EV20001: ENVIRONMENTAL SCIENCE

Assignment #1: Understanding Air Pollution

(DUE 17 FEBRUARY 2021)

1. A coal burning power plant consumes 10,000 tons of coal per day. The coal contains 2% sulfur by weight. If the sulfur oxides released during a certain day are confined to a volume of 10^{11} cubic meters, calculate the concentration of SO_2 (in $\mu g/m^3$) in the air surrounding the power plant. To comply with acid rain control requirements, the plant is considering switching to a low-sulfur coal. How low does the sulfur content in the coal have to be so that the power plant can meet the National Ambient Air Quality Standards (NAAQS) (i.e., 365 $\mu g/m^3$), if all other conditions are the same? **[5]**

2. In 2018, it was estimated that the number of gasoline-powered cars in the world was 1 billion. If a car averages 16,000 km per year at 7.8 liters of gasoline per 100 km and that the combustion of 1 liter of gasoline produces approximately 2.3 kg of CO_2, calculate the annual CO_2 emissions from automobiles assuming 25% CO_2 overheads emission incurred at production, refinery and downstream. [*Note*: 1,000 kg = 1 ton = 10^9 gigaton (Gt)] **[5]**