**CE 213-A**

**ASSIGNMENT- 4 (Air Pollution)**

**Emissions from a**n existing power plant have been found to produce an SO2 concentration of 20x10-6 g/m3 at a distance of 800 m directly downwind from the stack when the wind speed is 4 m / s from the north during a class C stability situation. At a later date another plant is built 200 m to the west of the original plant. It burns 1818 kg/hr of fuel oil which contains 0.5% sulfur. The second plant has an effective stack height of 60 m, and it has no SO2 emission control. For the same atmospheric conditions listed above, solve Q 1 and Q2 given below.

**Q-1:** Total amount of SO2 released from second plant

**Q-2:** Estimate the percentage increase in SO2 concentration at the downwind site due to the second plant. (Given value of stability class C σy= 86.1 m σz= 52.6 m)

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**Q-3:** Mass Balance - Simple Box Model.

A city with dimension W x L x H (7 km x 13 km x 1.5 km) had a wind velocity of 4 m/s. The upwind concentration of SO2 is 10 µg/m3 . The emission rate for the city is 4.5 x 10-6 g/s.m2 . What is the concentration of SO2 over the city?

**Q-4:** Estimate the plume rise for a 2 m diameter stack whose the exit gas has a velocity of 34 m/s when the wind velocity is 4 m/s, the pressure is 1 atm and the stack and surrounding temperatures are 850c and 330 c respectively. (Consider neutral condition)

**Q-5**: State the working principle of scrubbers, electrostatic precipitator and catalytic convertor