

Dr Garjuly

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
T2 EXAMINATION (March- 2018)
M. Tech. (II- SEM.)

COURSE CODE: 14M31CE211

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. Write Short notes on (a) Coefficient of Haze (b) advantages of wet collectors. (c) advantages and disadvantages of ESP. (1+2+2) [CO-1, 5]
2. a) Define Visibility? In this context, derive an expression for visibility (4) [CO-1, 5]
2. b) Derive an expression for potential temperature. Explain the modification for dry air. Also derive an expression for the vertical gradient of potential temperature (4) [CO-1, 5]
3. a) 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 (4) [CO-1, 2, 3]
3. b) In the context of question 3a, derive an expression for volume shape factor (β). Further, discuss Cunningham's correction factor (C) in this context (2) [CO-1, 2, 3]
4. a) The visibility due to scattering only is found to be 2.5 mi. What percentage of light will pass through a length of 0.3 mi if the limit of visibility is defined as (a) 98% reduction and (b) 99% reduction in original intensity? (2) [CO-1, 5]
4. b) A baghouse filter is to treat 50 m³/s of an emissions with a concentration of 0.06 kg/m³. The values of K_0 and K_d are 60,000 N.s/m² and 65000 s⁻¹ respectively. The maximum allowable pressure drop is 5000 N/m² and the operation time for filter is 8 hours between cleanings. Assuming no further restriction on face velocity is required, determine the filter area required. (2) [CO-1, 2, 3]
5. A parallel plate single stage ESP is to be installed on the gaseous emission of pulverized coal fire boilers for removal of 95% of its fly ash content. Compute the dimensions of the ESP. The following information are provided (a) $\eta = 98\%$, (b) gas flow rate 1, 70, 000 m³/hr, (c) particle drift velocity of 0.2 m/s (d) collectrode spacing 25 cm c/c (e) depth of collectrode is 6 m and (f) gas flow velocity is 1.85 m/s (2) [CO-1, 2, 3]