

## BLITZ: Modern Physics Form M-R

Name \_\_\_\_\_ Period \_\_\_\_\_

*This is a Take Home Exam. You may use your notes but you may NOT use help from human beings.*

**EXPLAIN IN COMPLETE SENTENCES AND GIVE EXAMPLES:**

**You MUST HAND WRITE THIS EXAM!! NO TYPED PAPERS WILL BE ACCEPTED!**

1. A. Describe the Michelson-Morley Experiment and tell what was learned from it. B. What is meant by “The Speed of Light is Invariant”?
2. Write the three equations for Einstein’s Special Theory of Relativity and tell what the parameters are.
3. What are the three effects of approaching the speed of light, and where do we see these really take place?
4. In Einstein’s General Theory of Relativity, what causes the gravitational attraction?
5. What is the meaning of Planck’s Quantum Constant and give its value.
6. If the Quantum Constant were very large, A. What would happen to a ball confined in a space? B. Where does this happen in real life?
7. If the Quantum Constant were very large, A. What would happen to a small animal leaping through a bamboo grove? B. Where does this happen in real life?
8. In the city where  $c = 10$  km/hr, what three things happened to Mr. Tompkins, relative to a sidewalk observer, as he approached 10 km/hr?
9. In the city where  $c = 10$  km/hr, what color was Tompky to the sidewalk observer when Tompky was approaching? What color when Tompky was receding? **Explain!**
10. What effects did Mr. Tompkins notice about his surroundings as he sped down the street?
11. On the Paradox of Time Dilation, describe what astounded Mr. Tompkins in the railway station?
12. What was Schrödinger trying to illustrate with the Schrödinger’s Cat analogy.
13. List the Four Forces, tell where they apply, how their strengths compare, and the distances over which they act.
14. What are Quarks? Name six types of quarks.
15. What is Heisenberg’s Uncertainty Principle?
16. What happened to the ice in *The Quantum Cafe*? How does this apply to radioactivity?
17. Give the titles of the three books we should read this summer according to Boom.

**When finished, please STAPLE this exam onto your papers and turn in on due date.**