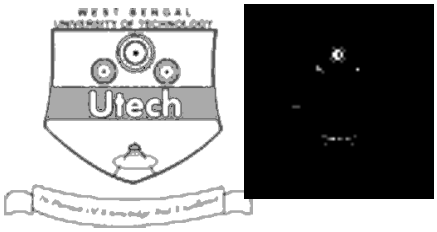
ENVIRONMENTAL POLLUTION AND CONTROL (SEMESTER - 8)

CS/B.Tech(CE-NEW)/SEM-8/CE-801/2/09



1. ..... *Signature of Invigilator*

2. ..... *Signature of the Officer-in-Charge*

Reg. No. | | | | | | | | | | | | | | |

Roll No. of the Candidate | | | | | | | | | | | | | | |

CS/B.Tech(CE-NEW)/SEM-8/CE-801/2/09

ENGINEERING & MANAGEMENT EXAMINATIONS, APRIL – 2009

ENVIRONMENTAL POLLUTION AND CONTROL (SEMESTER - 8)

Time : 3 Hours] [Full Marks : 70

INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **36 pages**. The questions of this concerned subject commence from Page No. 3.
2. a) In **Group – A**, Questions are of Multiple Choice type. You have to write the correct choice in the box provided **against each question**.
   b) For **Groups – B** & **C** you have to answer the questions in the space provided marked 'Answer Sheet'. Questions of **Group – B** are Short answer type. Questions of **Group – C** are Long answer type. Write on both sides of the paper.
3. **Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.
4. Read the instructions given inside carefully before answering.
5. You should not forget to write the corresponding question numbers while answering.
6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
7. **Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**
8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.
9. Rough work, if necessary is to be done in this booklet only and cross it through.

No additional sheets are to be used and no loose paper will be provided

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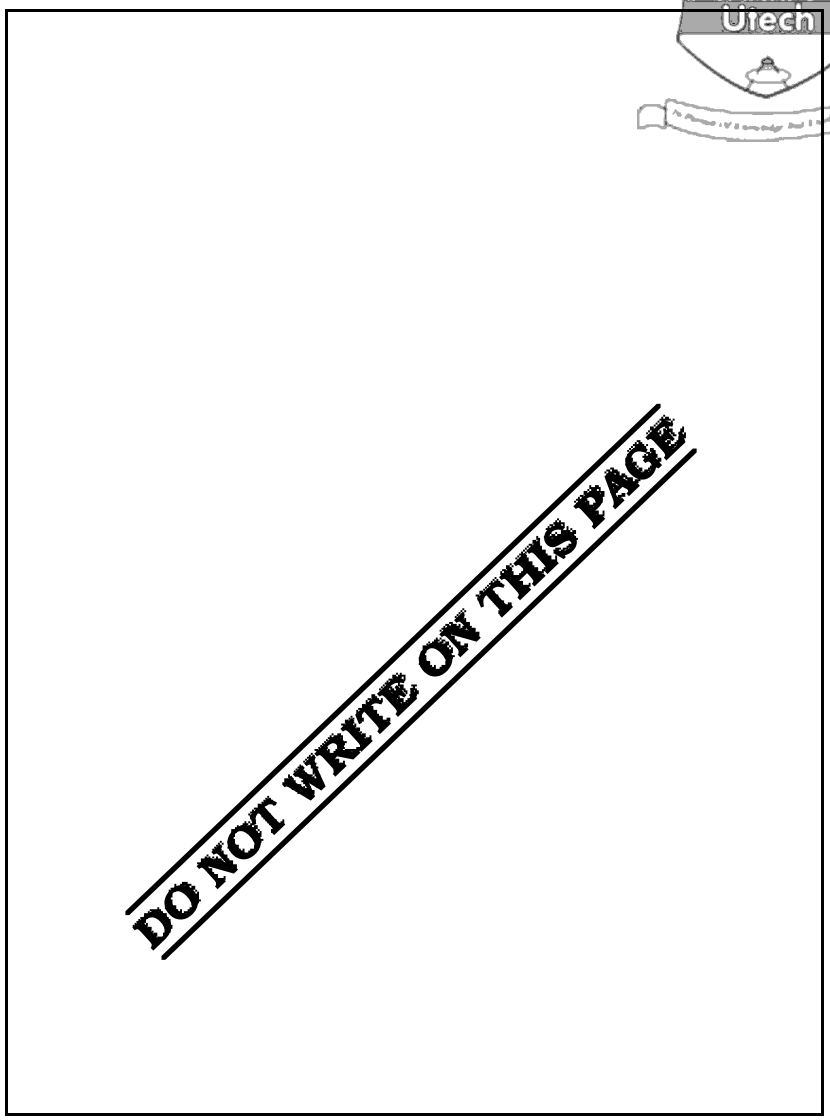
FOR OFFICE USE / EVALUATION ONLY

Marks Obtained

	Group – A										Group – B			Group – C				
Question Number																	***Total Marks***	***Examiner's Signature***
Marks Obtained																		

.....

Head-Examiner/Co-Ordinator/Scrutineer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Assume reseanable value of additional data if required.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10

i) The loudness of sound has been recorded as 60 phons. Its value in sone scale is

a) 4 b) 8

c) 16 d) 32.

ii) Implementation of the Motor Vehicle Act, 1988 took place in

a) 1990 b) 1991

c) 1989 d) none of these.

iii) Acid rain occurs at a pH value of

a) < 5·6 b) > 5·6

c) ≤ 5·6 d) none of these.

iv) Ozone depletion is as a consequence of

a) greenhouse effect b) emissions of VOC

c) emissions of CFC d) emissions of NO_x.

v) SO_2 and NO_x are

a) primary pollutants

b) secondary pollutants

c) none of these.

vi) Primary source of methane (CH_4) as a greehouse gas is from

a) automobile exhaustions

b) paddy fields

c) thermal power plants

d) none of these.

vii) Albedo refers to

a) average temperature of the earth

b) average reflectivity of the earth

c) average pressure

d) none of these.

viii) ..... is a direct greehouse gas.

a) CO_2 b) CO

c) SO_2 d) NO_x .

ix) EMP stands for

a) Environment Management Planning

b) Environment Monitoring Programme

c) Environment Management Programme

d) None of these.

x) The hydroxyl ion concentration of a water sample is 10^{-9} moles/litre. The pH of the water sample is

a) 5 b) 9

c) 10 d) none of these. [ ]

xi) Which one of the following plume behaviours occur when atmospheric inversion begins from the ground level and continues ?

a) Looping b) Fumigation

c) Coning d) Fanning. [ ]

xii) Which one of the following pollutants or pair of pollutants is formed due to photo-chemical reactions ?

a) CO alone b) O_3 and PAN

c) PAN and NH_3 d) NH_3 and CO. [ ]

xiii) Which is the major pollutant present in photo-chemical smog ?

a) PAN b) SO_2

c) HC d) NO_2. [ ]

xiv) Electrostatic precipitator are used as pollution control device for the removal of

a) SO_2

b) NO_x

c) suspended particulate matter

d) volatile organic substance. [ ]

xv) The maximum damage to the "Taj Mahal" is because of the gas

a) CO_2 b) CO

c) SO_2 d) all of these. [ ]

xvi) Match **list I** (air pollutant) with **list II** (harmful effects) and select the correct answer using the codes given below the list :

	List I		**List II**
a)	SPM	1.	Blood haemoglobin
b)	NO	2.	Vegation
c)	CO	3.	Respiratory system
d)	SO_2	4.	Building material.

Codes :

	a	***b***	***c***	***d***
A)	3	4	1	2
B)	1	2	3	4
C)	3	2	1	4
D)	1	4	3	2.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 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.

4. Write a short note about the global warming.

5. Write short note on the impact of thermal power plants 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.

8. What are the dry adiabatic lapse rate and the wet adiabatic lapse rate ? Explain why they differ.

9. Distinguish between :

   a) primary and secondary air pollutants

   b) stationary and mobile sources of air pollutants.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

10. a) While reading *A* weighted sound levels, 4 readings were taken at a site at different times of a day. These readings are : 20, 56, 66 and 42 dB (*A*) (re : 20 μ Pa). What is the average sound level ?

    b) A 60 dB (*A*) re : 20 μ Pa noise is accompanied with another 60 dB (*A*) re : 20 μ Pa noise. What will be the total noise level ?

11. Traffic noise data are shown in the table below :

Time (secs)	Sound Pressure Level dB (*A*)
10	71
20	75
30	70
40	78
50	80
60	84
70	76
80	74
90	75
100	74

Compute the Leq value from the above dataset.

12. a) Derive the expressions : Li ~ Lp and Lw = (Li or Lp) + 10 $\log_{10} A$, where the notations have their usual meanings.

b) What do you mean by enclosures in connection to noise control measures ?

13. Write short notes on any three of the following in connection to industrial waste water treatment :

a) Chemical coagulation

b) Biological Treatment

c) Reverse Osmosis

d) Floatation.

14. Draw flow typical flow chart for treating waste waters of

a) Sugar Mill and

b) Tannery.

15. Tabulate the pollution characteristics of fertilizer and oil refinery industries.

16. a) Determining maximum ground level concentration :

i) 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 condition 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.

ii) Calculating effective stack height.

b) 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 milli bars

v) Stack gas velocity is 9·14 m/sec.

vi) Stack gas temperature is 149°C. 11 + 4

17. a) What specific air pollution control devices are available for control of particulate emissions at their source ? Indicate the size, range of the particulate that each type of unit is capable of removing efficiently.

b) Name and describe three types of absorbers.

c) Name and define the two types of thermal inversions. Which type prompts the formation of fog ?

d) A rising parcel of dry air has a temperature of 15°C at sea level. Assuming a dry adiabatic lapse rate determine the temperature at 1000 m. 6 + 3 + 3 + 3

END