Total Number of Pages: 2

B.Tech
PCCI4402

7th Semester Regular / Back Examination 2016-17
WATER SUPPLY AND SANITARY ENGINEERING
BRANCH: CIVIL
Time: 3 Hours
Max Marks: 70
Q.CODE: Y146

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) Give the relationship between COD and ultimate BOD.
b) What is velocity gradient? What is its importance?
c) Define design period.
d) Name the four layouts of distribution systems.
e) Why Sewers are designed as gravity pipes?
f) Give any two formulae for calculating the velocity of water flowing through a conduit.
g) Define per capita water demand.
h) Why do we lay pipes in parallel?
i) Which form of chlorine has the best disinfecting action and at what pH it is predominant?
j) What do you mean by suspended growth system?

Q2 **a)** Give a brief account of the activated sludge process of wastewater treatment with a neat sketch. **(5)**
b) The 4 day 30°C BOD of a sewage is 135 mg/L. Calculate its 2 day 27°C BOD. The deoxygenation constant at 20°C is 0.1.

Q3 **a)** Discuss about the various tests for determining the yield of an open well. **(5)**
b) A pumping test was made in a medium sand and gravel to a depth of 20 m where a bed of clay was encountered. The normal ground water level was at the surface. Observation wells were located at distances of 5 m and 8.5 m from the pumping well. At a discharge of 4.2 L/Sec from the pumping well, a steady state was attained in about 24 hours. The drawdown at 5 m was 1.85 m and at 8.5 m was 0.45 m. Compute the coefficient of permeability of the soil. **(5)**

Q4 a) Discuss with a schematic diagram the design concepts of a horizontal flow sedimentation tank. What is its advantage over a vertical up flow sedimentation tank? **(5)**

b) 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 for water may be taken as 0.01 cm^2/sec. **(5)**

Q5 a) Briefly discuss about the various types of water demands. **(5)**

b) Give a short account of the factors affecting per capita water demand. **(5)**

Q6 a) Briefly discuss about the systems of sewerage **(5)**

b) A population of 35000 is residing in a town having an area of 65 hectares. If the average runoff coefficient for the area is 0.50, and the time of concentration of the design rain is 32 minutes, calculate the discharge for which the sewers of a proposed combined system will be designed for the town in question. Make suitable assumptions wherever needed. **(5)**

Q7 Discuss about the construction and working operation and cleaning of a rapid gravity filter with a neat sketch. **(10)**

Q8 **Write short answer on any TWO:** **(5 x 2)**
a) Break point chlorination

b) Alum as coagulant

c) Population forecasting

d) Disposal of sludge