

## FERMI QUESTIONS – NJAAPT PHYSICS OLYMPICS – 2021

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- Determine your answers to nearest order of magnitude (i.e.,  $10^4$  not  $3 \times 10^4$ ,  $10^6$  not  $7 \times 10^5$ ).
  - **Answers should be written as the exponent *only*.**  $10^4$  would be answered as “4” and  $10^{-7}$  would be “-7”.
  - **Explanations of answers are required and should follow the instructional “Guidelines” document.**
  - Ten points are awarded for each correct answer. There will be one point deducted for each order of magnitude the answer differs from the excepted 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.
  - Answers need to be submitted via Google Form on the Classroom page AND solutions documented and uploaded into Google Classroom within 45 mins from the start of the event.
  - Name your submission file “school\_school number\_Fermi”. Ex: “bernards\_9\_fermi.pdf”
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1. How many tons of asphalt were used to pave the main-line (not ramps) of the Garden State Parkway?
2. How many baseballs are used during games in a normal 162-game major league baseball season?
3. How many gallons of water are wasted by slow-leaking water faucets in the US annually?
4. Excluding hospital/medical facility use, how many masks were worn by US residents in 2020?
5. How many sheets of printer-paper, stacked flat, would it take to reach Mars on its closest approach to Earth?