(2½ Hours) [Total Marks :60

N.B. : (1) **All questions are compulsory.**
(2) Use of log **table** or non programmable **calculator** is permitted.

1. (a) Attempt any **two** of the following:— 8
(1) Describe the hazardous effects of effluents from metallurgical industries.
(2) Explain the term 'sewage'. How is sewage classified?
(3) How are industrial effluents treated? Explain with the help of flow sheet diagram.
(4) Discuss the importance of processing of effluent water for its reuse. State the applications of processed effluent water.

(b) Attempt any **one** of the following:— 4
(1) Give an account of ion-exchange technique for the recovery of metal from industrial effluent.
(2) Discuss in detail sources of pollution of potable water.

2. (a) Attempt any **two** of the following:— 8
(1) How does bio-medical waste contribute in polluting the environment?
(2) What are non-decomposable solid wastes? What are the correct ways of their management?
(3) How is dry cake from industrial effluent separated & disposed?
(4) What are the sources of solid waste? How are they classified?

(b) Attempt any **one** of the following:— 4
(i) Explain the meaning of the term '3R' in solid waste management.
(ii) Discuss the methods of disposal of bio-medical waste.

3. (a) Attempt any **two** of the following:— 8
(1) List metallic impurities in plastics. Explain their method of determination.
(2) What is flash point? How is it determined?
(3) How are acrylic based polymers analysed?
(4) Give impact of 'organsilicones' on environment.

(b) Attempt any **one** of the following:—
(1) What are the different types of pigments? How are non-volatile components 4 in paints determined?
(2) 'Plastic is regarded as pollutant to environment'. Explain.

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(a) Attempt any **two** of the following:—   8
   (1) Discuss the analysis of Galena ore, with respect to dissolution and determination of its lead content.
   (2) Write a brief note on- 'Purpose of developing alloy'.
   (3) What is dressing of ore? Explain method of magnetic separation.
   (4) 0.410 g of bronze alloy was given proper treatment for opening & diluted to 250 cm^3. 25.0 cm^3 of diluted solution was titrated with 0.05 N $Na_2S_2O_3$ for estimation of copper iodometrically. Constant burette reading obtained was 7.8cm^3. Calculate percentage of copper in bronze. (atomic wt. of copper 63.5)

(b) Attempt any **one** of the following:—   4
   (1) How is silicon refined commercially?
   (2) Discuss the principle involved in the estimation of thorium in monazite.

3. Attempt any **four** of the following:—   12
   (1) Discuss electrodeposition technique for recovery of metal from effluent.
   (2) Explain the role of metallurgical industry in polluting potable water.
   (3) What are the objectives of solid waste management?
   (4) Give effects of direct & indirect sources of solid waste on environment.
   (5) How are plastics classified?
   (6) What are binders in paints? Explain their role.
   (7) How is aluminum in magnelium alloy estimated?
   (8) What is carating of gold?

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