

國立成功大學
110學年度碩士班招生考試試題

編 號：141

系 所：環境工程學系

科 目：環境工程概論

日 期：0202

節 次：第 1 節

備 註：可使用計算機

※ 考生請注意：本試題可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

Environment Management (25%)

- Please write out the full names of the following underlined abbreviations.
 - Corporate ESG performance.
 - A company has disclosed its environment and social impacts in its CSR.
 - GHGs includes the gases of global warming potential.
 - In 2015, 195 nations agreed with the United Nation to set ambitious plans for the SDGs to have a better world.
 - EIA evaluates the environmental consequences of a plan, policy, program, or actual projects prior to the decision to move forward with the proposed action.

Water Resource Management (25%)

- The BOD₅ of an industrial wastewater after pretreatment is 200 mg/L and the ultimate BOD is 300 mg/L. What is the deoxygenation constant k_1 (base e)? (11 %).
- Please write seven principal mechanisms that remove or transform certain pollutants in wetlands (14%).

Air Quality Control (25%)

- The concentration of SO₂ at ground level is not allowed to exceed 80µg/m³ at 100m downwind from the source. If the wind speed is 4 m/s on a clear day, and if the source emits 0.05 kg SO₂/s, what must the effective stack height be to meet this requirement? Please use the equation of Gaussian dispersion model to derive the equation for stack height as a function of the concentration at ground level and the crosswind standard deviations σ_y and σ_z (10%). Then, use Table 1 and Figure 1 to find the corresponding values of crosswind standard deviations at 100m downwind (5%). Finally, calculate the required stack height (10%).

$$C = \frac{Q}{2\pi\bar{u}\sigma_z\sigma_y} \exp\left[-\frac{1}{2}\left(\frac{y}{\sigma_y}\right)^2\right] \left\{ \exp\left[-\frac{1}{2}\left(\frac{z+H}{\sigma_z}\right)^2\right] + \exp\left[-\frac{1}{2}\left(\frac{z-H}{\sigma_z}\right)^2\right] \right\}$$

Table 1 Atmospheric Stability Key for Figure 1

Surface Wind Speed (at 10 m) (m/s)	Day			Night	
	Incoming Solar Radiation (Sunshine)			Mostly Overcast or $\geq 4/8$ Cloud Cover	Mostly Clear or $\leq 3/8$ Cloud Cover
	Strong	Moderate	Slight		
<2	A	A-B	B	—	—
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

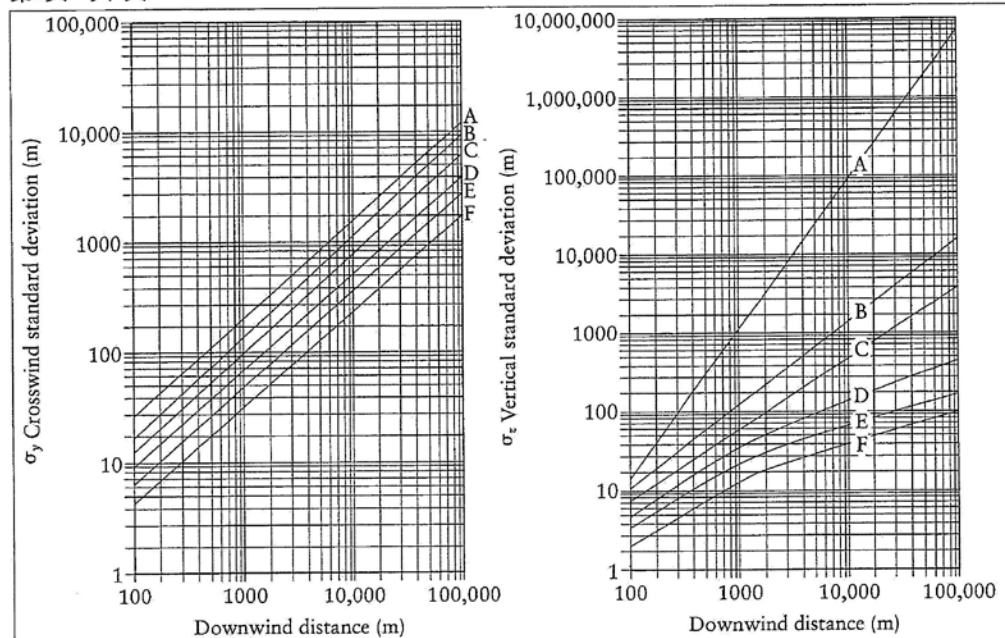


Figure 1 Dispersion coefficients

Waste and Resource Management (25%)

5. A solid waste incinerator has a maximum operating capacity of 100 tonnes/day. The facility receives MSW during the workweek, but not during the weekend. Typically, it receives the following daily loads:

	Received (tonnes/d)
Mondays	180
Tuesdays	160
Wednesdays	150
Thursdays	130
Fridays	90
Saturdays	0
Sundays	0

How large should the receiving pit be to be able to hold enough waste to operate through a weekend? Please justify your answer (13%).

6. Please write all circular flow paths' names (from P1 to P12) in the Circular Economic System Diagram (Butterfly Diagram) on your answer sheet (12%). You can write words in English or Chinese.

注意! 請寫在答案紙上，寫在試題紙上則不予計分。

