B.E. Chemical (4th Yr- 7th Sem)_Environmental Engineering_18th October, 2021

MID SEMESTOR EXAM (Test-1)

Attempt all questions: Marks:25

ASSUME ANY MISSING DATA

1. Describe in detail about particulate air pollutants.
   Describe the chemistry of photochemical smog. CO1 (**5+4)**

2 Water is used in a spray chamber as a spray fluid to treat standard air containing particles with density 1000 kg/m^3. The flow rate of air is 120 m^3/min and that of water is 0.3 m^3/min. The average drop size is 1000 µm. The spray chamber has a diameter of 1m and height 3m. What is the overall collection efficiency of the spray chamber if the average particle size is 2.5 µm?
[Data: Individual Drop collection efficiency is 9%] CO3 (**8**)

3. a) Define Gaussian plume model. Describe its advantages and disadvantages. CO2 (**3**)
   b) A chimney with a design stack height of 350 m is emitting SO_2 at a rate of 550 g/s on a sunny day with moderate wind speed (7m/s) at stack altitude; Find:
   $< \rho_{SO2} >$ (1000,0, 0, 350), $< \rho_{SO2} >$ (1000,50,0,350), $< \rho_{SO2} >$ (1000,50,25,350).
   Data: A=0.286, B= 0.109, p= 0.986, α = 0.25

Find the effective stack height if stack diameter is 6 m, SO_2 exit velocity is 13 m/s, exit gas temperature is 140 ^{0}C and ambient temp is 25 ^{0}C. Find the reduction ratio (decrease in conc. of pollutants) in case of effective stack height. CO2 (**5**)

NOTE: CO1, CO2 and CO3 are first three **course** (learning) **outcomes** resp. for the course Environmental Engineering.