BCE-033

Diploma in Civil Engineering

Term-End Examination

June, 2008

BCE-033 : ENVIRONMENTAL ENGINEERING

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt **five** questions in all. Question No. 1 is **compulsory**. All questions carry equal marks.*

1. Choose correct alternatives : *14×1=14*

(a) Per capita water requirement for a large city is

(i) less than small city

(ii) more than small town

(iii) per capita water requirement is independent of size of city

(iv) None of the above

(b) The ratio of peak hourly demand to the annual average hourly demand is

(i) 1·8

(ii) 1·5

(iii) 2·7

(iv) None of these

(c) Which of the following is correct ?

(i) Surface water is normally free from suspended impurities

(ii) Groundwater is normally free from suspended impurities

(iii) Both are true

(iv) None of these

(d) Higher values of pH indicates

(i) stronger acids

(ii) stronger alkalies

(iii) higher pathogens

(iv) None of the above

(e) Temporary hardness in water is due to

(i) carbonates and bicarbonates of calcium and magnesium

(ii) bicarbonates of sodium and potassium

(iii) carbonates of calcium and magnesium

(iv) All of the above

(f) The bacteria which survive in absence of oxygen are called

(i) Anaerobic

(ii) Aerobic

(iii) Facultative

(iv) *E. coli*

(g) Which of the following is used to determine colour of the water ?

(i) Turbiditymeter

(ii) Nanometer

(iii) Tintometer

(iv) None of these

(h) The efficiency of disinfection by chlorine, in water treatment, increases with

(i) decrease in time of contact

(ii) decrease in temperature of water

(iii) increase in temperature of water

(iv) None of these

(i) Preliminary treatment of sewage is meant for

(i) removal of large suspended matter

(ii) removal of fine suspended organic matter

(iii) removal of dissolved organic matter

(iv) removal of pathogens

(j) The minimum D.O. prescribed for river stream to avoid fish kills is

(i) 2 ppm

(ii) 4 ppm

(iii) 8 ppm

(iv) 10 ppm

(k) 20 ml of raw sewage is diluted to 600 ml. The dilution factor is

(i) 20

(ii) 600

(iii) 30

(iv) None of these

(l) The wastewater coming from bathrooms and kitchen is popularly known as

(i) domestic sewage discharge

(ii) drainage discharge

(iii) sullage discharge

(iv) sludge discharge

(m) Which of the following units work on the principle of anaerobic decomposition ?

(i) Oxidation ditch

(ii) Trickling filter

(iii) Sludge digestion tank

(iv) Sedimentation tank

(n) Lower F/M ratio in conventional activated sludge process means

(i) lower BOD removal

(ii) higher BOD removal

(iii) no effect on BOD removal

2. (a) Name the various ground water sources. With the help of a neat sketch describe the water flow through an infiltration gallery. 7

(b) A tube well having a diameter of 20 cm taps an artesian aquifer of thickness 25 m. If the drawdown is 4·50 m and permeability is 40 m^3 per unit area per day, calculate the yield of the tube-well. Assume the radius of circle of influence as 300 m. 7

3. With the help of a neat sketch, describe the working of a Slow sand filter. Also discuss its relative advantages and disadvantages over Rapid sand filter. 14

4. (a) Name the most commonly used disinfectants in treatment of water. Discuss the various factors affecting the disinfection process. 7

(b) Compare the Lime-soda and Zeolite process of softening of water. 7

5. (a) List the various options of wastewater disposal. Also discuss in detail the method of wastewater disposal to water environment. 8

(b) Differentiate between total dissolved solids, total volatile solids and total suspended solids. Is there any relationship between electric conductivity and total dissolved solids of wastewater ? 6

6. (a) With the help of a flow diagram, explain the working of Activated Sludge process. 8

(b) What do you understand by terms Sludge Bulking and F/M ratio ? Discuss their importance with reference to wastewater treatment. 6

7. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(i) Water borne disease

(ii) SOR

(iii) Hydraulic Ram

(iv) Flanged Joint

(v) Oxidation Ditch

(vi) Drop Manhole

(vii) Crown Corrosion

(viii) Water Hardness