Started on	Wednesday, 18 October 2023, 2:45 PM
State	Finished
Completed on	Wednesday, 18 October 2023, 3:05 PM
Time taken	19 mins 44 secs
Grade	**5.50** out of 10.00 (**55**%)

Question 1

Complete

Mark 0.00 out of 1.00

Determine the distance downwind (in km) from the stack at which the plume touches the ground due to inversion. The following data are given for stack and atmosphere.

Effective stack height=65 m;

Inversion base=275 m; Wind speed at the top of the stack=3.1 m/s

Clear sky of winter; Evening 5 pm; Solar altitude 25°

Table 1: stability class and related coefficients

TABLE 6.1
Key to stability categories

Surface wind speed (at 10 m), m/s	Day			Night	
	Incoming solar radiation				
	Strong	Moderate	Slight	Thinly overcast or ≥ 4/8 cloud	Clear or ≤ 3/8 cloud
0–2	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

Source: Ref. 7.

Note: The neutral class D should be assumed for overcast conditions during day or night.

TABLE 9-14
Values of a, c, d, and f for calculating σ_y and σ_z

Stability class	a	$x \leq 1$ km			$x > 1$ km		
		c	d	f	c	d	f
A	213	440.8	1.941	9.27	459.7	2.094	−9.6
B	156	100.6	1.149	3.3	108.2	1.098	2
C	104	61	0.911	0	61	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	0.74.0	−0.35	62.6	0.18	−48.6

(*Source:* Martin, 1976.)

1.695

One possible correct answer is: 3.3918317100477

Question 2

Complete

Mark 1.00 out of 1.00

Match the following.

Nocturnal boundary layer	Stable boundary layer
Coldest point in the atmosphere	Mesosphere
Absorption of shortwave radiation by N2 and O2	Thermosphere

The correct answer is: Nocturnal boundary layer → Stable boundary layer, Coldest point in the atmosphere → Mesosphere, Absorption of shortwave radiation by N2 and O2 → Thermosphere

Question 3

Complete

Mark 1.00 out of 2.00

Match the following. Select the most appropriate answer.

Indicator organism	E. coli
Rachel Carson	Poliovirus
Erin Brockovich	Hepatitis
John Snow	Cholera

The correct answer is: Indicator organism → E. coli, Rachel Carson → DDT, Erin Brockovich → Chromium, John Snow → Cholera

Question 4

Complete

Mark 0.50 out of 2.00

Match the following. Select the most appropriate answer.

Endocrine disruptor	PFAS
Dupont	Ciprofloxacin
Multiple tube fermentation technique	Most probable number
Sukinda valley	Mercury

The correct answer is: Endocrine disruptor → Bisphenol A, Dupont → PFAS, Multiple tube fermentation technique → Most probable number, Sukinda valley → Chromium

Question 5

Complete

Mark 1.00 out of 1.00

In the afternoon of rainy days, the cumulative heating rate of the mixing layer was recorded as 750 K-m and the surface temperature was found as 20 °C. The atmosphere is neutral. What would be the mixing height and potential temperature of mixing layer? The wet and dry adiabatic lapse rates of air parcel is given as 6.5 °C/km.

Select one:

- a. 73,21.5
- b. 73, 20.5
- c. 75,23.6
- d. 74, 22.4

The correct answer is: 73,21.5

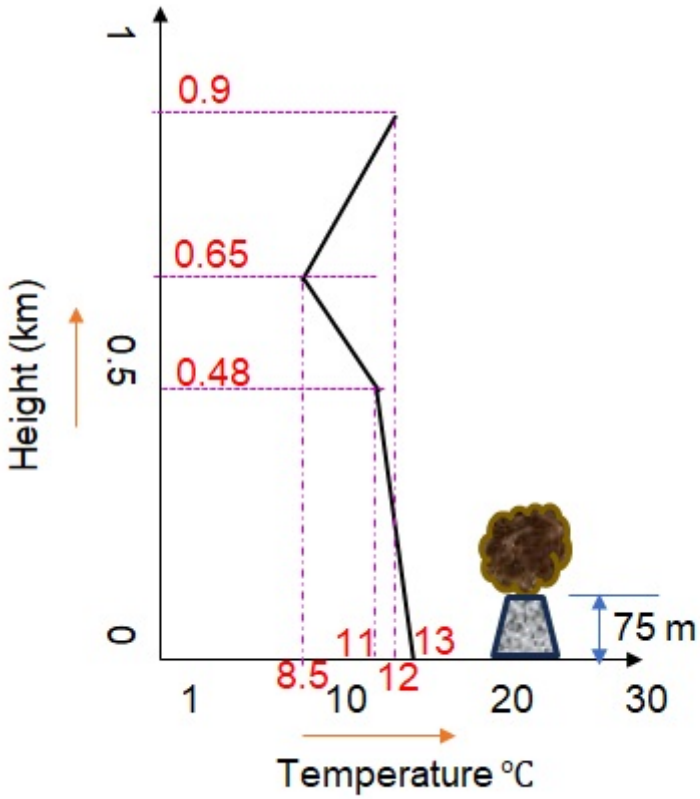
Question 6

Complete

Mark 1.00 out of 1.00

The atmospheric condition was observed as shown in Figure 1, the behavior of plume can be defined by following appropriate terms.

Figure 1. Atmospheric stability conditions



Select one:

- a. Looping, Fanning
- b. Lofting, trapping
- c. Lofting, Looping
- d. Conning, fumigation

The correct answer is: Conning, fumigation

Question 7

Complete

Mark 1.00 out of 1.00

Choose the correct statements related to dispersion model.

Select one:

- a. Increase in plume rise decreases the ground level concentration.
- b. The gaussian plume equation contains diffusion and dispersion in x direction
- c. The degree of dilution of the effluent plume is proportional to the stack diameter
- d. An increase in wind speed (u) will increase the plume rise.

The correct answer is: Increase in plume rise decreases the ground level concentration.

Question 8

Complete

Mark 0.00 out of 1.00

Which of the following parameter(s) is(are) given utmost priority in drinking water treatment?

Select one or more:

- [ ] Total dissolved solids
- [ ] Turbidity
- [x] Biochemical oxygen demand
- [x] Pathogens

The correct answer is: Pathogens

◄ Air pollution meteorology and dispersion modelling

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