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MANIPAL INSTITUTE OF TECHNOLOGY MANIPAL UNIVERSITY



SIXTH SEMESTER B. TECH. CHEMICAL ENGINEERING MAKE UP EXAMINATION MAY 2016

SUBJECT: O.E.: INDUSTRIAL POLLUTION CONTROL (CHE 324)

Time: 3 HOURS

Max.Marks: 100

Note: Answer **ANY FIVE FULL** questions Each question carries 20 Marks

1 A	Draw a neat self-explanatory diagram of the nitrogen cycle.	6
1 B	What is the significance of the following:	6*1=6
	i) Volatile solids	
	ii) Turbidity	
	iii)Temperature	
	iv)Alkalinity	
	v) Acidity	
	vi)BOD	
1 C	Explain the principle and working of any two methods (each) to collect	8
	i) gaseous sample ii) particulate sample from air.	

2 A	Explain any two techniques used in tertiary treatment of wastewater.	10
2 B	Differentiate between Anaerobic and Aerobic treatment of wastewater.(Any	5*2=10
	five)	

3 A	With neat schematic diagrams explain any four processes in primary	2.5*4=10
	treatment of wastewater.	
3 B	What is isokinetic condition of sampling particulate matter from a stack.	2+2=4
	What is its significance?	
3 C	Explain any two primary parameters under meteorological information	2*3=6
	required for designing air pollution monitoring network.	

4 A	Describe the three approaches for capture of CO ₂ involved in Carbon	10
	sequestration.	
4 B	Describe how	2.5*4=
	i) NOx pollution is controlled by low NOx burner	10
	ii) NOx pollution is controlled by low excess air	
	iii) Particulate emission is controlled using gravitational settling	
	chamber	
	iv) Particulate emission is controlled using cyclone separator	
5 A	A steel plant located 4 km outside the western edge of a city has a smelter	10
	with a stack 150 m high. Plume rise is 576 m.	
	Mass flow rate of flue gas emitted from stack is 3770 Kg/s. Wind is blowing	
	eastward at a speed of 3 m/s. It is a sunny day (strong solar radiation).	
	Assume that the pollutant concentration at the plume centerline is blown into	
	the city whose dimensions are 4 km northwards and 3 km eastwards. Given,	
	emission density in the city is $5*10^{-4}$ g/s.m ² and the mixing height of the city	
	is 450 m.	
	Considering the entire city to be enclosed in a box and that fixed box model	
	is applicable, what is the concentration of pollutant in the city?	
5 B	Explain the different processes for sludge treatment (in not more than two or	10
	three sentences per process).	

6 A	How is e-waste managed by the following methods?	10
	i) Inventory management	
	ii) Segregation and volume reduction	
6 B	Describe methods adopted to control noise pollution in industry.	10