Fermi Questions: F-M Invitational

Names:_____
School:_____
Letter Code:_____

Part One: Let's get started with some Fermi Questions!

[1] Most modern golf balls are made of three layers to help improve performance and ball flight. How many Titlelist™ golf balls could fit in this room, assuming normal stacking?

FA_____

[2] What is the weight, in ~~Fig Newtons~~ micro-Newtons, of the people taking this test in this room right now?

FA_____

[3] How tall (in mm) would be a stack of paper with 1 billion stars this size * on this style paper (with these margins and single line spacing) be?

FA_____

[4] If it became your day job to count money in $1s, how many work days would it take you to count the total value of the money contained in Fort Knox?

FA_____

[5] Consider a regular dodecahedron. Let A=Number faces, B=Number of edges, C=the number of Platonic Solids, D=the number of vertices, and E=sum of all interior angles of a regular dodecahedron. Compute AxBxDxE

FA_____

Part 2: In Honor of our Gracious Hosts!

[6] What is the Average Kinetic Energy of the average hornet in kilowatt-hours?

FA_____

[7] How many pints of honey were produced in 2014?

FA_____

[8] How many times does an average worker honey bee flap its wings during it's life?

FA_____

Part 3: This Test is Making me Hungry and Thirsty!

[9] How many years would it take Chipotle to sell 1 mole of their burritos?

FA_____

[10] How many Joules of energy will be consumed today by Science Olympians here at the F-M Invitational as a result of Chipotle consumption?

FA_____

[11] At the inferior burrito establishment Moe's, you are always given a serving of tortilla chips with your burrito. How many ears of corn are needed to produce all the tortilla chips that Moe's serves in a year?

FA_____

[12] Strictly from calories, how many **red** M&Ms would a person have to eat per year to survive?

FA_____

[13] On average, how many molecules of H_2O should a healthy person consume each second of the day?

FA_____

Part 4: Some Really Phun Fisiks Questions

[14] The Red Giant **Betelgeuse** is one of the largest and most luminous stars visible to us while stargazing at night. If you were looking up at **Betelgeuse** right now, how many seconds ago were the photons of light you're seeing emitted from **Betelgeuse**? (oh no I said it 3 times!)

FA_____

[15] Protons and antiprotons can completely annihilate each other, and produce energy in the form of gamma rays. If this energy could be all converted into electricity, at what rate would the particles need to be annihilated to light a 100 watt Halogen light-bulb? (i.e. calculate the number of annihilations per second)

FA_____

[16] If two large males each possessed 1% more electrons in their body and were separated by a distance of 1m, how many g's of acceleration would each person initially experience?

FA_____

[17] By what factor is the electrostatic force of repulsion between the two males above larger than the gravitational force of attraction between them?

FA_____

[18] Consider a small adult woman with brunette hair wearing a sweater and walking at a normal gait. By what factor is her DeBroglie wavelength larger than the Planck length?

FA_____

[19] How many photons of infrared light are emitted from an average human during a typical day in Fayetteville?

FA_____

[20] How many parsecs does a spacecraft leaving the earth at escape velocity travel in a googol seconds worth of time?

FA_____

Part 5: Some Fermi Pot Pourri!

[21] How many times could all of your DNA in your body wrap around the equator of the Earth if it were connected and stretched in a straight line?

FA_____

[22] How many frames of film were needed to create the entire Main Saga Films in the current *Star Wars* movie franchise? (i.e. episodes 1-7)

FA_____

[23] Let Jan 1st =1, Jan 2nd=2, …, and December 31st=365. Determine the number of cheerios eaten by all americans in 2015 on days which are prime numbers.

FA_____

[24] If the entire Earth (oceans and land) were 100% covered in Solar Panels, how much energy would be produced in 1 year in kilowatt-hours?

FA_____

[25] How many hours would we need these solar panels to collect sunlight for to provide the energy used by the entire Earth's population for an entire year?

FA_____

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