Student Exam No:-_____

GANPAT UNIVERSITY

B.Tech. SemesterV CIVIL ENGINEERING

Regular Examination – November / December: 2012

3 CI – 505: Environment Engineering-I

Max.Time: 3 Hours **Max. 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

Q-1 Attempt the following Question.

(A) **Define Following Terms:-** 5

1). Mcwane Pipe 2). Sand Spun Pipe.

3).Delavaud pipe 4). Pump

5). Pipe

(B) **The following data shows the variation in population of a town from 1930 to 1970. Find out the population of in decades 1990, 2000, 2010, by using incremental increase method.** 5

Year	1930	1940	1950	1960	1970
Population	22200	29500	34750	41250	52000

OR

Q-1 Attempt the following Question.

(A) **A pumping station, Situated at an Elevation of 610m uses pumps which Required 35Kpa positive suction pressure (NPSH) when delivering water at 20°C.Determine the allowable suction lift of these pumps if the entrance and friction losses are 12Kpa.Take barometric pressure at 610 m altitude as 94 Kpa and Vapour pressure of water at 20°C as 2.35Kpa** 5

(B) **Explain methods of Rain water Harvesting.** 5

Q-2 Attempt the following Question.

(A) **Explain Classification of Pump and Explain Working of Reciprocating Pump.** 5

(B) A Steel Penstock, 70 cm in diameter has a shell thickness of 12.5 mm. The module of elasticity of pipe shell material is $2.1X10^{10}$ Kg/mm^2 with the Poisson's ratio of ¼ and the volume modules of elasticity of water is $2.1X10^8$ kg/cm^2. The pipe is designed to discharge water at mean velocity of 2m/sec .Determine the water hammer pressure rise caused by sudden closure of valve at Downstream end:
(a) Neglecting the elasticity of pipe material, and
(b) Considering the also the elasticity of pipe material.

OR

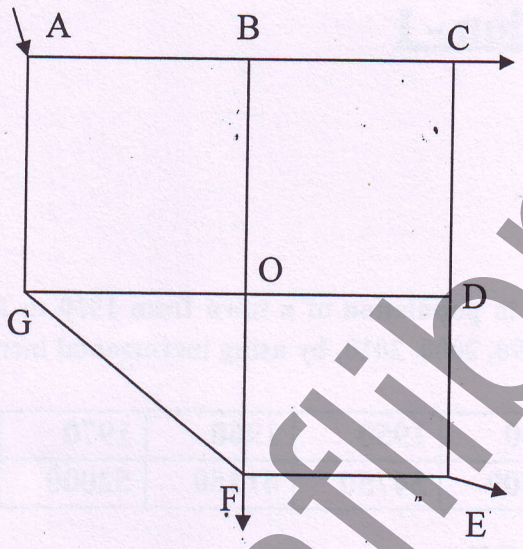
Q-2 Attempt the following Question.

(A) Discuss Factors affect that rate of Water Demand. 5

(B) How can you remove fluoride contain from rural water? 5

Q-3 Attempt the following Question. 15

(A) Analyse the pipe network shown in the figure as below. Take C = 100 in the Hazen Williams formula. (2 Trial)
Inlet At Point A is 35 m^3/sec.



LINE	LENGTH (m)	DIA (cm)
AB	2000	25
BC	1500	30
CD	1800	20
DE	2500	15
EF	3000	30
FG	3000	20
BO	1200	25
FO	1600	20
GO	1800	30
DO	1500	25

Section - II

Q-4 Attempt the following:

(A) Design a Bell mouth canal intake for a city of 9500 persons drawing water from a canal which runs for 10 hours a day with depth of 2m. Also calculate the head loss in the intake conduit if the water treatment works are 0.5 km away. Draw the neat sketch of canal intake. Assume the velocity through the screen and bell mouth to be less than 16cm/sec and 32cm/sec respectively. 6

(B) Define the following terms: 6

1. Sedimentation with Coagulation
2. Detention Period
3. Surface Loading Rate or Overflow Rate
4. Weir Loading Rate
5. Discrete particles
6. Permanent Hardness

OR

Q-4 **Attempt the following:**

(A) The population of a town is 1, 00,000 and average per capita demand is 135 LPCD. Design the coagulation cum sedimentation tank for the water works, supplying water to the town. The maximum demand may be taken as 1.8 times the average demand. Assume the detention periods of 5 hrs and 30 minutes for settling tank and floc chamber respectively, flow rate as 900 liters/hour/m^2 of plan area. 6

(B) Enlist important unit operations. Explain Solute Stabilization and Solids Transfer. 6

Q-5 **Attempt the following.**

(A) Briefly explain different types of Feeding devices with neat sketches. 6

(B) Enlist removal methods for permanent hardness. Explain Zeolite process in detail. 5

OR

Q-5 **Attempt the following.**

(A) Describe with the help of neat sketch, backwashing method of Rapid Sand Gravity Filter. 5

(B) Explain Break point chlorination with neat figure and Super chlorination. 6

Q-6 **Attempt the following** 12

Design a Rapid Sand Gravity Filter to treat 12 million liters of raw water per day allowing 0.5% of filtered water for backwashing. Half hour per day is used for backwashing. Assume necessary data.

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