

Total number of printed pages – 7 **B. Tech**
CPEV 7306

Sixth Semester Examination – 2008

FUNDAMENTAL OF AIR POLLUTION

Full Marks – 70

Time : 3 Hours

*Answer Question No. 1 which is compulsory
and any **five** from the rest.*

*The figures in the right-hand margin
indicate marks.*



1. Answer the following questions in brief :

2 × 10

- (a) List the pollutants and their sources responsible for ozone layer depletion.
- (b) Name the air pollutant responsible for creating the following pollution episodes : Bhopal Gas, London smog, Chernobyl disaster.

- (c) Why some pollutants are known as primary pollutants whereas other pollutants are known as secondary pollutants ? Explain with suitable examples.
- (d) What is the most common unit for the measurement of particulates as recommended by USEPA ?
- (e) What is the heat island effect ?
- (f) What are the important parameters responsible for attenuation of noise pollution ?
- (g) Name the acts and their objectives of the acts enacted for the control of air pollution in India.
- (h) Briefly discuss the adverse effect of inhaling CO on blood cells of human.

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Contd.

- (i) What is wind rose diagram and where it is used ?
- (j) What are the parameters responsible for developing the plume rise above the stack ?
2. (a) Discuss four important layers of the atmosphere with the sketch of a temperature profile of the atmosphere. 4
- (b) Briefly discuss the composition of atmosphere. 4
- (c) Determine the saturation concentration of O_2 at $20^\circ C$ at one atmosphere. (Take Henry's constant at $20^\circ C$, $K_h = 4.01 \times 10^4$ atm/mole) 2
3. (a) A sample of air analysed at $0^\circ C$ and 1 atm pressure is reported to contain 9 ppm of

carbon monoxide. Determine the equivalent CO concentration in $\mu g/m^3$. 3

- (b) Discuss the pollutant, and adverse effects of automobile pollution. Describe the sampling and analysis of smoke comes from diesel engines. 3+4
4. (a) Discuss the adverse effects of following types of air pollution on human health, vegetation and materials : 5
- (i) Particulates
- (ii) PAN & PBN.
- (b) Discuss the procedure of sampling and analysis of SO_2 in the local atmosphere or inside a coal fired power plant. 5

5. Discuss the following plume behaviours with the help of sketches (ELR vs DALR) and stability conditions (any five) : 2×5

- (i) Looping
- (ii) Coning
- (iii) Neutral
- (iv) Fanning
- (v) Fumigating
- (vi) Lofting.

6. (a) Write the equations and the meaning of associated terms used in Gaussian dispersion model in the following cases : 5

Case-I Point source at Ground level

Case-II Point source at elevation H above the ground level with reflection.

(b) Emission of SO_2 at the rate of 160 g/sec from a stack with an effective height of 60 m and the wind speed at the stack height is 6 m/sec and the stability class is 'D' the ground level concentration along the centre line at a distance of 500 m from the stack. Assume for class 'D' the σ_y and σ_z are 36 and 18.5 m respectively at a distance of 0.5 KM. 5

7. (a) Define the noise pollution and its units. Also discuss the noise criteria and sound intensities generated by the following types of noise environment : 2×3

- (i) Car
- (ii) Lorry
- (iii) Jet engine.

(b) Differentiate radiation inversion with subsidence inversion. 4

8. Write short notes on the following (any *four*):
2.5×4

- (i) Photochemistry in the atmosphere
- (ii) Global warming
- (iii) Air pollution index / indices
- (iv) Guidelines for fixing stack height
- (v) Pasquill – Gifford atmospheric stability classifications
- (vi) Effect of air pollutants on meteorology, land / sea breeze effects.