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B.Tech
PCCI4402

7th Semester Regular/Back Examination 2017-18
Water Supply and Sanitary Engineering
BRANCH : CIVIL
Time: 3 Hours
Max Marks: 70
Q.CODE: B221

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

- Q1** Answer the following questions: (2 x 10)
- a) Define *per capita demand*.
 - b) What is *Coincident Draft*?
 - c) List the factors that govern the selection of a site for intake structure.
 - d) For the same solid content, if the quantity of sludge with moisture content of 98% is V, then what will be the quantity of sludge with moisture content of 96%?
 - e) What is dirty skin?
 - f) Define Time of Concentration.
 - g) Explain Perched Aquifer with a neat sketch.
 - h) What are the components of *sedimentation aided with coagulation*?
 - i) What do you mean by specific yield and specific retention? Write the relation between them wrt the porosity.
 - j) State the importance of recirculation in "Activated Sludge Process".
- Q2**
- a) A 40 cm diameter well penetrates 30m below the static water table. After 24 hours of pumping @ 6000 L/min, the water level in a test well at 90 m is lowered by 0.64m and in a well 35 m away the drawdown is 1.11m. What is the transmissibility of the aquifer? Also determine the drawdown in the main well. (6)
 - b) What considerations govern the choice of particular type of pump in water supply engineering? (4)
- Q3**
- a) In a continuous flow settling tank 3m deep and 60m long, what flow velocity of water would you recommend for effective removal of 0.025 mm particles at 25 °C. the specific gravity of particles is 2.65 and kinematic viscosity of water is taken as 0.01cm²/sec. (5)
 - b) Discuss about the disinfecting action of chlorine and break-point chlorination. (5)
- Q4**
- a) Discuss the merits and demerits of Slow Sand Filter and Rapid Gravity Filter. (4)
 - b) A filter unit is 4.5m by 9.0m. After filtering 10,000 cubic meter per day in 24 hours period, the filter is backwashed at a rate of 10 l/sq. m/sec. for 15 min. Compute the average filtration rate, quantity, percentage of treated water used in washing and the rate of wash water trough in each trough. Assume 4 troughs. (6)
- Q5**
- a) Mention any three methods of *softening* of water. Describe zeolite process of softening of water in detail. (5)
 - b) Differentiate between *separate system* and *combined system* of sewerage. (5)
- Q6**
- a) Explain with neat sketch the working principle of *trickling filter*. (5)
 - b) Calculate the velocity of flow and corresponding discharge in a sewer of circular cross section with diameter of 1 m, laid in a gradient of 1 in 500. The sewer runs at 0.6 times depth. Use Manning's formula considering $k = 0.012$. (5)

- Q7** Illustrate with sketch different types of Layouts of Distribution Network. **(10)**
Compare their advantages and disadvantages.
- Q8** **Write Short Notes on any Two :** **(5 x 2)**
- a) Sludge volume index (SVI)
 - b) Cavity formation in wells
 - c) Oxidation pond and oxidation ditch.
 - d) Bulking of sludge