ME (C) ENVIRONMENTAL II (R)
ADVANCED WATER TREATMENT

Con. 3588–09.

BB–5739

(4 Hours) [Total Marks : 100

N.B. : (1) Question No. 1 is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume **suitable** data if required but state them **clearly**.

M.E (C) Env. Engg II Advanced water treatment

1. (a) (i) Define effective size and uniformity coefficient of sand. Discuss their significance. 10
(ii) Derive mathematical expression for efficiency of ideal sedimentation tank. 5

(b) prove $G = \sqrt{\frac{p}{\mu \cdot v}}$ and explain each term in the formula. 5

(c) Draw the hydraulic flow diagram of water treatment plant treating surface water. 5

2. (a) Design a cascade type aerator for 100 M.L.D. Sketch the arrangement of your own design. Assume suitable data. 10
(b) Discuss in brief basic design factors that may be considered in due design of water treatment plant. 6
(c) Discuss the concept of decline rate of filteration. 4

3. Write short notes on :– 20
(a) Column test to find efficiency of flocculent settling.
(b) Adsorption isotherm
(c) Coagulant aids
(d) Tube settler
(e) Quality of drinking water.

4. (a) Explain the corrosion theory, different types and control of it. 8
(b) What are the different methods to remove permanent hardness. Discuss and write relative merits. 8
(c) Write with neat sketches annual cycle of lake water movement. 4

5. (a) A settling tank is designed for an overflow rate of 5000 litres/m^2/hr. What % age of particles of diam. – 8
(i) 0·06 mm
(ii) 0·03 mm will be removed in this tank.
Temperature of water is 20°C and specific gravity of particles is 2·65.
(b) Discuss the factors which affect gas transfer in aeration of water. 5
(c) Discuss the removal of taste and odour control. 7

6. (a) A water treatment plant is using ferrous Sulphate with time as coagulant. The ferrous sulphate is consumed at the rate of 10 mg/lit . Determine the quantities of ferrous sulphate and lime required to treat 15 million litres of water. 6
(b) What are the various methods of disinfection ? Discuss their merits and demerits. Also with neat sketch, explain break point of chlorinaiton. 10
(c) State the permissible limits for fluorides in water. Mention due ill effects when they are not in permissible limits. 4

7. (a) Design completely a rapid sand filter for a town having total filtered water requirement of 6 million litres of water/day. 10
(b) Draw a neat sketch of an intake structure and explain. 5
(c) Explain G and GT as applied to flocculation. 5