Car Energy Calculation Problems Assignment

Name: Date: Hour:

Many people feel that they have very little impact on Global Warming. So why worry about global issues if we are so insignificant? Most of us need cars, yet we seldom consider the impact our personal means of transportation has on the issues of energy use and carbon dioxide production. The United States uses about880,000,000 gal oil/day. Sixty-five percent of that consumption (572,000,000 gal oil/day) is in the area of transportation.

The following is the approximate equation for burning gas in a car:

**25 O2 + 2C8H18 ------> 18 H20 + 16 CO2** **+ Heat**

A gallon of gas weighs about 7 lbs which when burned produces 20 lbs of CO2. The average vehicle is driven 12,000 miles per year and has an average life of 12 years (U.S. Dept. of Transportation).

1. The conventional gasoline-powered 2018 Honda Civic is one of the best fuel-efficient cars in its class for mileage. The conventional Honda Civic gets 35 mpg during city driving (40 mpg highway). When the exact same car is given a hybrid-electric engine, mileage is 40 mpg city and 45 mpg highway. The costs are $20,650 Honda Civic Hybrid and $16,000 Honda Civic conventional \*average, depending on features. You plan to drive mostly in the city, to and from work and for weekend errands. You expect to drive 8,000 miles a year in the city, plus another 4,000 miles in longer trips that would count as “highway”.
2. How much would you spend on gas for the hybrid Civic in a year, assuming gas cost $2.25

per gallon)?

To get you started:

8000 miles / 40 mpg = \_\_\_\_\_\_\_\_ gallons x $2.25 = \_\_\_\_\_\_\_\_\_\_\_\_\_

4000 miles / 45 mpg = \_\_\_\_\_\_\_\_ gallons x $2.25 = \_\_\_\_\_\_\_\_\_\_\_\_\_

Answer 1 \_\_\_\_\_\_\_\_\_\_\_\_ + Answer 2 \_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ amount spent on gas in hybrid

1. How much would you spend on gas for the conventional Civic in a year, assuming gas cost

$2.25 a gallon?

1. How long would it take for the savings in gas costs tooffset the increase in the price of the hybrid Civic?

2. The 2018 Toyota Prius gets 48 mpg city and 45 mpg freeway. The “best-selling car in America” is the ford F-150 truck. The 4WD, V6 version of the F-150 gets 14 mpg city and 19 mpg highway.

1. The average American drives 12,000 miles per year. Assume that most people do about 9000 miles of their driving in stop and go city traffic and 3000 miles in highway traffic. How much money would be saved per person by driving the Prius over the F-150?

F – 150:

Prius:

1. Assume that every gallon of gas consumed contributes approximately 20 kg of CO2 to the atmosphere. How many extra kg of CO2 are put into the atmosphere by the F 150 in a year, when compared to the Prius?

Gallons of gas used by F-150 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ x 20 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ CO2

Gallons of gas used by Prius \_\_\_\_\_\_\_\_\_\_\_\_\_\_ x 20 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ CO2

Amount of extra CO2 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. F-Series trucks (all Ford trucks like the F-150) were the best-selling vehicles in America for the 26nd consecutive year in 2017. Sales totaled 845,586 trucks for the year. Calculate how many gallons of gas and kg of CO2 would be saved if all of these truck purchasers brought Prius cars instead.

Gallons and Amount of CO2 from trucks:

Gallons and Amount of CO2 from Prius’:

Difference:

CO2=

Gallons=

If gas were still $2.25/gallon, how much money would be saved total? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. If the vehicle is in-service for 10 years, how much CO2 is saved over the life of the vehicle? How much money is saved? (Assuming gas still costs $2.25 a gallon.)

3. Now do these calculations for your own car. (If you don’t have a car, pick one of your parents that you ride in most frequently). Find out the average mpg your car gets for city driving and highway driving. You may have to do a bit of research on the internet if you don’t know off the top of your head. An average number is ok.

1. The average American drives 12,000 miles per year. Assume that most people do about 9000 miles of their driving in stop and go city traffic and 3000 miles in highway traffic. How much money and CO2 would be saved per person by driving the Prius over your car?

Prius answers: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ CO2

Your car: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (year, make, and model)

Mpg city \_\_\_\_\_\_\_\_\_\_\_\_

Mpg highway \_\_\_\_\_\_\_\_\_\_\_

Amount of money saved by driving a Prius instead of your car? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Amount of C02 saved by driving Prius instead of your car? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Some people feel their impact on the earth is insignificant in terms of CO2 production. Use data from this lab to support or refute this position.

5. How is driving your car to school (vs. taking the school bus) connected to the following:

1. acid deposition:

b) global warming:

6. If the United States imports 10 million barrels of oil a day at a price of $60.00 a barrel, how much money is leaving the country each day? Show your work.

7. If people had more money to spend on other things than energy, how would this impact the other sectors of the economy? Explain why this would be good or bad.

8. List 5 reasons why reducing our oil consumption is a great goal.