GANPAT UNIVERSITY
B. Tech. Semester Vth Civil Engineering
Regular Examination – Nov/Dec : 2013
2CI– 505: Environmental Engineering - I

Time: 3 Hours   **Total Marks: 70**
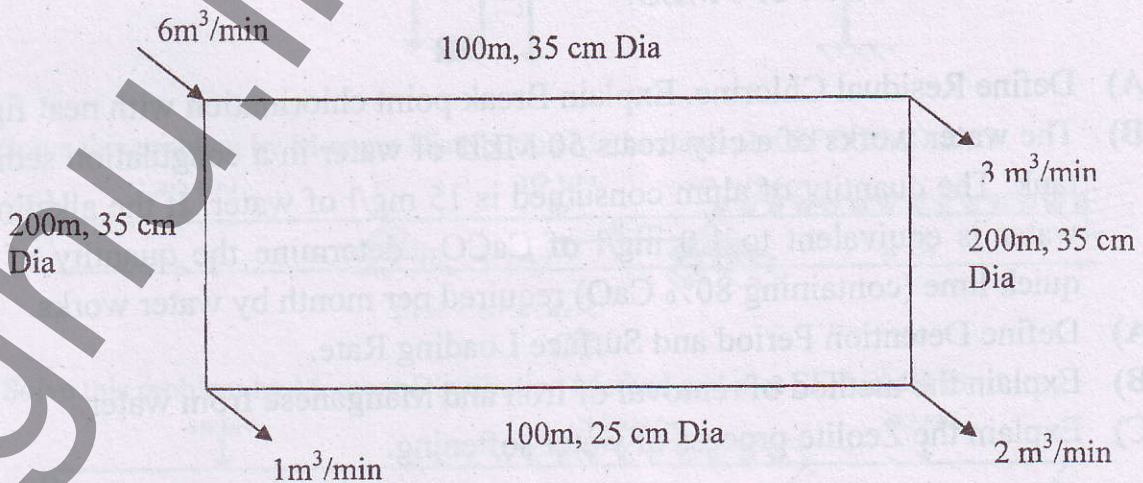
Instructions: - (1) Answer to the two sections must be written in **separate** answer books.

           (2) Figures to the right indicate **full** marks.

           (3) Assume suitable data if required.

Section - I

1   (A)   Define pump and classified the pump based on mechanical operation, power requirement, and types of service?   **(6)**

    (B)   A pumping station, situated at an elevation of 610m uses pumps which require 32kpa positive suction pressure (NPSH) when delivering water at 20°C. Determine the allowable suction lift of these pumps if the entrance and the friction losses are 12kpa. Take barometer pressure at 610m altitude as 94kpa and vapour pressure of water at 20 C as 2.35 kpa.   **(6)**

OR

1   (A)   The population of city in successive decennial census is given as 41500 and 57500. Assuming the census date as 10th April, find midyear population as 10th July for (a) 3rd inter-censal year, and (b) 6th post-censal year by arithmetical increase method and the geometrical increase method.   **(6)**

    (B)   Define fire demand and enlist different fire demand formula   **(6)**

2   (A)   Analyze the following Pipe Network by Hardy Cross Method (Take C=100) and Assume suitable Data if Requires. (Maximum Two Trials)   **(11)**

6m^3/min   100m, 35 cm Dia

                                                3 m^3/min

200m, 35 cm Dia   200m, 35 cm Dia

1m^3/min   100m, 25 cm Dia   2 m^3/min

3 Attempt the following questions:(any Three)
  (A) Write a short note on (i) water supply project Drawing
                              (ii) Water supply project estimate
  (B) How can you remove the fluoride in rural area water?
  (C) Draw the neat sketch of various types (any Two) of joints used in CI pipes?
  (D) Explain the different methods of water distribution with neat sketch.
  (E) Define various factors affecting the rate of water demand.

Section – II

4 (A) Describe with the help of neat sketch, backwashing method of Rapid Sand Gravity Filter. (6)

  (B) Design mechanical rapid mix unit for a design flow to be treated equal to 250m^3/h. Assume suitable permissible values for various design parameters of design. Assume a temperature of 20°C. (6)

OR

4 (A) Design a bell mouth canal intake for a city of 4, 00,000 persons drawing water from a canal which runs for 13 hours a day with a depth of 2m. Also calculate the head loss in the intake conduit if the works are 1.5 km away. Draw a neat figure of bell mouth canal intake. (8)

  (B) Determine the maximum displacement velocity, without fear of settled particles being lifted up, and the ratio of length to depth of settling unit for following particles: (a) Alum floc having S_s = 1.15 and diameter =0.08cm (b) Anthracite coal dust having S_s = 1.6 and diameter =0.008cm. Assume a Weisbach Darcy friction factor f = 0.025 and temperature of 25°C. (4)

5 (A) Find the diameter of particles with specific gravity of 1.4 removed in a tank having surface area of 300m^2 and treating 10MLD of water with temperature 20°C. (3)

  (B) Design the units: (a) Filter units (b) Under-Drainage System (c) Depth of sand (d) Size gradation of gravel of Rapid Sand Gravity Filter for producing a net filtered water flow of 6 MLD. (8)

OR

5 (A) Define Residual Chlorine. Explain Break point chlorination with neat figure. (6)

  (B) The water works of a city treats 50 MLD of water in a coagulation sedimentation tank. The quantity of alum consumed is 15 mg/l of water. If the alkalinity of raw water is equivalent to 1.0 mg/l of $CaCO_3$, determine the quantity of alum and quick lime (containing 80% CaO) required per month by water works. (5)

6 (A) Define Detention Period and Surface Loading Rate. (2)
  (B) Explain the method of removal of Iron and Manganese from water. (4)
  (C) Explain the Zeolite process of water softening. (6)

" END OF PAPER"