Paper Code: MTEV-101	**Roll No.**									

M. Tech.
FIRST SEMESTER EXAMINATION, 2016-17
ENVIRONMENTAL CHEMISTRY AND MICROBIOLOGY

[Time:- 3 Hours] [Max Marks:- 70]

Note: Attempt ***ALL*** questions. Assume suitable data, if required. All question carry equal marks.

1. Attempt any *four* parts of the following: - **(3.5×4=14)**

(a) Explain the Boyle's and Charle's law with suitable example.
(b) Write the environmental significance of E.coli and B.coli.
(c) Explain Henry's law with example.
(d) What do you understand by reverse osmosis with example.
(e) What is meant by enthalpy explain with suitable example.
(f) Why does solubility increase as still larger quantities of a common ion are added?

2. Attempt any *two* parts of the following:- **(7×2=14)**

(a) What is oxidation reduction ? How can we use oxidation reduction for industrial water pollution control? Explain with an example.

(b) What is the reason behind this tendency of a system to increase its entropy, and to lose its internal-energy?

(c) What is meant by order of reaction? Describe in detail. Write the rate constant for given equation (i) Zero order (ii) Half order, (iii) First order, (iv) 3/2 order

$$Kn = (dm)^{n-1}\ mol^{1-n}\ s$$

3. Attempt any *two* parts of the following:- **(7×2=14)**

(a) Give a description account of evolution of organism for their adaptability in present day environment?

(b) What do you understand by colour and turbidity in water? What are the measurement methods of colour and turbidity? Explain the permissible limits of them and the environmental significance of them.

(c) Why does the COD analysis and BOD analysis usually gives different results for the same waste? Why seeding is done in BOD test? What use is made of the BOD test in water pollution and control?

4. Attempt any *two* parts of the following: - **(7×2=14)**

(a) Explain the electro-kinetic potential? Explain the relationship between surface charge density, surface potential, stern potential and zeta potential. Explain the theory of coagulation?

(b) What do you understand by effective disinfection? Briefly explain the commonly used disinfecting agents? What do you understand by the break-point chlorination?

(c) Describe the mass balance concept in microbial system with the help of example.

5. Attempt any *two* parts of the following:- **(7×2=14)**

(a) What do you mean by binary mixtures? Explain class I and class II for binary mixtures.

(b) Ammonium (NH_4) stays in soil, while nitrate (NO_3) is easily leached out. Why do they behave so differently? Also enumerate the importance of nitrogen in vegetation and effect of nitrogen oxides on human health.

(c) What is the difference between aerobic and anaerobic growth. What are the different environmental factors which influence their growth?