(2½ Hours) (Total Marks: 60)

**Please check whether you have got the right question paper.**

N.B. : 1) **All questions are compulsory**
2) **Figures to the right indicate full marks.**
3) **Use of nonprogrammable calculator is allowed.**

1. A. Attempt **ANY TWO** of the following:- **(08)**
   i) Discuss electrochemical technology for the recovery of heavy metals from industrial effluent.
   ii) Explain the importance of Sewage treatment with respect to safety of environment.
   iii) Comment on Permissible limits for heavy metals in the metallurgical industrial effluent.
   iv) Write a note on construction of Effluent treatment plant with the help of process flow chart.

   B. Explain activated sludge process for sewage treatment with the help of flow chart. **(04)**
   **OR**
   B. Discuss the importance of the recycle and reuse of treated water. **(04)**

2. A. Attempt **ANY TWO** of the following: **(08)**
   i) Discuss the occupational health hazards associated with biomedical waste handling.
   ii) How does the solid waste generated in the residential area affect the civil life?
   iii) Discuss the treatment and disposal of sludge.
   iv) Explain the classification of Biomedical waste

   B. Discuss 3R concept of solid waste management. **(04)**
   **OR**
   B. Outline the methods of solid waste management. **(04)**

3. A. Attempt **ANY TWO** of the following: **(08)**
   i) Give the method for analysis of vinyl chloride polymers.
   ii) What are Organo silicones? Give the advantages of the Organo silicone based paints.
   iii) List the metallic impurities in plastic and explain the methods for its determination.
   iv) Discuss the determination of volatile matter in paints.

   B. Give the classification of plastics. **(04)**
   **OR**
   B. Discuss the impact of plastic on the human health and environment. **(04)**

4. A. Attempt **ANY TWO** of the following: **(08)**
   i) What is Smelting process? Discuss the effect of pollution due to Smelting process.
   ii) Explain the procedure to determine Aluminium from Bauxite
   iii) What is Zone refining? Discuss the parameters which affect the efficiency of zone refining

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iv) 0.574 gm of bronze was opened with proper treatment and then diluted to 250 cm$^3$. From this stock, 25 cm$^3$ of diluted solution was titrated against 0.1N $Na_2S_2O_3$ for the estimation of copper iodometrically. if the constant burette reading was 3.2cm$^3$, then calculate the percentage of copper in bronze. (Atomic weight of Copper = 63.5).

B.   What is ore dressing? Explain anyone method of ore dressing. **(04)**

**OR**

B.   What is alloy? How to determine copper from Cupronickel? **(04)**

5.   Attempt **ANY FOUR** of the following: **(12)**
  i)   Discuss the importance of equalization tank in the effluent treatment process.
  ii)  What is the impact of effluent from metallurgical industry on water pollution?
  iii) Outline the different methods for the disposal of Biomedical waste.
  iv)  Explain management of non decomposable solid waste.
  v)   Discuss any one method for the determination of molecular weight of polymer.
  vi)  Describe the inorganic pigments used in paints.
  vii) What are the applications of the high purity materials?
  viii) Write short note on determination of iron from pyrolusite ore.

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