

**GANPAT UNIVERSITY**  
**B. TECH SEM- V(CIVIL)**  
**REGULAR EXAMINATION- NOV-DEC 2016**  
**2CI505 ENVIRONMENTAL ENGINEERING-I**

TIME: 3 HRS

TOTAL MARKS: 60

- Instructions: (1) This Question paper has two sections. Attempt each section in separate answer book.  
 (2) Figures on right indicate marks.  
 (3) Be precise and to the point in answering the descriptive questions.  
 (4) Assume Suitable Data where ever required.

**SECTION: I**

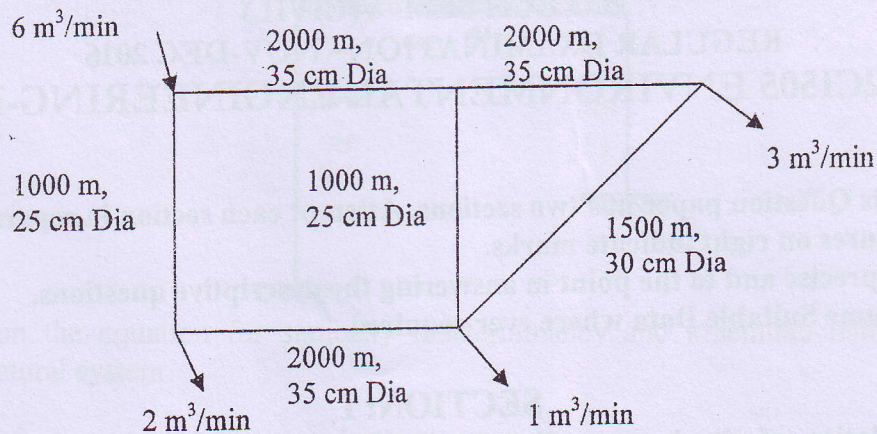
- Q.1 (A) The population of city in successive decennial census is given as 80000 and 100000. Assuming the Census date as 12<sup>th</sup> May, find the midyear population as 12<sup>th</sup> December. (6)  
 for (A) 4<sup>th</sup> inter Censal year, and (B) 8<sup>th</sup> post-Censal.  
 By the arithmetical increase method and Geometrical Increase method.
- Q.1 (B) Write a short note on Water supply Project Report. (4)

**OR**

- Q.1 (A) Calculate Fire demand with the help of different Fire Demand Formula for a city in 2010, if the city having a population is 35000 in 1990 and the average geometric increase growth is 12% per decade. (6)
- Q.1 (B) Write a short not on followings: (4)  
 A. Water Supply Project drawings.  
 B. Water Supply Project estimation.
- Q.2 (A) Calculate Break horse power , Theoretical horse power and Electric Horse Power of pump set for a population in 2035, if the city having a population is 2,80,000 in 1975 and the Average Arithmetic increase growth is 25000 per decade. The rate of water supply is 160 liter per capita per day. The elevation Difference between source and supply is 38 m. The length of rising main is 900 m and diameter of it is 40 cm. Take the coefficient of friction (f) is 0.035 .The efficiency of motor 75 % and efficiency of Pump is 85%. Consider pump is running 12 Hr in a day. Consider peak Factor 1.5. (5)
- Q.2 (B) How can you Remove Iron contain in Rural Water? (5)
- OR**
- Q.2 (A) A steel penstock 80 cm in dia has a shell thickness of 1.3 cm. the modulus of elasticity of pipe shell material  $2.1 \times 10^6 \text{ Kg/cm}^2$  with poisson ratio of 1/4 and the volume modulus of elasticity of water is  $2.1 \times 10^4 \text{ Kg/cm}^2$ . The pipe is designed to Discharge water at mean Velocity of 2.1 m/sec. Determine water hammer pressure is caused by sudden closure of valve at the downstream end: (a) neglecting the Elasticity of pipe material, and (b) Considering the Elasticity of pipe material. (5)
- Q.2 (B) Explain Nalgonda Technique for removal of Flouride from water. (5)

Q.3

Analyze the following Pipe Network by Hardy Cross Method (Take  $C=100$  in Hazen William Formula) and Assume suitable Data if Requires. (10)



## SECTION: II

Q.4 (A) Design a bell mouth canal intake for a city of 1,00,000 persons, drawing water from a canal which runs only for 12 hours a day with a depth of 1.5m. Also calculate the head loss in the intake conduit if the treatment works are 0.3 km away. Draw a neat sketch of the canal intake. Given average consumption per person = 180 L/d, assume the velocity through the screens and bell mouth to be less than 16cm/sec and 32 cm/sec respectively. (06)

Q.4 (B) If Water having pH = 6, what will be the hydroxyl ion concentration in mg/lit. (04)

OR

Q.4 (A) Explain the importance of physical and chemical analysis of water used for domestic purposes. (06)

Q.4 (B) Find the total hardness and non-carbonate hardness of a water having the following dissolved ions: (04)

$[\text{Na}^+] = 10 \text{ mg/lit}$ ;  $[\text{Ca}^{++}] = 62 \text{ mg/lit}$ ;  $[\text{Mg}^{2+}] = 30 \text{ mg/lit}$ ;

$[\text{Al}^{3+}] = 6.0 \text{ mg/lit}$ ;  $[\text{HCO}_3^-] = 205 \text{ mg/lit}$ ;  $[\text{Cl}] = 165 \text{ mg/lit}$  and

pH of water is 7. Consider the following table.

Compound	Na	Ca	Mg	Al	C	O	H	Cl
Molecular wt.	23	40	24	27	12	16	1	35.45

Q.5 (A) Explain the theory of sedimentation. Derive Stoke's Law. (05)

Q.5 (B) Determine quantity of alum required in order to treat 20 million liters of water per day at treatment plant, where 18 ppm of alum dose is required. (05)

OR

Q.5 (A) Design a rapid sand gravity filter (including backwashing) for a town having water requirement of 4.5 MLD. Assume suitable data. (10)

Q.6 (A) What do you mean by turbidity of water? How it is determined? Enlist the different units of turbidity. (03)

Q.6 (B) Explain in detail, various forms of chlorine as a disinfectant. (04)

Q.6 (C) What is the difference between Disinfection and Sterilization? Why is Disinfection necessary? (03)

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