2+2=4.

SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR

ROLL No: | | | | | | | | | | | | | | Total number of pages:[2]

Industrial Pollution Control (New)

Re appear

Subject Code :BTCH- 501A/504

Paper ID :

Batch: 2015 onwards

Paper ID: May, 2018

Time allowed: 3 Hrs **Max Marks: 60**

Important Instructions:

- **All questions are compulsory**
- **Assume any missing data**
- **Additional instructions, if any**

PART A (10x 2marks)

Q. 1. Short-Answer Questions:

(a) What do you mean by Dry Adiabatic Lapse rate DALR?
(b) What is temperature Inversion? How it affects stability of atmosphere?
(c) What do you mean by Effective stack height of a Plume?
(d) What is Stack Sampling?
(e) What factors effecting the collection efficiency of an ESP?
(f) What are Bouyant Plumes?
(g) What do you mean by Cut size diameter d_{PC} ?
(h) What is the difference between BOD and COD?
(i) What are the various types of Cyclone seperators?
(j) How hardness can be removed for drinking water?

PART B (5×8marks)

Q.2 Explain in detail the conditions, mechanism and various reactions leading to the formation of 'Photochemical Smog'. Also illustrate the dynamic behaviour of concentration of Pollutants during day & night. CO1

OR

Given the following temperature variation with altitude:

Elevation (m):	0	20	40	60	80	100	120
Temp.(°C):	20	18	16	18	20	18	16

What type of plume would you expect if the exit temperature of the plume was 20°C and the smoke stack was (a) 20m ? (b) 40m ? (c) 60m ? (d) 80m tall? CO1

Q3. (a)Explain briefly the Gaussian Plume model for Air Pollutant dispersion. What are its limitations? CO4

(b) A 1000 MW power plant of 35% thermal efficiency is proposed. The Plant burns 3% sulphur coal with a heating value of 6000 kcal/kg and emit 64000 m3/min-of flue gas. What is the concentration of SO2 in the flue gas in ppm? Assume the density of SO2 is 1920 g/m3.

OR

A 1000 MW power plant burns 10000 metric tons of 1.5% sulphur coal per day. The flue gases are emitted into the atmosphere through a stack whose height is 200m. The dia of the stack at the plume exit is 5m. The velocity & the temp. of the plume at the exit are 10m/s & 120°C respectively. What is the downwind SO2 concentration in the plume centerline on the ground at a distance of 5 km on a thin overcast night when the environmental lapse rate CO4

is equal to zero? Assume ambient temp. is 15°C & the wind speed at the stack altitude is 6m/s.

Q4. Give in detail the steps of handling & disposal of sludge from biological wastewater treatment plants. Discuss in detail any of the two steps. Also Discuss the ion exchange technique of removal of hardness & iron and manganese salt from drinking water supplies. CO2

OR

Describe in detail the technique for removal of particulate matter from air by means of a Reverse-flow type of cyclone separator.Briefly describe a method for collection of particulate pollutants of size less than 10μm. Show by sample calculation how to find its gravimetric concentration? On what factors the collection efficiency depends. CO2

Q5. A large stream has a rate of reaeration k2=0.55 and a rate of deoxygenation k1=0.23 per day. The DO deficit of the mixture of stream water and wastewater at the point of reference, D0, is 4.0 mg/l and the ultimate BOD of the waste, Lu is 75 mg/l. Calculate (1) the DO deficit at a point one day distant from the point of reference and (2) the critical deficit and the critical time. Derive the relations used in solving the problem. CO3

OR

What are the various types of sampling techniques of waste water & analysis. Discuss in detail step-wise procedure for measurement of organic content by 5-day, 20°C. CO3

Q6. Explain the 'Activated sludge process' for biological treatment of waste water. On what factors the effluent quality of such a system depends? Give in detail any two steps of handling & disposal of sludge from biological wastewater treatment plants. CO5

OR

Explain the process of purification of sewage by 'Trickling filter'. What are advantages with respect to activated sludge process. Differentiate between standard and high rate trickling filters. CO5