Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII(NEW) • EXAMINATION – WINTER 2016

Subject Code:2173510 Date:25/11/2016

Subject Name:Design of Air Pollution Control System and Air Quality Modeling(Department Elective - I)

Time:10.30 AM to 1.00 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)**	Define: ESP, stability classes, air quality model, Plume rise, desulphurization, migration velocity, air pollution.	**07**
	(b)	A plate type ESP consist of 12 equal channel. The spacing b/w plates is 0.2m, and the plates are 2m high and 2m long. The unit handles 12,000m3/hr of gas. Consider migration velocity=0.1m/s. a) What is the efficiency of collection? b) What should be the length of the plates for achieving 99% efficiency, if other conditions are same?	**07**
Q.2	**(a)**	Sulphur dioxide is emitted at a rate of 2kg/s from the top of a chimney that is 120m high. The plume initially rises vertically a further 10m above the chimney exit, before being convected horizontally by a wind speed of 15m/s under conditions of neutral stability. Calculate; (a) The ground level concentration at a distance of 800m downwind of the chimney (that is, along the x-axis). (b) The location (x) where the maximum ground level concentration occurs downwind of the chimney on the x-axis. (c) The concentration at this location.	**07**
	(b)	What do you understand by Dispersion Modeling? Explain in detail.	**07**
		OR	
	(b)	Write about Photochemical Modeling and Receptor Modeling.	**07**
Q.3	**(a)**	Discuss in detail "Desulphurization of flue gases"	**07**
	(b)	Write short notes: • AERMOD • CALPUFF	**07**
		OR	
Q.3	**(a)**	Explain "The Reinluft Process" for sulphur dioxide control.	**07**
	(b)	Write short notes: • ISCST3 • CALINE4	**07**
Q.4	**(a)**	Discuss "Control of oxides of Nitrogen by Modification of Operating Conditions and Modification of Design Condition".	**07**

(b) Write short notes: **07**

- Control technologies for Hydrocarbons
- Control technologies for CO

OR

Q.4 **(a)** Discuss "Control of oxides of Nitrogen by Flue gas treatment methods". **07**

(b) Write short notes: **07**

- Air quality Dispersion models
- Desulphurization of fuel oils

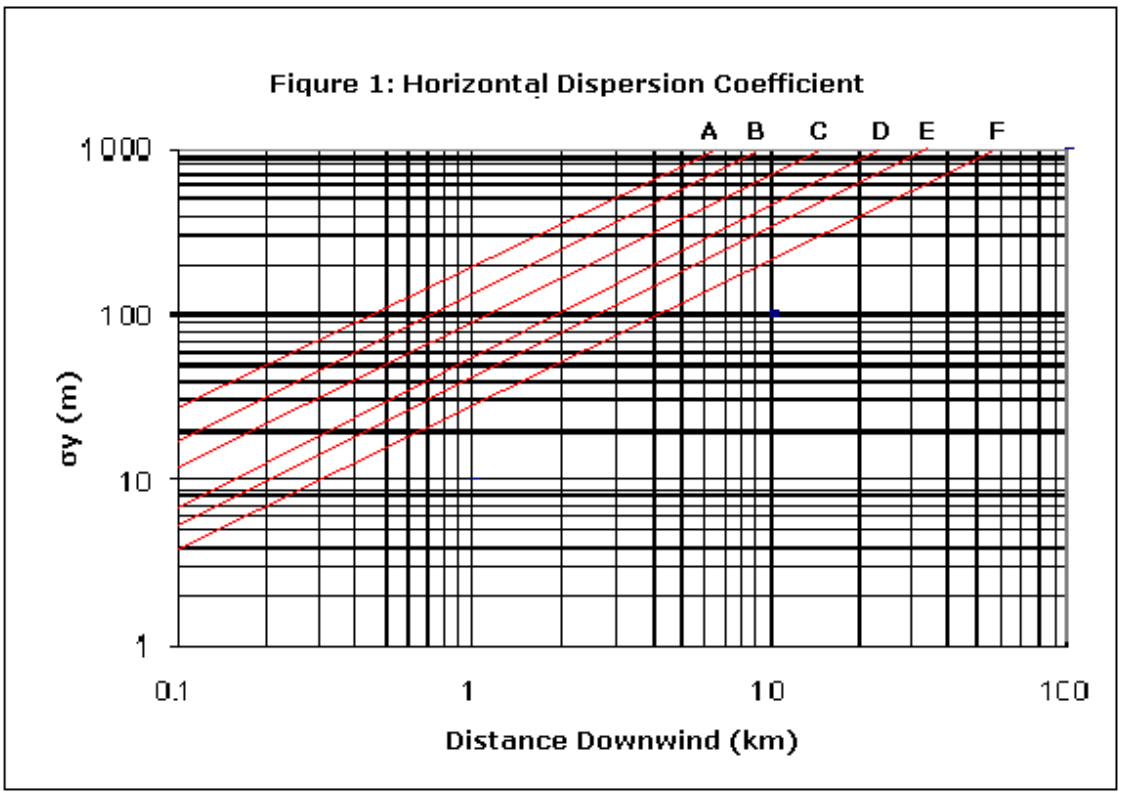
Q.5 **(a)** Write about Gaussian Plume model in detail with its limitation. **07**

(b) Discuss in detail "Wet scrubber for Air Pollution control". **07**

OR

Q.5 **(a)** Explain "DCDA (Double Contact Double Absorption) Process" for production of sulphuric acid from sulphur dioxide. **07**

(b) Discuss working of fabric filter in detail. **07**



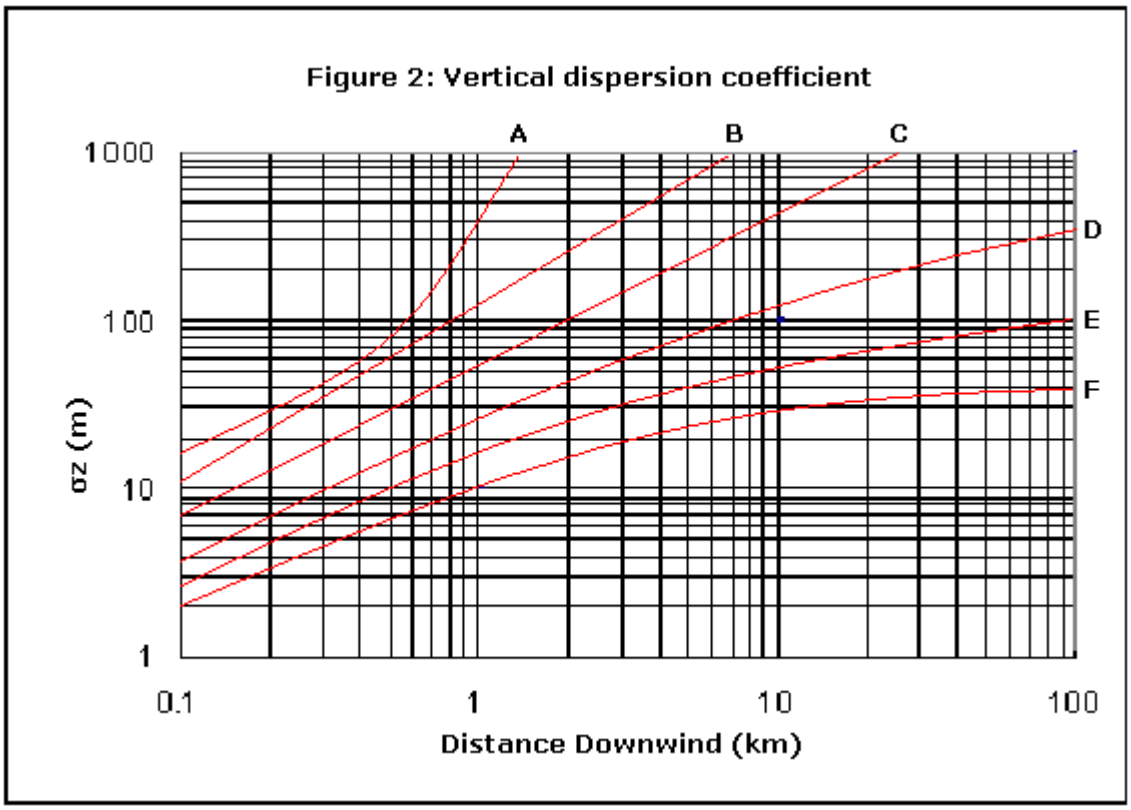


Figure 2: Vertical dispersion coefficient
A
B
C
D
E
F
1000
100
10
1
σz (m)
0.1
1
10
100
Distance Downwind (km)

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