

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E Sem-I Examination January 2010****Subject code: 711801****Subject Name: Air Pollution Control and Management****Date: 20 / 01 / 2010****Time: 12.00 – 2.30 pm****Total Marks: 60****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain Plum behavior under different atmospheric condition with the help of sketches. **06**
(b) Explain wind rose diagram, with application and advantages. **06**

- Q.2** (a) Write down sources of Air pollutant. **06**
(b) A Thermal power plant of 1000MW capacity is discharging $2.5 \text{ m}^3/\text{hr}$ of air from a stack of 175 ms. The dia of stack is 2m. The atmospheric pressure is 1000millibar and ambient air Temp. 25°C . The stack gas Temp. is 250°C . Estimate the plum rise in critical winter condition, the effective stack height at 10 m metrological tower is 2m/s.(By Holland Equation). Assume suitable data if required. **06**

OR

- (b) A Thermal power plant with an install capacity of 1000MW consumes coal at 10T/MW of power generation. The composition of coal is 40% ash and 2% sulphur. Estimate the source strength of fly ash and SO_2 from the power plant. Assume suitable data if required. **06**

- Q.3** (a) What do you understand by Integrated, planning, control and Management of Air pollution? Explain in detail the various approaches. **06**
(b) Write a short note on Settling Chamber. **06**

OR

- Q.3** (a) Estimate settling velocity of a PM having dia 25μ and 50μ is having density as $2000\text{kg}/\text{m}^3$. **06**
(b) A ESP has to treat $100\text{m}^3/\text{s}$ of polluted gas in the length of collecting electrode has 3m and width is 1m. The migration velocity is 0.1 m/s. If the electrode is required to achieve efficiency of 99.99%. Estimate what should be collecting area. And How many collecting plate shall be provided? Assume suitable data if required. **06**

- Q.4** (a) Describe Combustion control method of NO_x . **06**
(b) Describe control method of Sox. **06**

OR

- Q.4** (a) A copper smelter plant has a stack of 150 m height, with a plum rise of 250 m. If process 1000T of ore/day. Which is chelko pyrite (CuFeS_2)? Calculate maximum ground level concentration of SO_2 at 10 m down wind and 2 km gross wind. If the wind speed is 2m/s at 10 m metrological tower. Assume $\sigma_y=550\text{m}$ and $\sigma_z=135\text{m}$. Assume suitable data if required. **06**

- (b) How long must a cyclone to be connect a particles of 10μ dia, if the flow is $1\text{m}^3/\text{s}$, $r_2=10\text{cm}$, $r_1=4\text{cm}$, $w=15\text{cm}$. $\rho_p=1000\text{kg}/\text{m}^3$ and desire efficiency is 99%. $\mu=1.84\times 10^{-5}$. Assume suitable data if required. **06**
- Q.5** (a) What do you understand by ESP? What is its principle? Explain the advantages, disadvantages and application. **06**
- (b) Write short note on different type of scrubber. **06**
- OR**
- Q.5** (a) Discuss alternative fuel for air pollution control management. **06**
- (b) Air pollution control management for urban area. Give your views. **06**
