke’s tube?
- _____ 18. Rutherford proposed the existence of which part of the atom? What charge was it?
- _____ 19.
- _____ 20. Spherically shaped electron regions are called _____ clouds.
- _____ 21. Hour-glass shaped electron regions are called _____ clouds.
- _____ 22. The difference in the spherical and hour glass shaped clouds is in their _____.
- _____ 23. An example of a trace element in the environment vital to human diet is _____.
- _____ 24. A harmful element in the environment even in extremely small amounts is _____.
- _____ 25. One technique to use signals from atoms to identify atoms is called _____ spectroscopy.
- _____ 26. The key to emission spectroscopy is _____.

_____ 27. When an electron emits light energy, what happens to the energy of the electron?

_____ 28. When an 's' cloud changes to a 'p' cloud is energy absorbed or given off?

Essay Questions:

29. Why are some parts of the electron cloud represented darker and other parts lighter when you look at a model of an atom?

30. What did Rutherford think most of the positively charged particles from the polonium source would do when they encountered the piece of gold foil? What did they really do?

31. How does an electron produce a unique emission spectrum?