Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER III (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2731704 **Date:03/05/2016**

Subject Name: Air Pollution control Equipment

Time:10:30 am to 01:00 pm **Total Marks: 70**

Instructions:

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

Q.1 **(a)** Describe the working of Cyclone Scrubber with neat sketch. **07**

(b) Estimate the average liquid droplet size in the venture scrubber, using following data: **07**

- Gas flow rare =0.06 m^3/sec
- Liquid flow rate = 0.6 l/min
- Throat area = 6.5 cm^2
- surface tension of liquid =72 dynes/cm
- density of liquid = 1gm/cm^3
- μ1= dynamic viscosity of liquid =0.0982 poise

Q.2 **(a)** Write short note on "Fabric Filter with sketch. **07**

(b) Compare and contrast with dry dust collection with dust collection. **07**

OR

(b) Estimate the permeability, Kp of the dust layer using the following data: **07**

- Pressure drop = 6 .30 cm water
- Filter cake density = 1.50 g/cm^3
- Residual pressure drop across the cleaned filter =1.25 cm water
- Air velocity =1.7 m/min
- Time elapsed = 5 hours
- Temperature of air = 70·C
- Initial dust loading = 30 g/m^3

Q.3 **(a)** Write short note on "Gravity settlers" with neat sketch. **07**

(b) An aerosol 1.5 μm in diameter is passed through a gravity settling chamber having 50 cm wide and 60 cm long. There are 20 plates and the channel thickness is 0.125cm. The chamber operates at an efficiency of 66% and the gas flow rate is 10 l/min. Calculate the number of plates required if the efficiency is to be enhanced to 80%. **07**

OR

Q.3 **(a)** Explain the operation of venture scrubber by means of a neat sketch. **07**

(b) Differentiate between fixed bed and floating bed scrubbers. **07**

Q.4 **(a)** Write short note on "Cyclone" with neat sketch. **07**

(b) Describe the methods of automobile air pollution control. **07**

OR

Q.4 **(a)** Write a short note on "Electrostatic Precipitator". **07**

(b) Calculate the collecting plate length of a plate type collector with an overall spacing of 20 cm and an applied voltage of 50kV. Assume 100% efficiency for collecting 0.6μ particles at 450· K and a mean gas velocity of 1.5 m/s through the collector. **07**

Q.5	**(a)**	Enlist the methods of gaseous air pollution control. Explain absorption in detail.	**07**
	(b)	Explain the control gaseous air pollution by adsoption.	**07**
		OR	
Q.5	**(a)**	Enlist the methods used for mist elimination. Discuss any one in detail.	**07**
	(b)	Write short note on removal of gaseous matter by combustion process.	**07**

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