

Day: Tuesday  
Date: 04/12/2018

W-2018-3300

Time: 11.00 AM TO 02.00 PM  
Max Marks.: 60

N.B. :

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat and labeled diagram **WHEREVER** necessary.
- 4) Assume suitable data if necessary.

**SECTION - I**

Q.1 List out the polluting parameters, with respect to physical, chemical and biological characteristics and state their industrial sources with permissible limits. (10)

**OR**

Q.1 Describe treatment of physical, chemical and biological characteristics of Industrial waste water. (10)

Q.2 Write the process of froth flotation? List frothing agent and electrolytes added for better froth and effective result. (10)

**OR**

Q.2 What is coagulation? How does it help in flocculation? Describe the process of sedimentation and Thickener Area calculation using laboratory settling curve data. (10)

Q.3 Explain the importance of Aeration in waste water treatment? Give the various reactions with water pollution. Draw and describe various types of Aerations in waste water treatment. (10)

**OR**

Q.3 Explain the data required for overall design of Activated Sludge Process (ASP). Give step by step method for overall design of ASP. (10)

**SECTION - II**

Q.4 Explain the following for sludge digestion and disposal (10)

- i) Volume – mass relationship
- ii) Volume of the sludge and digested sludge
- iii) Calculation for percent of volatile matter after digestion
- iv) Calculation for specific gravity of digested sludge

**OR**

Q.4 Determine the liquid volume before and after digestion and % reductions for 1000 kg (dry basis) of primary sludge with the following characteristics: (10)

Content	Primary	Digested
Solid %	6	12
Volume matter %	90	90
Specific gravity of fixed solids	3.0	3.0
Specific gravity of volatile solids	1.0	1.0

Q.5 What are the different adsorption isotherms? Draw and explain break through curve? What is adsorption hysteresis? (10)

**OR**

Q.5 State the salient features of the following advanced waste water treatments. (10)  
i) Ion exchange method ii) Chemical oxidation iii) Membrane process

Q.6 Explain the importance of solid waste management how would you dispose hazardous waste sludge. (10)

**OR**

Q.6 How would you make risk assessment in disposal of nuclear solid waste? (10)