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Total Number of Pages: 02

B.Tech  
PCCI4402

7<sup>th</sup> 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 0.01cm<sup>2</sup>/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. Compare their advantages and disadvantages. **(10)**

**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