Indian Institute of Technology Kharagpur

Department of Chemical Engineering

TIME: 60 MINS

CLASS TEST-2

Date: 05-10-2021

FULL MARKS - 30

Industrial Pollution Control (CH 62007)

Answer all the questions

(Open Book, Open Note examination. Assume suitable data whenever necessary with justification)

Write your name and Roll No on the front page of the answer script.
Email the neat and clean hand-written answer script only in A-4 size paper in pdf form.

Q. 1

A cement plant is emitting PM from the clinker unit in the size range 50- 120 µm at 300 ˚C with a capacity of 2,00,000 m^3/hr. Select an appropriate air pollution control equipment, if ≥ 60% removal efficiency is required with justification of the selection?

[5]

Q. 2

A gas at 1 atm pressure and 175 °C passes through a gravimetric chamber (H = 1.22 m) at a rate of 10 m^3/sec which contains particles from 0-100 µm. What portion of 50 µm particles with a specific gravity of 2.2 will be collected by the settling chamber for (a) Laminar flow (b) Turbulent flow regime? Also, calculate the cut size particle diameter $D_{P,\,50}$ for the laminar flow region. Assume, residence time t = 10 sec, width of chamber = 2.1 m and µ = 0.01 cP.

[10]

Q. 3

How waste minimization of a Sponge Iron Plant can be planned to minimize the emission? With the help of sketch and diagram show various aspects based on your understanding. Indicate sources where emissions may be there and attempt to minimize in each units.

[15]