Reg.No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL UNIVERSITY

SIXTH SEMESTER B. TECH. CHEMICAL ENGINEERING
END SEMESTER 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 sulphur cycle.	**6**
1 B	What is the significance of the following: i) Volatile solids ii) Turbidity iii)Temperature iv)Alkalinity v) Acidity vi)BOD	**6*1=6**
1 C	Explain the principle and working of any 2 methods (each) to collect gaseous sample **and** particulate sample from air.	**8**

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

3 A	Draw a neat flowchart with schematic diagrams of each treatment process in primary treatment of wastewater.	**10**
3 B	Discuss deviations from isokinetic condition of sampling particulate matter from a stack.	**4**
3 C	Explain the three basic cases of atmospheric stability.	**3*2=6**

4 A	Describe the three approaches for capture of CO_2 involved in Carbon sequestration.	**10**
4 B	Describe how i) NOx pollution is controlled by flue gas recirculation ii) NOx pollution is controlled by water/steam injection iii) Particulate emission is controlled using bag filter iv) Particulate emission is controlled using electrostatic precipitator	**2.5*4=10**

5 A	A steel plant located 4 km outside the western edge of a city has a smelter with a stack 150 m high. Plume rise is 576 m. Volumetric flow rate of flue gas emitted from stack is 3141.5 m^3/s. Density of flue gas is 1.2 kg/m^3. 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 3 km northwards and 4 km eastwards. Given, emission density in the city is $5*10^{-4}$ $g/s.m^2$ and the mixing height of the city is 400 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?	**10**
5 B	Explain the different processes for sludge treatment (in not more than 2 or 3 sentences per process).	**10**

6 A	How is e-waste managed by the following methods? i) Production process modification ii) Sustainable product design	**10**
6 B	Describe methods adopted to control noise pollution in industry.	**10**