

**GUJARAT UNIVERSITY**  
**B.E. Sem V (Civil) Examination**  
**Environmental Engineering-I**

**Wednesday, 9th January, 2008]**

**[Time : 3 Hours**  
**Max. Marks : 100**

- Instructions :** (1) Attempt **all** questions from each section.  
 (2) Answer to the two sections must be written in **separate** answer books.  
 (3) Figures to the right indicate **full** marks.  
 (4) Assume suitable data if required

**SECTION I**

- 1 ( a ) Enlist the different characteristics of water and describe in detail biological characteristic. 17  
 ( b ) Describe the test for E-coli.  
 ( c ) Write a note on common water borne diseases.

**OR**

- 1 ( a ) Why coliform bacteria are known as indicator organisms. 17  
 ( b ) Describe certain desirable characteristics of indicator organisms.  
 ( c ) Describe the procedure for MPN of coilform count.

An unknown water sample is analyzed for the estimation of coilform organisms. Three sample portions, 1ml, 10 ml, and 100ml, are used for titration. Each of these portions is filtered through five filter membranes using the memberane filtration technique. After incubation in each betridish, the colonies were counted. The counts were found as follows

Sr. No.	Sample portion	Number of Colonies
1	1ml	4, 7, 8, 6, 5
2	10ml	21, 25, 30, 35, 29
3	100ml	250, 301, 289, 370, 340

What is the number of coilform per 100ml of sample?

- 2 ( a ) Define hardness. What is the importance of determination of hardness of water? 17  
 ( b ) What is the principle of EDTA titration? How can you determine the permanent hardness of water by EDTA method?  
 ( c ) 50ml of a samples of water on EDTA titration with Eriochrome Black-T as an indicator consumed 2ml. of 0.045M EDTA till end point is reached. Calculate the hardness of water. Take 1ml of 0.01M EDTA = 1mg of CaCO<sub>3</sub>.

**OR**

- 2 ( a ) What is air pollution? State the effects of air pollution on man and vegetation. 17  
 ( b ) What is noise pollution? State the adverse effects of nosie. How traffic nosie can be reduced?  
 ( c ) Classify air quality standards. Explain air quality act 1970.

- 3 Write short notes any **four** : 16  
 ( i ) Membrane filter technique  
 ( ii ) Alkalinity test for water  
 ( iii ) Rural sanitation  
 ( iv ) Comfort criteria of ventilation and its system  
 ( v ) Importance of microbes in environment

**P. T. O.**

## SECTION II

- 4 ( a ) Explain 1st stage & 2nd stage BOD. How do you determine BOD? What are its limitations? 17  
 ( b ) Deduce the expression for 1st stage BOD.  
 ( c ) The BOD of a sewage sample incubated for 1 day at 30°C has been found to be 120 mg/l. What will be the 5 day 20°C BOD? Assume  $K_{DC(20)} = 0.12/\text{day}$ .

OR

- 4 ( a ) Differentiate between Aerobic process and anaerobic process. 17  
 ( b ) Write a note on carbon cycle.  
 ( c ) A 3% solution of a sewage sample was incubated for 5 days at 20°C. The depletion of oxygen was found to be 6 mg/l. Determine the BOD of the sewage.

- 5 ( a ) Discuss fully the processes of self purification of natural water. Explain oxygen sag curve. 17  
 ( b ) Explain any one method of solid waste disposal.  
 ( c ) The domestic sewage of a town is to be discharged into a stream after treatment. Determine the maximum permissible effluent BOD and the percentage purification required in the treatment plant.

Given the following particulars :

- ( i ) Population of town = 1,00,000  
 ( ii ) D.W.F. of sewage = 140 lpcd.  
 ( iii ) BOD contribution per capita = 0.08 kg/day  
 ( iv ) Minimum flow of stream = 0.2 m<sup>3</sup>/s  
 ( v ) BOD of the stream = 3 mg/l  
 ( vi ) Max BOD of stream on d/s = 6 mg/l

OR

- 5 ( a ) What is house drainage? Explain aims and principles of house drainage. 17  
 ( b ) Draw the layout diagrams of treatment plants of textile and fertilizer industries?  
 ( c ) Write a note on 'characteristics' of industrial waste.

- 6 Write short notes any four : 16  
 ( i ) COD test on waste water sample  
 ( ii ) Boiler feed water  
 ( iii ) Orthotolidine Test  
 ( iv ) Break point chlorination  
 ( v ) Chloride test on water.