

Name:
Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, May 2021

Course: Air Pollution, Control and Monitoring
Program: B.Tech (Civil Engineering)
Course Code: CIVL 4023

Semester: VIII
Time: 3 hrs.
Max. Marks: 100

Instructions: All questions are compulsory to attempt.

SECTION A (30 Marks)

S. No.	Question	Marks	CO
Q 1.	The atmospheric conditions favourable for formation of photochemical smog are _____, _____ and _____.	5	CO1
Q 2.	Enlist the different Air Quality Index categories along with their ranges.	5	CO3
Q 3.	Define the terms: Environmental Lapse Rate and Adiabatic Lapse rate	5	CO2
Q 4.	Define the term: Effective Height of a Stack	5	CO3
Q 5.	The various types of solid and liquid suspended particulate matter which can present in air are _____, _____, _____, _____ and _____.	5	CO1
Q 6.	The various important devices used to control particulate pollutants in industries are _____, _____, _____, _____ and _____.	5	CO4

SECTION B (50 Marks)

Q 7.	Explain the sub-adiabatic stability condition in the environment along with its key points.	10	CO2
Q 8.	State the conditions in which the plume emitted from a stack will disperse in the fanning and lofting pattern.	10	CO2
Q 9.	Analyze the term "Inversion". Also discuss its types along with their key points.	10	CO2
Q 10.	Explain the following air pollution control devices along with their critical points: 1. Electrostatic precipitators 2. Fabric filters	10	CO4
Q 11.	State the key effects of air pollution on the various ecosystem components.	10	CO1

SECTION-C (20 Marks)

Q12.	A factory utilizes 0.25 Ml of oil fuel per month. It has been also estimated that for every 1 Ml of fuel oil burnt in the factory, per year, the quantities of particulate matter, SO ₂ , NO _x , HC and CO emitted are 2.6 t/yr, 57 t/yr, 6 t/yr, 0.3 t/yr and 0.4 t/yr respectively. Determine the height of the chimney required to be provided for safe	20	
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	<p>dispersion of these pollutants.</p> <p style="text-align: center;">OR</p> <p>A thermal power plant burns coal at the rate of 8 tonnes per hour and discharge the flue gases through a chimney having an effective height of 85 m. The coal has a sulphur content of 4.3 %. The wind velocity at the top of the stack is 7.8 m/s. The atmospheric conditions are slightly unstable. Determine the ground level concentrations of SO₂ at a distance of 3 km downwind at a). The centre line of the plume and b). at a crosswind distance of 0.5 km on either side of the centre line. Assume value of horizontal dispersion coefficient and vertical dispersion coefficient as 250m and 150m at downwind distance of 3 km from source.</p>	20	CO3
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