Attempt any four out of six questions:

(a) Define the term "Self cleansing velocity".
(b) Write down the importance of Neutralization process in industrial wastewater treatment.
(c) Write a note on self-supporting strength of a conduit.
(d) Write in brief various chemical methods used for treating industrial wastewater.
(e) Discuss the relative merits of the oval shape sewer section.
(f) Write a note on various physical properties of wastewater.
2. Attempt any two out of three questions: 

(a) A circular sewer, 50 cm in diameter is laid at a gradient of 1 in 200. Using \( N = 0.0125 \) in Manning's formula calculate velocity, discharge and Chezy's coefficient when the sewer is running full.

(b) Describe various types of water carriage system, stating advantages and disadvantages of each and the factors governing on them.

(c) Discuss the variations in dry weather flow. How it will be affect the rate of sewage and design of sewer?

3. Attempt any two out of the three questions: 

(a) What do you understand by preliminary treatment of wastewater? Enumerate various unit operations falling this. Also draw flow diagrams for the possible arrangements of various units falling under preliminary treatment.

(b) What do you understand by sewage ventilation? What is the necessity of ventilation of sewers?

(c) Explain the term UASB in detail with the help of a labeled diagram. What are its advantages and drawbacks?

Attempt any two out of three questions:

(a) What do you understand by advanced wastewater treatment? How it is differ from the conventional treatment? Give the importance of this process.
5 Attempt any two out of three questions:

(a) Give the characteristics of the waste from a paper and pulp mill. How do you treat this waste before disposing it into the stream? Explain with the help of a flow diagram.

(b) Explain the various methods commonly employed for disposal of solid waste, with their advantages and disadvantages.

(c) Write short note on the following:
   (i) $BOD_5$
   (ii) $ThOD$
   (iii) Physical characteristics of sewage
   (iv) Composting.