What You Should Know from “Looking Glass Universe”!

1.) Protons and electrons are attracted to one another. The attraction is due to virtual particles that come into existence for a moment before ceasing to exist. What principle allows that tiny bit of energy to be created out of nothing, existing for only a brief instant?

2.) What are the four distinct kinds of force fields and what do they do?

3.) Virtual particles are called what?

4.) How is the energy and mass of a virtual particles affect its existence? That is, what limitation would there be on a high energy, super massive virtual particle?

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6.) Why are lighter gauge bosons associated with forces that are longer range?

7.) What are the two massless gauge bosons, and what does this lack of mass have to do with their range?

8.) How many distinct states does the charge property of the Strong force come in? What are these usually referred to? (This is why the theory is called quantum chromodynamics.)

9.) For particles like protons governed by the Strong force, how many charge colors do the particles need to be neutral?

10.) How many gauge bosons (gluons) does the Strong force have?

11.) When quarks interact and exchange gluons, they do what? (swap colors)

12.) Can gluons be attracted to one another? (yes) When that happens, what is the collection called? (a glue ball)

13.) Because the Weak force gauge bosons are incredibly massive, what is true of their range? Also, what are they called?

14.) Over distances small enough, and at high enough energies, what is true of the four forces?

15.) In the Standard Model, there are six quarks, six leptons, their anti-particles, and twelve gauge bosons (force intermediaries), but only which of those particles populate the universe in a natural state today?

9.) What is the name of the core principle around which the Standard Model is formed?