

Total No. of Questions : 8]

SEAT No :

P 2170

[5330]-22

[Total No. of Pages :2

M.Sc.

ENVIRONMENTALSCIENCE

**ENV - 202 : Water & Waste Water Engineering
(2008 Pattern) (Semester-II)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) Answers to the two sections should be written in separate answer books.*
- 2) Neat diagrams must be drawn wherever necessary.*
- 3) All questions carry equal marks.*
- 4) All questions are compulsory.*

SECTION-I

Q1) Answer any two:

- a) State the types of water demand. Explain any one in detail.
- b) Explain incremental increase method with example to determine water demand of a city at the end of 2051.
- c) What are the physical & chemical characteristics of water?

Q2) Answer any two:

- a) Design a plain sedimentation tank to treat 5MLD of water assuming horizontal velocity 0.2 m/min depth restricted to 3 m.
- b) Explain the mechanism of chlorination in detail.
- c) Discuss the operational problems of rapid sand filter.

Q3) Answer any two:

- a) Discuss the types of hardness and their removal methods.
- b) Explain the working of clarifloculator with diagram.
- c) Explain the significance of disinfection in water treatment.

P.T.O.

Q4) Write short notes on:

- a) Iron removed.
- b) Breakpoint chlorination.
- c) Population forecasting.

SECTION-II

Q5) Answer any two:

- a) Distinguish between river standards and effluent standards.
- b) What is the importance of physicochemical treatment of effluent.
- c) Calculate the sewage generation from a community of 1000 people.

Q6) Answer any two:

- a) Why is a primary clarifier placed before aeration tank in an ETP?
- b) Compare aerobic and anaerobic treatment processes.
- c) Explain the significance of microorganisms in effluent treatment.

Q7) Answer any two:

- a) What are the characteristics of distillery effluent? Draw a flow chart of distillery ETP.
- b) Explain the use of root zone technologies in waste water treatment.
- c) Recovery of chromium from effluents - write a note.

Q8) Write short notes on:

- a) Velocity control in grit chamber.
- b) Self purification capacity
- c) Microbiology of anaerobic digestion.

