

FERMI QUESTIONS – NJAAPT PHYSICS OLYMPICS – 2022

NJPO Assigned Team Number: _____

School: Answers

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- Determine your answers to nearest order of magnitude (i.e., 10^4 not 3×10^4 , 10^6 not 7×10^5).
 - **Answers should be written as the exponent only.** 10^4 would be answered as “4” and 10^{-7} would be “-7”.
 - **10 points** are awarded for each correct answer. There will be one point deducted for each order of magnitude the answer differs from the expected with a maximum of ten points deducted per question.
 - **NO DEVICES** (cell phones, smart devices/watches, ipods/ipads, calculators, computers, etc.) or preprinted references shall be permitted to be used during the event.
 - You have 30 minutes to provide your answers.
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1. How many water molecules are contained in a six-pack of 12 oz cans of soda? 1) 26
2. What thickness of rubber, in meters, is worn off during each revolution of a passenger car tire? 2) -10
3. How much money (in US Dollars) would it take to stack \$100-bills flat from the surface of the Earth to the surface of the Moon? 3) 14
4. How many golf balls would fill the Pacific Ocean (to “sea-level”)? 4) 22
5. How many times are cell phones “checked” (glanced at) in the US in a year? 5) 12
6. What volume of saliva, in cubic meters, is produced by a human in their lifetime? 6) 1
7. How many kilograms of flour were used in making holiday cookies by home bakers in the US during the 2021 holiday season? 7) 7
8. How many kilometers of toilet paper are used in the US annually? 8) 8
9. What is the volume in cubic meters of a single strand of human hair 4 inches long? 9) -9, -10, or -11
10. How many seconds would it take to grow a finger-nail the length of a football field? 10) 11