Civil 7 (E – I) 3 (2007-08)

B.E. (Civil) Semester – VII (RC) (2007-08) Examination, Nov./Dec. 2018
AIR POLLUTION (Elective I)

Duration : 3 Hours | Total Marks : 100

Instructions : *1) Answer a minimum of **one** question from **each** module and a total of **five** questions.*
*2) Figures to the **right** indicate marks allotted to the questions.*
*3) Assume **any** additional data and mention **it clearly**.*
*4) Draw neat sketches **wherever** required.*

MODULE – I

1. a) Describe Thames Valley episode. Explain its scientific reason and effects.
   b) Classify air pollutants into different categories indicating their sources. **(10+10)**

2. a) Gas from a thermal power plant has an SO_2 content of 10 ppm at 760 mm Hg and 55°C. Calculate the SO_2 concentration in $\mu g/m^3$ and mg/m^3.
   b) Explain the effects of air pollution on plants. **(10+10)**

MODULE – II

3. a) How are environmental and adiabatic lapse rate used in conjunction with establishing degree of stability within the atmosphere ?
   b) Describe with neat sketches, the types of plume behaviour. **(10+10)**

4. a) A high volume air sampler operated at 1500 LPM. The sampling period was 24 hrs, the filter paper weighed 3.0051 gm at the start of the run and 3.7010 gm at the end of the sampling period. Determine the concentration of the suspended particulate in $\mu g/m^3$.
   b) Describe Inversion conditions of atmosphere. **(10+10)**

MODULE – III

5. a) Describe Ozone depletion and how it affects the environment.
   b) Determine the effective height of a stack using the data given below :

Stack	=	175 mt. tall
Inside diameter	=	1.10 mts.
Wind velocity	=	3.75 m/sec.

P.T.O.

Air temperature	=	20°C
Barometric Pressure	=	1000 millibars
Stack gas velocity	=	8.00 m/s
Stack gas temperature	=	90°C

(10+10)

6. a) Describe the phenomenon of greenhouse effect due to carbon dioxide.

   b) The traffic density of a highway is 1100 vehicles/ hr and the average vehicle speed is 50 km/hr. The average CO emission per vehicle is 3.1 gm/sec. Estimate the CO concentration at 100 m, 300 m and 1000 m downwind of the highway if the wind speed normal to the highway is 3.0 m/s, assuming neutral condition.

Distance in m	σz in m
100	4.6
250	10.2
300	14.0
400	16.9
500	17.7
1000	31.3

(10+10)

MODULE – IV

7. a) What are the advantages and disadvantages of fabric filter ?

   b) Outline the steps that must be considered to establish air quality and emission standards. (10+10)

8. Write detail notes on the following : (4×5=20)

   a) Electrostatic precipitator

   b) Cyclone separator

   c) Constitution and functions of Central Pollution Control Board

   d) Air Pollution Acts.

CIVIL 7 – (E-I) 3 (RC)

B.E. (Civil) (Semester – VII) (RC) Examination, Nov./Dec. 2017
AIR POLLUTION (Elective – I)

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*4) Draw **neat** sketches **wherever** required.*

Module – I

1. a) Write a note on Photochemical Smog. **(10+10)**
   b) Write the harmful effects of pollution on metals and materials.

2. a) Distinguish between : **(10+10)**
      i) Primary and Secondary air pollutants
      ii) Stationary and Mobile sources of air pollution.
   b) Describe in brief the Indonesia forest fire.

Module – II

3. a) Explain analytical method of SPM determination using HVS. **(10+10)**
   b) A high volume air sampler operated at 1750 LPM. The sampling period was 12 hours. The filter paper weighed 2.9550 g at the start of the run and 3.4440 g at the end of the sampling period. Determine the concentration of the suspended particulate matter.

4. a) What is inversion ? Classify inversions and state their causes and effects. **(10+10)**
   b) Explain plume behaviour with its different types.

Module – III

5. a) Write the causes and effects of ozone depletion. (8+12)

   b) Find the effective stack height if 33 m stack releases SPM at a rate of 1.25 gm/sec. The atmospheric pressure is 17.6 m of water. The ambient air temperature and gas temperature are 34°C and 52°C respectively. The wind flows at a velocity of 3.2 m/sec. The stack gas velocity is 9.5 m/sec. and the diameter of stack is 1.90 m. Also calculate G.L.C. at 1 km, 5 km and 10 km during day time with moderately stable wind condition.

   The value of σy and σz for moderately stable conditions are as follows :

x km	1	2	3	4	5	6	7	8	9	10
σy	4	133	180	275	300	325	400	450	490	510
σx	30	50	65	85	95	105	115	125	135	150

6. a) Explain atmospheric dispersion through Gaussian model. (10+10)

   b) A chimney with a stack height of 95 m is emitting CO at a rate of 135 gm/sec. on a sunny day in December with moderate wind speed of 4.2 m/sec. the stack diameter is 1.95 m. The gas exit velocity is 8.5 m/sec. and the gas temperature of the exit is 135°C. What is the plume rise for an ambient air temperature of 31°C ? Calculate effective stack height under this condition.

Module – IV

7. a) Describe the principle, construction and working of Electrostatic precipitator. (10+10)

   b) Explain with neat sketches the working and operating problems of fabric filters.

8. Write detail notes on the following : (10+10)

   a) Gravitational Setting Chamber.

   b) Constitution and functions of State Pollution Control Board.

CIVIL 7 – (E-I) 3(RC)

B.E. (Civil) (Semester – VII) (RC) Examination, Nov./Dec. 2016
AIR POLLUTION (Elective – I)

Duration : 3 Hours | Total Marks : 100

Instructions : *1) Answer a minimum of **one** question from **each** Module and a total of **five** questions.*
*2) Figures to the **right** indicate marks **allotted** to the questions.*
*3) Assume any additional data and mention it **clearly**.*
*4) Draw neat sketches **wherever** required.*

MODULE – I

1. a) Explain the sources and classification of air pollution. **(10+10)**

   b) What are the effects of Carbon Monoxide on environment ?

2. a) Write a note on Chernobyl Nuclear disaster. **(10+10)**

   b) Determine the volume occupied by 3 mole of gas at 32° C and 820 mm of Hg.

MODULE – II

3. a) Explain the process of Oxidant in photochemical smog. **(8+12)**

   b) Describe with neat sketches the types of plume behaviour.

4. a) State the composition and structure of atmosphere. **(10+10)**

   b) Calculate the mass concentration of suspended particulate in $\mu g/m^3$. The average pressure for the period is 760 mm of Hg. The average temperature for that period was 31.5° C. The sampling process was from 8.00 am on 15^{th} Jan. to 8.00 am on 16^{th} Jan. The rate of sampling was 1.90 m^3/min. The weight of filter paper before exposure was 3.225 gm and after exposure was 4.110 gm.

MODULE – III

5. a) What are the assumptions and limitations of Gaussian Plume model ? (10+10)

   b) Estimate the plume rise in neutral condition of the atmosphere for an industry emitting gas from the stack at 160° C at a velocity of 13 m/sec. The diameter of the stack is 3 m and the height 110 m. The ambient temperature is 30° C and the wind speed is 6.15 m/sec at 110 m height.

6. a) Write a note on Ringelmann Chart. (8+12)

   b) A power plant uses 7.50 tonnes of coal per hour and discharges the emission through a stack with an effective height of 90 m. The coal has a sulphur content of 3.0% and the velocity at the top of the stack is 5.5 m/s. The atmospheric stability conditions are of class C. Where $\sigma z / \sigma y$ is a constant. Take σz : 53 m and σy : 88 m. Determine the maximum ground level concentration. Also determine the ground level concentration at a distance of 3.0 km down wind at the centre line of the plume and at a cross wind distance of 0.4 km of the centre line where σz : 170 m and σy : 280 m.

MODULE – IV

7. a) Write a note on Electrostatic Precipitator. (10+10)

   b) Briefly explain the principle, working, advantages and disadvantages of Fabric Filters.

8. Write detail notes on the following : (4x5=20)

   a) Cyclone Separator

   b) Wet collector

   c) Functions and power of state pollution control board

   d) Air Pollution Acts.

CIVIL 7 – 4 (RC)

B.E. (Civil) Semester – VII (RC) Examination, Nov./Dec. 2015
AIR POLLUTION (Elective – I)

Duration : 3 Hours | Total Marks : 100

Instructions : *1) Answer **any five** questions.*
*2) Figures to the **right** indicate marks **allotted** to the questions.*
*3) Assume **any** additional data and mention it clearly.*
*4) Draw **neat** sketches **wherever** required.*

1. a) Describe in brief the London Smog Episode 1952. **(10+10)**
   b) Define Dust, Smoke, Mist, Fumes and Vapours.

2. a) Distinguish between :
      i) Primary and Secondary air pollutants
      ii) Stationary and Mobile sources of air pollution **(10+10)**
   b) Write the harmful effects of SO_2 and CO on human beings.

3. a) Describe the effects of topography on pollutant dispersion. **(10+10)**
   b) Describe the stable, unstable and neutral condition of atmosphere.

4. a) Name and describe the four major layers of the atmosphere. **(10+10)**
   b) Explain plume behaviour with its different types.

5. a) Explain atmospheric dispersion through Gaussian model. **(8+12)**
   b) Find the effective stack height if 60m stack releases SPM at a rate of 1.50 gm/sec. The atmospheric pressure is 15.6m of water. The ambient air temperature and gas temperature are 27°C and 430°C respectively. The wind flows at a velocity of 2.5 m/sec. The stack gas velocity is 9 m/sec and the diameter of stack is 2.0m. Also calculate G.L.C at 1km, 10km and 20km during day time with moderately stable wind condition.

   The value of σy and σz for Moderately stable conditions are as follows :

x, km	1	2	3	4	5	6	7	8	9	10
σy	4	133	180	275	300	325	400	450	490	510
σz	30	50	65	85	95	105	115	125	135	150

6. a) Explain the phenomenon of acid rain. How it is formed ? Briefly discuss the effects of acid rain on vegetation and on properties. (10+10

   b) A chimney with a stack height of 170m is emitting CO at a rate of 350 gm/sec on a sunny day in June with moderate wind speed of 2.2 m/sec. The stack diameter is 3.2 m. The gas exit velocity is 9.2 m/sec and the gas temperature of the exit is 150° C. What is the plume rise for an ambient air temperature of 30° C ? Calculate effective stack height under this condition.

7. a) Describe the principle, construction and working of a centrifugal separator. (10+10

   b) Explain with neat sketches the working and operating problems of fabric filters.

8. Write detail notes on **any two** of the following : (10×2=20

   a) Effects of Ozone hole and its controlling measures

   b) Electrostatic precipitator

   c) Constitution and functions of state pollution control board

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B.E. (Civil) Semester- VII (Revised Course 2007-08)
EXAMINATION Aug/Sept 2019
Elective- I
Air Pollution

Duration : Three Hours] **[Max. Marks : 100]**

nstructions:

1. Answer a minimum of **one** question from each module and a total of **five** questions.
2. Figures to the right indicate marks allotted to the questions.
3. Assume any additional data & mention it clearly.
4. Draw neat sketches wherever required.

Module – I

.No:1 a) Define Air Pollution and explain the terms Dust, Smoke, Mist and Fumes. **(10+10)**
b) Write the harmful effects of So_x and NO_x on human beings.

.No.2 a) Explain: i) Primary and Secondary air pollutants **(10+10)**
ii) Stationary and Mobile sources of air pollution
b) Briefly explain the causes and effects of any two episodes of notable air pollution disasters in the world

Module – II

.No.3 a) Name and describe the four major layers of the atmosphere. **(10+10)**
b) Write a note on Heat Island effects.

No.4 a) Describe the laboratory method of determining SPM using HVS **(10+10)**
b) Explain plume behavior with its different types.

Module-III

No.5 a) Explain atmospheric dispersion through Gaussian model. **(08+12)**
b) Find the effective stack height if 75m stack releases SPM at a rate of 1.60 gm/sec. The atmospheric pressure is 15.6m of water. The ambient air temperature and gas temperature are 30°C and 390°C respectively. The wind flows at a velocity of 3.1 m/sec. The stack gas velocity is 8.8 m/sec and the diameter of stack is 1.7m. Also calculate G.L.C at 1km, 5km and 10km during day time with moderately stable wind condition.

The value of σy and σz for Moderately stable conditions are as follows:

x, km	1	2	3	4	5	6	7	8	9	10
σy	4	133	180	275	300	325	400	450	490	510
σz	30	50	65	85	95	105	115	125	135	150

Q.No.6 a) Explain the phenomenon of acid rain. Briefly discuss the effects to acid rain on vegetation and on properties. (10+10)

b) A chimney with a stack height of 140m is emitting CO at a rate of 550 gm/sec on a sunny day in May with moderate wind speed of 3.7 m/sec. the stack diameter is 2.5 m. The gas exit velocity is 7.7 m/sec and the gas temperature of the exit is 170°C. What is the plume rise for an ambient air temperature of 35°C? Calculate effective stack height under this condition.

MODULE- IV

Q.No.7 a) Describe the principle, construction and working of a centrifugal separator. (10+10)

b) Explain with neat sketches the working and operating problems of fabric filters.

Q.No.8 Write detail notes on any TWO of the following (10X2=20)

a) Constitution and functions of Central pollution control board

b) Electrostatic precipitator

c) Air Pollution Acts.