Code No: 07A70108 | **R07** | **Set No. 2**

IV B.Tech I Semester Examinations,MAY 2011
AIR POLLUTION AND CONTROL
Civil Engineering

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Discuss the effects of particulates on human health in particular.

   (b) Describe the effects of air pollution on Taj Mahal.   [9+7]

2. (a) Write a short notes on various kinds of Air Quality Standards.

   (b) Give the Indian Air Quality Standards (SPM, SO_2, NOx, CO) for Residential, Industrial and Sensitive areas.   [8+8]

3. What are the various dry methods of control of SOx? Explain how do you control SOx by the following processes:

   (a) Cat Ox

   (b) Process use of metal oxides.   [16]

4. (a) Explain the major air pollutants generated due to power plants.

   (b) Discuss the role of modern transportation in generating air pollutants.

   (c) Discuss the role of water vapour and oxides of carbon generated naturally.
                                                                      [6+6+4]

5. (a) Why do we see different dispersion patterns during night and day time in a valley?

   (b) How does urban zoning help in reducing the effects of air pollution?   [9+7]

6. (a) Discuss the effects of special pollutants like ammonia and Arsenic on Human health.

   (b) How lead and mercury pollutants are causing damage to the human body?

   (c) Discuss the effects carbon monoxide on health. What are the remedial Measures for the same.   [6+5+5]

7. The traffic density along a straight national highway is 4000 vehicles per hour and average speed is 60KMPH. The average vehicle emission rate of HCS is 40 mg/sec. Find the concentration at a point 300m downwind on an overcast day if wind is blowing perpendicular to the road at 5 m/sec speed.   [16]

8. (a) Explain the factors to be considered while selecting the filter medium for bag houses.

   (b) Calculate the collection efficiency for a gas flow rate of 8 m^3/sec, particle density of 1500 kg/m^3 and diameter of 10 μm, if a multiple cyclone (64 cyclones each of diameter 24 cm) is used instead of a single large unit.   [8+8]

1

Code No: 07A70108

R07

Set No. 2

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R07

Set No. 4

IV B.Tech I Semester Examinations,MAY 2011
AIR POLLUTION AND CONTROL
Civil Engineering

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) What do you mean by 'Pollution Roses'? Enlist the types.

   (b) Discuss different types of environmental lapse rates.   [6+10]

2. Discuss the role of wind in air pollution dispersion.   [16]

3. (a) Write a short notes on Emission Standards.

   (b) What are the Indian Standards for particulate matter emission in the case of Cement industry and Thermal Power Plants in:

      i. Protected areas

      ii. Other areas.   [6+10]

4. (a) How natural sources are responsible for creation of oxides of carbon.

   (b) Give comparative picture of natural and artificial sources of air pollution.

   (c) Discuss the natural and artificial production of oxides of sulphur.   [6+6+4]

5. (a) How LPG is produced? Explain the uses and formation of air pollutants.

   (b) Discuss the role of natural gas its availability and eco-friendly nature in India.
                                                                           [8+8]

6. (a) List the various procedures for controlling the emission of NOx.

   (b) Explain, how do you control the emission of SOx bt the following process:

      i. $c_u o$ / $c_u so_4$ process

      ii. ASARCO Process

      iii. COMINO Process.   [4+12]

7. A thermal power plant burns 100 tonnes of coal with 5.5% sulphur content. Calculate the minimum stack height required. The particulate concentration in flue gases is 8000mg/m^3 and the gas flow rate is 20m^3/sec.   [16]

8. Design a parallel plate ESP with an efficiency of:

   (a) 90%

   (b) 99%

   (c) 99.9% of removal of 0.75 mm sized fly ash from a cement industry with a gas flow rate of 10 m^3/sec. The drift velocity Vp = 2.5 ×10^5 dp m/sec.   [16]

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3

Code No: 07A70108 | **R07** | **Set No. 1**

IV B.Tech I Semester Examinations,MAY 2011
AIR POLLUTION AND CONTROL
Civil Engineering

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) How incinerators are contributing to the air pollution.

   (b) How zoning in city planning can be useful in abating air pollution.

   (c) Explain the significance of Threshold Limit Value (TLV).

   (d) Enlist and explain the toxic and hazardous air pollutants.   [5+4+4+3]

2. Explain with a neat sketch the Principle, Construction and working of a settling chamber. How can its efficiency be improved?   [16]

3. (a) What do you mean by Wind Rose diagram? Explain the same with a typical diagram.

   (b) What is lapse rate? Discuss its relation with temperature variation.   [10+6]

4. (a) Explain the thermodynamics of formation of Oxides of Nitrogen.

   (b) Explain the role of Sulphur dioxide as a reducing and oxidizing agent.   [8+8]

5. (a) Describe the effects of ozone holes on flora and fauna.

   (b) Explain briefly the history of Ozone holes.   [9+7]

6. (a) List the various procedures for controlling the emission of SOx.

   (b) Explain, how do you control the emission of SOx by the following :

      i. $c_u o$ / $c_u so_4$ process
     ii. ASARCO Process
    iii. COMINO Process .   [4+12]

7. (a) Explain the effect of air pollutants on meteorology.

   (b) Explain the Gaussion plume model.   [8+8]

8. (a) Explain the environmental guidelines for industries.

   (b) Write in detail the environmental input assersment.   [8+8]

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4

Code No: 07A70108 $\boxed{\textbf{R07}}$ $\boxed{\textbf{Set No. 3}}$

IV B.Tech I Semester Examinations,MAY 2011
AIR POLLUTION AND CONTROL
Civil Engineering

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Describe the ill effects of Acid rain on metals.

   (b) Describe the ill effects of Acid rain on fertility and crop yield.   [9+7]

2. (a) What are the merits and de-merits of cyclones?

   (b) Find the length of a simple gravity collector required to remove 90% of 50 micron diameter particles of density 2 g/c.c. The bulk gas velocity is 0.5m/sec and the chamber is 3.5 m in height. Calculate the length if two trays are used for same efficiency.   [6+10]

3. (a) Explain the term inversion and its types. Discuss the causes and effects of Inversion.

   (b) Discuss causes and remedies for photochemical smog.   [8+8]

4. (a) Describe the scenario of air pollutants generated in automobiles and Industrial processes.

   (b) India's one of the most widely used fossil fuels is coal. How does it affect our environment from air pollution point of view.

   (c) Discuss the properties of oxides of sulphur with reference to air pollution.
   $$[6+7+3]$$

5. (a) Define Air Pollution Index. What are the parameters generally used for calculating Air Pollution Index?

   (b) What are the Air quality standards adopted by the Environmental protection agency, U.S.A.   [8+8]

6. (a) What is thermodynamics? Why it is relevant in the study of air pollution.

   (b) Discuss the cause of CO production.   [8+8]

7. A thermal power plant burns 5.45 tonnes with 4.2% sulphur per hour and discharges through a stack of effective height 75m. The average wind speed at top of stack is 6m/sec. The atmosphere is slightly to moderately stable. Find

   (a) Maximum ground level concentration and the corresponding distance

   (b) Ground level concentration at 3 km downward and 0.4 km cross wind distance. Note :
   At 0.85 km distance, $\sigma_y = 88$, $\sigma_z = 53$
   At 3 km distance, $\sigma_y = 280$, $\sigma_z = 170$.   [16]

5

8. Explain stack gas emission standards for different industries. [16]

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