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B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2013

CIVIL ENGINEERING

VI Semester

CE 9050 AIR POLLUTION CONTROL

(Regulation 2008)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. What are all the causes of air pollution from automobiles?
2. Define air pollution index.
3. Draw a temperature altitude profile .
4. List out the assumptions of Gaussian Dispersion model.
5. What are the controlling technology of air pollutant emission from industries?
6. What is meant by incineration?
7. What are the features of high efficiency particulate air filters?
8. What are the sources of Radon gas?
9. What are all the effects of noise on human health?
10. How to detect noise level?

Part-B (5 x 16 = 80Marks)

11. (a) (i) Write the ambient air quality standards as per CPCB? (8 Marks)
- (ii) What is isokinetic sampling? What are all the conditions for isokinetic sampling? (8 Marks)

12. (a)(i) Give a different Plume behavior pattern based on the stability conditions. (8 Marks)

(ii) What is the use of wind rose diagram? Write a short notes about it. (8 Marks)

OR

(b) A thermal power plant releases particulate matter from its stack at a rate of 3g/s. The stack height is 65m while the temperature of the stack gases is 150°C and the ambient air temperature is 32°C. The wind velocity at stack height is 2.5m/s. The stack diameter is 2.5m. The atmospheric pressure is 1bar. The wind speed at 10m height from the ground is 2m/s. Estimate the ground level concentration of the pollutants at 2.5 and 4.5km downwind distance. (16Marks).

13.(a) Discuss the controlling method of gaseous pollutants from Industries. (16marks)

OR

(b) With the help of schematic diagram explain the working mechanism of Electrostatic precipitator. List its merits and demerits. (16Marks)

14.(a) List out the sources of Automobile pollution. What are the ways to control automobile pollution? Explain in detail. (16Marks)

OR

(b) What are the sources of Indoor air pollution? Discuss the method to control Indoor air pollution.

(16Marks)

OR

15.(a)(i) Write about the sources of noise pollution. (8Marks)

(ii) Mention the acceptable noise level for various activities. (8Marks)

Table 5.7 Atmospheric stability classifications

Surface wind speed	Day solar insolation			Night cloudiness	
	Strong	Moderate	Slight	Cloudy	Clear
<2	A	A-B	B	E	F
2-3	A-B	B	C	E	F
3-5	B	B-C	C	D	E
5-6	C	C-D	D	D	D
>6	C	D	D	D	D

A-very unstable; B-moderately unstable; C-slightly unstable; D-neutral; E-slightly stable; F-stable

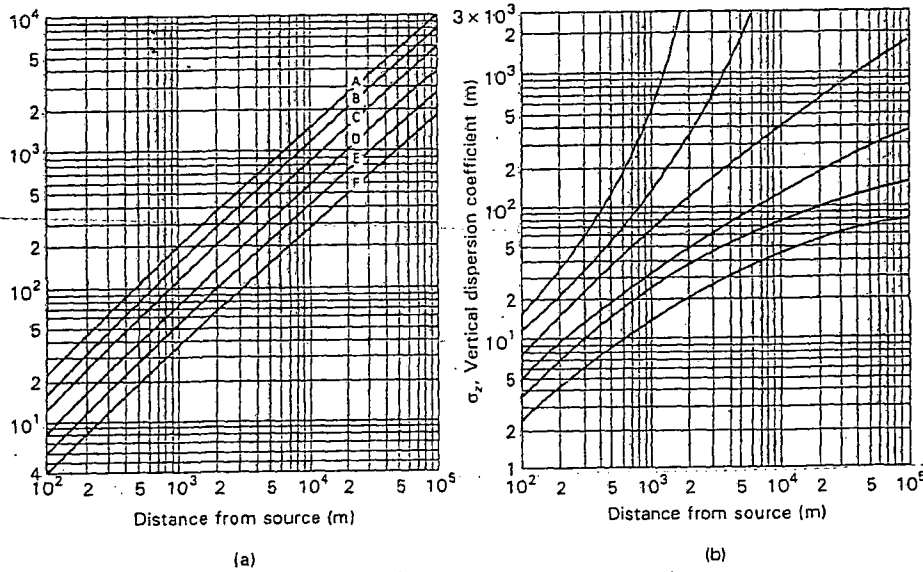


Fig. 5.36 Gaussian dispersion coefficients as a function of distance downwind (a) Horizontal dispersion coefficient σ_y (b) Vertical coefficient σ_z

Table 5.9 Values of constants to be used in equation as a function of downwind distance and stability condition

Stability	$x \leq 1 \text{ km}$						
	a	c	d	f	c	d	f
A	213	440.8	1.941	9.27	459.7	2.094	-9.6
B	156	106.6	1.149	3.3	108.2	1.093	2.0
C	104	61.0	0.911	0	61.0	0.911	0
D	68	33.2	0.725	-1.7	44.5	0.516	-13.0
E	50.5	22.8	0.678	-1.3	55.4	0.305	-34.0
F	34	14.35	0.740	-0.35	62.6	0.180	-48.6

Source: D. O. Martin, 1976. *J. Air Pollution Control Assoc.* 26, No. 145. [15]

Table 5.8 Approximate values of σ_y and σ_z as a function of downwind distance for various stability classes in metres

Distance (km)	Stability Classes and σ_y Values						Stability Classes and σ_z Values					
	A	B	C	D	E	F	A	B	C	D	E	F
0.2	51	37	25	16	12	8	29	20	14	9	6	4
0.4	94	69	46	30	22	15	84	40	26	15	11	7
0.6	135	99	66	43	32	22	173	63	38	21	15	9
0.8	174	128	85	56	41	28	295	86	50	27	18	12
1.0	213	156	104	68	50	34	450	110	61	31	22	14
2.0	396	290	193	126	94	63	1953	234	115	51	34	22
4.0	736	539	359	235	174	117		498	216	78	51	32
8.0	1367	1001	667	436	324	218		1063	406	117	70	42
16	2540	1860	1240	811	602	405		2274	763	173	95	55
20	3101	2271	1514	990	735	495		2904	934	196	104	59

Source: D. B. Turner, 1970. *Workbook of atmospheric dispersion estimates.* Washington D.C. [14]