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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST II EXAMINATION (April- 2016)
M. Tech. (II- SEM.)

COURSE CODE: 14M3ICE211

MAX. MARKS: 25

COURSE NAME: Air and Noise Pollution Control

COURSE CREDIT: 3

MAX. TIME: 1.5 HRS

Note: Attempt all Questions. Carrying of mobile phones during exams will be treated as case of unfair means. Assume suitable data if required.

1. A filter has K_0 and K_d values of 25000 N.s/m^3 and 65000 s^{-1} respectively. The filter area is 8200 m^2 and the gas flow rate is $150 \text{ m}^3/\text{s}$. The C_{mv} value was 0.05 kg/m^3 . Determine the pressure drop in the filter after cleaning for 5 hours. (3)
2. Determine the dimensions of a parallel single stage ESP to be installed for coal fired boilers for removal having 90% fly-ash content. The gas flow rate is $15 \times 10^4 \text{ m}^3/\text{hr}$, particle drift velocity of 0.25 m/s , and gas flow velocity of 3 m/s . The depth and height of collectrode are 3.5 m and 6.5 m respectively. The collectrode spacing is 25 cm c/c and the required efficiency is 95% (4)
3. Derive the formulation for a diameter of a particle under gravitational settling for treatment of gaseous emissions for particulate control. In this context, also explain the need for defining an equivalent diameter of particle. Further, derive an expression for volume shape factor (β). Further, discuss Cunningham's correction factor (C) in this context (2+2+1)
4. Define Visibility and Coefficient of Haze? In this context, derive an expression for visibility and Coefficient of Haze explaining the respective terms (2)
5. With a neat sketch explain the significance of Potential temperature (2)
6. With a neat sketch explain the West and Gaeke method to determine concentration of SO_2 in air. (4)
7. Determine the efficiency of a single cyclone separator (dry type) for treatment of gaseous emissions from furnace having a diameter of 2 m , a gas velocity of $1.5 \times 10^{-5} \text{ kg/m}^3 \cdot \text{s}$ and a particle velocity of 3000 kg/m^3 . The gas flow rate is $8 \text{ m}^3/\text{s}$. The size distribution information is as follows (5)

Particle size (μ)	0-5	5-10	10-20	20-44	44-64	64-94	> 94
Percent(by weight) for size	64.7	6.79	11.9	8.96	4.25	2.4	1.0