Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2024

Subject Code:3171307 Date:28-05-2024

Subject Name:Design of Air Pollution Control Equipments

Time:02:30 PM TO 05:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Discuss the operation and maintainace issues of Cyclone separator.	**03**
	(b)	Draw plan and section of Cyclone Separator.	**04**
	(c)	Enlist various types of scrubbers & briefly explain any two types with neat sketch.	**07**
Q.2	**(a)**	Draw a detailed plan and section view of Electrostatic precipitator.	**03**
	(b)	Explain particle removal mechanism of ESP from flue gas.	**04**
	(c)	An ESP with specific collection area of 0.984 m2 /m3 .min is found to have an actual overall efficiency of 97 %. If the value of A/Q is increase to 1.5 m2 /m3 .min. Estimate anticipated collection efficiency on basis of deutsch equation and hazen equation. Assume n = 4.	**07**
		OR	
	(c)	Determine the Saltaion velocity of conventional cyclone separator for following data: Q= 10 m3 /Sec g = 9.81 ρg = 1.185 kg/m3 ρp = 2000 kg/m3 Vi = 21 m/sec. Assume Suitable data and take µg = 1.85 x 10^-5 kg/m.sec.	**07**
Q.3	**(a)**	Differentiate between Adsorption and Absorption.	**03**
	(b)	Enlist the disadvantages of Bag filter.	**04**
	(c)	Design Bag filter for the flow of 15 m3/sec.	**07**
		OR	
Q.3	**(a)**	Differentiate between high velocity system and low velocity system.	**03**
	(b)	What are the selection criteria's of Fans?	**04**
	(c)	Explain the principle, construction and working of cyclonic scrubber along with neat sketch.	**07**
Q.4	**(a)**	Enlist various adsorbent for control of gaseous pollutants.	**03**
	(b)	Calculate gas velocity at throat of venturi scrubber, if the flow of flue gas is 2.5 m^3 /Sec. The diameter of throat is 150 mm. Draw the design sketch.	**04**
	(c)	Enlist and explain types of systems used to transport the dust to the collector. Draw neat sketches.	**07**

OR

Q.4	**(a)**	Explain methods to improve the efficiency of bag filter?	**03**
	(b)	State design consideration for designing Duct system.	**04**
	(c)	Write a short note on Spray Tower with neat sketch.	**07**
Q.5	**(a)**	Explain the term Air to cloth ratio. What is its importance in design of bag filter?	**03**
	(b)	State advantages and disadvantages of venturi scrubber.	**04**
	(c)	Enlist Auxiliary Equipments. Highlights the importance of auxiliary equipment. Explain any one in detail.	**07**

OR

Q.5	**(a)**	Define following terms: 1. Gauge Pressure 2. Capture velocity 3. Friction loss.	**03**
	(b)	Draw any one hood system and explain in detail.	**04**
	(c)	Explain the effects of changes in performance characteristics produced by changes in cyclone design & exhaust gas properties.	**07**

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