Nama	Utech
Name:	
Roll No.:	
Invigilator's Signature :	

CS/B.Tech (CE-NEW)/SEM-8/CE-801/2/2010 2010

ENVIRONMENTAL POLLUTION & CONTROL

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

 $10 \times 1 = 10$

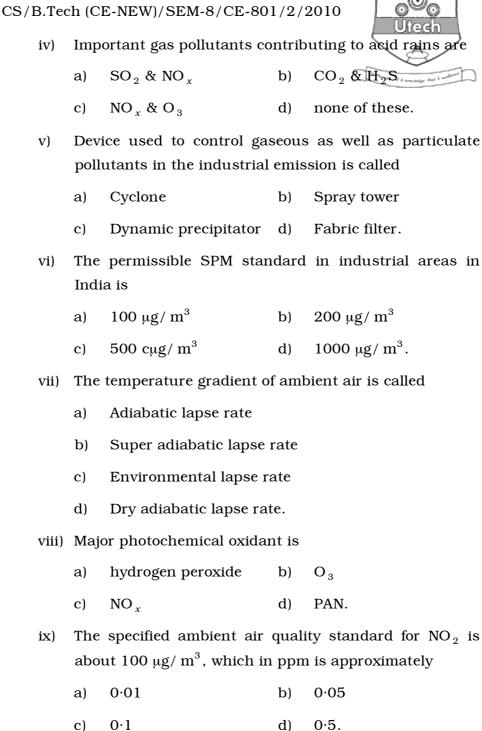
- i) Pollution by depletion of ozone layer is caused due to the reaction of ${\rm O}_3$ with
 - a) CO_2

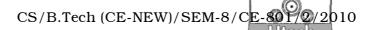
b) Cl

c) SO_2

- d) None of these.
- ii) The poisonous gas responsible for Bhopal Gas tragedy of India was
 - a) Sulphur dioxide
- b) Methyl siocyanide
- c) Laughing gas
- d) none of these.
- iii) During temperature inversion in atmosphere, air pollutants tend to
 - a) accumulate above inversion layer
 - b) accumulate below inversion layer
 - c) disperse laterally
 - d) disperse vertically.

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- x) A rainfall is classified as acidic if its pH is less than or equal to
 - a) 5

b) 6.5

c) 7

- d) 7.5.
- xi) The most significant environmental issue, threatening mankind, is
 - a) Global Warming
 - b) Acid Rain
 - c) Ozone Hole
 - d) none of these.
- xii) Electrostatic precipitators remove
 - a) sulphur dioxide,
 - b) particulate matter
 - c) both (a) and (b)
 - d) none of these.

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following.

 $3 \times 5 = 15$

- 2. What do you mean by Environmental Impact Assessment (EIA)? What are the factors to be taken into consideration for preparing an EIA report?
- 3. Write short notes on Water (Prevention and Control of Pollution) Act, 1977 and Motor Vehicle Act, 1988.

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- 4. What do you mean by Ozone depletion and Acid rain? Give chemical reactions to support your answer.
- 5. Write a short note on the impact of mining on the surrounding environment.
- 6. Define sound intensity, sound pressure and sound power level. How are the three levels related?
- 7. Sketch the following plume phenomena and discuss each sketch in relation to dry adiabatic lapse rate :
 - a) Looping
 - b) Fanning
 - c) Trapping
 - d) Lofting
 - e) Fumigating
 - f) Coning.
- 8. What are the dry adiabatic lapse rate and the wet adiabatic lapse rate? Explain why they differ.
- 9. Distinguish between the following:
 - a) Primary and secondary air pollutants.
 - b) Stationary and mobile sources of air pollutants.

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GROUP - C

(Long Answer Type Questions)

Answer any three of the following.



- 10. a) What do you mean by octave band analysis of noise? 2
 - b) A 70 dB (A) lasting for 35 minutes is followed by 80 dB (A) and 60 dB (A) lasting for 15 minutes and 10 minutes respectively. Calculated of Leq of noise. 3
 - c) While recording a weighted rated sound level, 4 readings were taken at a site at a difference time of a day. The readings have been found to be 30 dB (A), 60 dB (A), 65 dB (A), 40 dB (A). What is the average sound level ? 3
 - d) Traffic noise data is shown in the table below:

Time (s)	Sound pre-level (120 dB)	A (+corrected)
10	65	+5
20	68	-6
30	70	+3
40	75	-3
50	85	-4
60	90	-5
70	70	0
80	75	+1
90	70	+4
100	75	+5
110	85	+3
120	90	+1

Calculate Leq based upon the value determined by the comments on the area.

e) Derive the expression : Lw = Li + $10 \log_{10}$ A, where the notations have their usual meanings.

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- 11. Describe the pollution characteristics and suggested treatments for any *five* of the following industries: 5×3
 - a) Dairy
 - b) Distillery
 - c) Fertilizers
 - d) Oil Refineries
 - e) Pulp and Paper Mills
 - f) Petrochemicals
 - g) Pharmaceutical
 - h) Sugar
 - i) Tannery
 - j) Textile.
- 12. Explain the concept of EIA (Environmental Impact Assessment). Describe the probable environmental impacts of a thermal power plant and a mining industry. 3 + 6 + 6
- 13. What do you understand by atmospheric dispersion? Write down the equation for determining ground level concentration of pollutant. Where does the maximum ground level concentration occur? A thermal power plant burns coal at the rate of 7.5 tonnes/hr. and discharges the flue gases through a stack having effective height of 95 m. The coal has a sulphur content of 4.6%. The wind velocity at the top of the stack is 8 m/s. The atmospheric conditions are slightly unstable.
 - a) Determine the ground surface concentration of SO_2 and the distance from the site at which this occurs.
 - b) Determine the ground surface concentration of pollutants at a distance 2000 m down wind at centre line of the plum. [Provide Δ_y vs x and Δ_z vs x for different atmospheric stabilities] 5 + 10

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- 14. Tabulate the pollution characteristics of fertilizer and dairy.
- 15. a) Determine maximum ground level concentration when a power plant burns 5.45 tonnes of coal per hour and discharges the combustion products through a stack that has an effective height of 75 m. The coal has a sulphur content of 4.2%, and the wind velocity at the top of the stack is 6 m/sec. The atmospheric conditions are moderately to slightly stable. Determine the maximum ground level concentration of SO_2 and the distance from the stack at which the maximum occurs.
 - b) Calculating effective stack height, determine the effective height of a stack given the following data:
 - i) Physical stack is 203 m tall with 1.07 m inside diameter.
 - ii) Wind velocity is 3.56 m/sec.
 - iii) Air temperature is 13° C.
 - iv) Barometric pressure is 1000 millibars.
 - v) Stack gas velocity is 9.14 m/sec.
 - vi) Stack gas temperature is 149° C. 10 + 5