(3 hours) **Marks : 80**

N.B.

1. Question **No 1 is compulsory**
2. Attempt any three questions from the remaining **five** questions
3. Assume **suitable** data where ever required
4. **Figures** to the **right** indicate **full** marks

Q1.	**a.**	Explain the principle of sedimentation and the design parameters used.	**05**
	b.	Explain physical, chemical and biological impurities in water.	**05**
	c.	Write a note on rain water harvesting techniques.	**05**
	d.	Write a note on reverse osmosis.	**05**
Q2.	**a.**	Design a rectangular sedimentation tank to treat 5 MLD of water. Assume data wherever required and check for surface loading and weir loading	**10**
	b.	List the factors affecting the selection of site for intake structure. Also Draw a neat diagram of submerged intake structure.	**10**
Q3.	**a.**	Explain the process of coagulation and flocculation. Write about coagulant aids.	**10**
	b.	Draw a flow diagram showing sequence of various treatment units with river as a source. List these units sequentially state the function of each unit.	**10**
Q4.	**a.**	Define and Enlist different methods of water softening. Explain Zeolite process with neat Sketch	**10**
	b.	Explain different methods of disinfection and types of chlorination.	**10**
Q5.	**a.**	Design a rapid sand filter unit along with under drainage system for population of 200,000 which is to be served by a 200 l/head/day of water supply. Assume all the data and mention the same.	**10**
	b.	What are air pollutants and control measures for gaseous and particulate matter? Mention air quality standards.	**10**
Q6.		Write short notes on **(any four)**	
	a.	Noise pollution and control	**05**
	b.	Fixture and Fittings of Building Water Supply	**05**
	c.	Aeration process and types	**05**
	d.	Slow sand filters	**05**
	e.	Water demands	**05**
	f.	Removal of iron and manganese.	**05**

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