Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–I(New course)• EXAMINATION – WINTER- 2015

Subject Code: 2711801 **Date: 31/12/2015**

Subject Name: Application based systems for Air Pollution Control Management

Time:2:30 pm to 5:00 pm **Total Marks: 70**

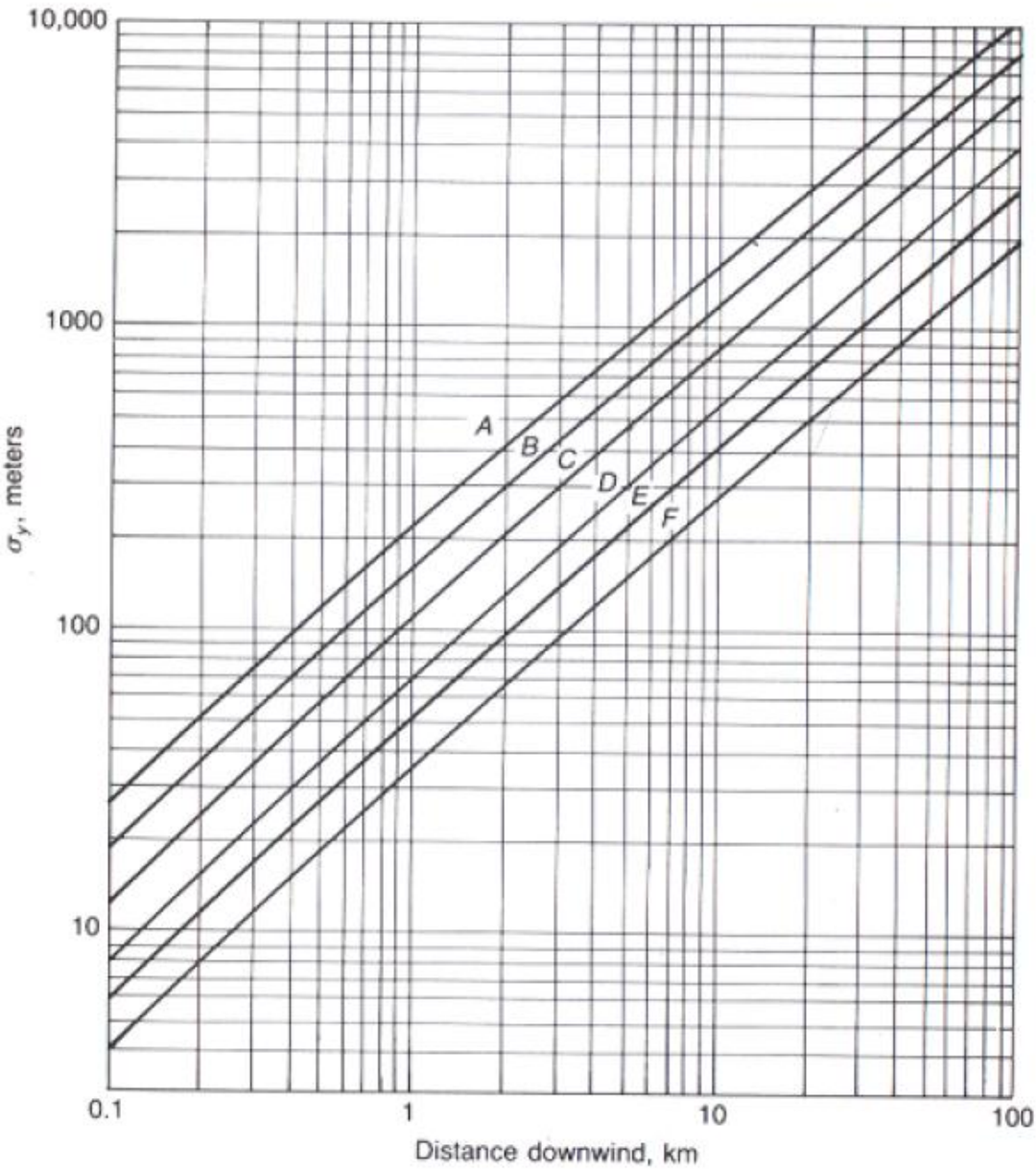
Instructions:

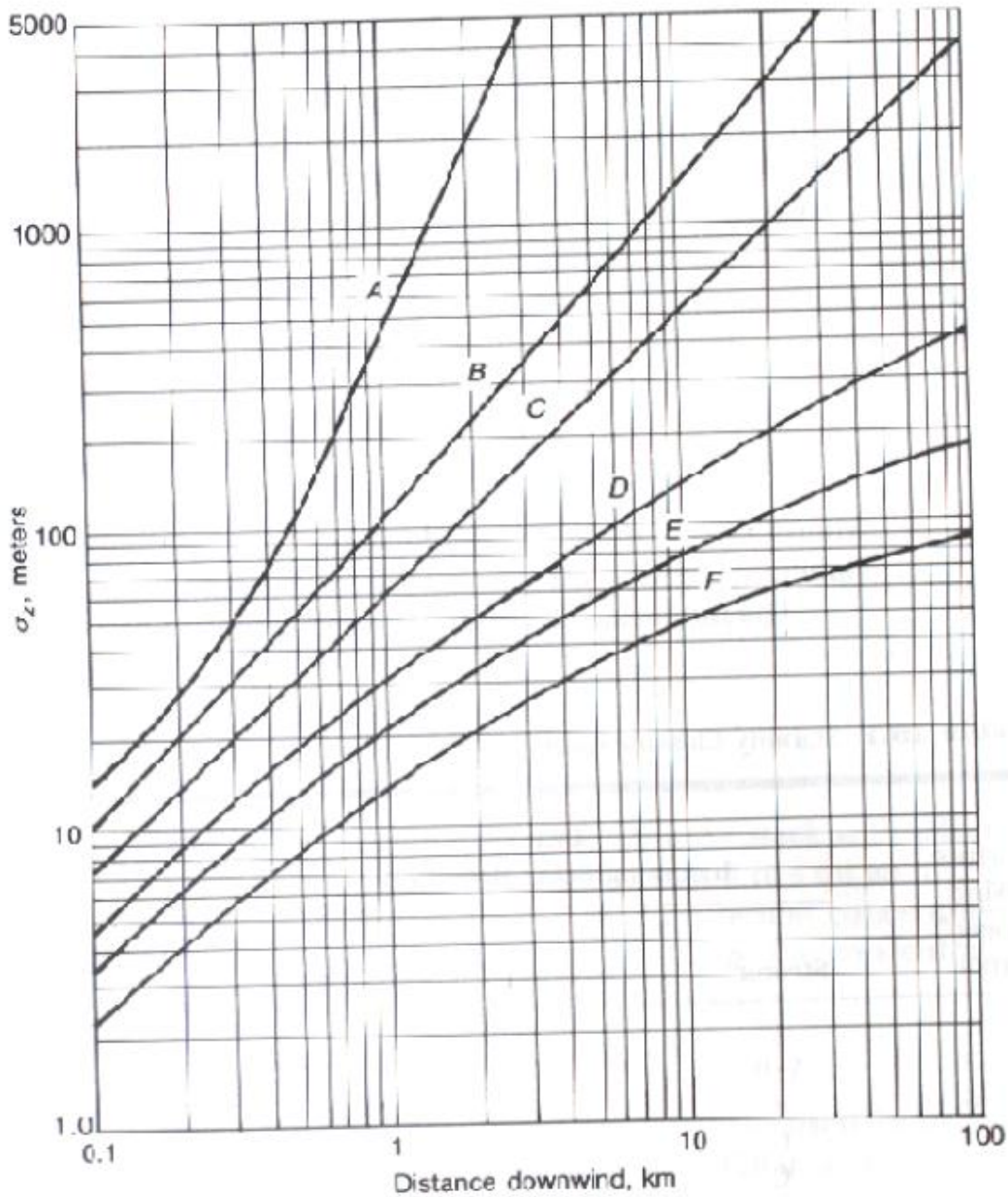
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Enlist and explain the meteorological parameters which affect the dispersion of air pollutants into the atmosphere.	**07**
	(b)	Write a short note on Wind rose diagram along with neat sketch and applications.	**07**
Q.2	**(a)**	Explain the relationship between lapse rate and atmospheric stability conditions of the atmosphere.	**07**
	(b)	Explain the different types of plume behavior with the help of neat sketches.	**07**
		OR	
	(b)	What is inversion? How are subsidence and radiation inversion formed?	**07**
Q.3	**(a)**	Describe the chemical processes involved in removal of SO_2 from flue gases using wet scrubbers	**07**
	(b)	Enlist the flue gas control methods for reduction of emissions of NOx and explain any one.	**07**
		OR	
Q.3	**(a)**	Which are the important air pollutants emitted from vehicular sources? Explain the techniques for their control.	**07**
	(b)	Write a note on adsorption of air pollutants along with design criteria.	**07**
Q.4	**(a)**	Explain the collection mechanisms for control of particulate matter.	**07**
	(b)	With the help of a neat sketch explain the working principle, construction and working of bag filter.	**07**
		OR	
Q.4	**(a)**	Write a short note on cyclone separator along with its limitations. On what factors does the efficiency of cyclone separator depend?	**07**
	(b)	Draw a neat sketch and explain venturiscrubber for control of air pollutants	**07**
Q.5	**(a)**	A coal fired power plant burns 24,000 tonnes of coal per day. The coal has sulphur content of 4.2 %. The physical stack height is 200 m .The inside diameter of stack is 8 m. The stack gas exit velocity is 18.3 m/s and the gas has a temperature of 140^0 C. The ambient air temperature is 8^0 C. The atmospheric pressure is 1000 millibars and the average wind speed is 4.5 m/s. Compute the effective stack height.	**07**
	(b)	Explain the procedure to measure ambient air quality parameters.	**07**
		OR	

Q.5 **(a)** A coal burning power plant burns 6.25 tonnes of coal per hour and discharges the combustion products through a stack that has an effective height of 80 m. The coal has a sulphur content of 4.7% and the wind velocity at the top of stack is 8.0 m/s. Atmospheric conditions are moderately to slightly stable. Determine the maximum ground level concentration of SO_2 and the distance from the stack where the maximum ground level concentration occurs. **07**

(b) What is the relationship between air to fuel ratios and emissions of HCs, CO and NOx from vehicular sources ? Explain stoichiometric ratio. **07**




5000
1000
100
10
1.0
0.1
1
10
100
σ_z, meters
Distance downwind, km
A
B
C
D
E
F

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