BCE-033

Diploma in Civil Engineering

Term-End Examination

December, 2007

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. Select the correct alternative. *1×14=14*

(a) Which source of water, among the following is ***not*** a surface source ?

(i) River

(ii) Well

(iii) Lake

(iv) Ocean

(b) If hardness of water is between 50 and 100 (as $CaCO_3$ mg/*l*) then water is

(i) soft

(ii) hard

(iii) moderately soft

(c) Disinfection of water helps in

(i) removing turbidity

(ii) removing hardness

(iii) killing pathogen bacteria

(iv) complete sterilisation

(d) Which of the following grows in the presence as well as in the absence of oxygen ?

(i) Anaerobic bacteria

(ii) Facultative bacteria

(iii) B-coli

(e) Surface loading or overflow rate of sedimentation tank, passing a discharge Q, and having length = L, depth = D and width = B is given by

(i) $\frac{Q}{BD}$

(ii) $\frac{Q}{BL}$

(iii) $\frac{Q}{BDL}$

(iv) BDL

(f) A sample collected from a spot at any instant is called

(i) composite sample

(ii) integrated sample

(iii) grab sample

(g) An aquifer, sandwiched between top and bottom aquicludes is commonly known as

(i) Non-artesian well

(ii) Artesian well

(iii) Flowing well

(iv) None of the above

(h) Examples of the displacement pumps are

(i) Reciprocating pumps

(ii) Rotary pumps

(iii) Both of the above

(iv) None of the above

(i) SPT in reference to water treatment stands for

(i) Special plate count test

(ii) Standard plate count test

(iii) Specific plate count test

(iv) Standard phenolic test

(j) The bacteria which survives in absence of oxygen are called

(i) anaerobic

(ii) aerobic

(iii) facultative

(iv) None of these

(k) Slow sand filters remove the bacteria to the extent of

(i) 40% – 50%

(ii) 70% – 80%

(iii) 98% – 99%

(iv) None of these

(l) The gas which is generally found present in sewers is

(i) H_2S

(ii) CO_2

(iii) CH_4

(iv) All of the above

(m) State whether the following are true or false; answer any ***two*** of the following :

(i) Water entering rapid sand filter has high turbidity as compared to slow sand filter.

(ii) Slow sand filters are not suited for places where cost of land is high.

(iii) Rate of filtration of slow sand filter is higher than rapid sand filter.

(n) State whether the following are true or false; answer any ***two*** :

(i) Screens are provided to remove colloidal particles present in water.

(ii) Water storage improves water quality.

(iii) Due to aeration, gases such as carbon dioxide and hydrogen sulphide are liberated from water.

2. (a) List the various categories of water requirement for which provisions are made in water supply schemes. Give approximate break-up of each provision, if average daily demand of water is 270 lpcd. 7

(b) Write various factors which are considered before taking a decision on design period of water supply schemes. 7

3. (a) List various types of pipes and pipe joints which are used for water supply system. Describe with the help of neat sketch, two types of joints. 7

(b) What do you understand by corrosion in pipes ? What are the reasons of corrosion ? What are the remedial methods ? 7

4. (a) What are the basic components of sanitary sewer system ? 7

(b) Distinguish between Sanitary sewer and Storm drainage system. 7

5. (a) With the help of a neat sketch, describe the working of slow sand filter. 7

(b) Compare slow sand filter and rapid gravity sand filter. 7

6. With the help of a flow diagram describe the working of Aerobic Sludge Digester. Also discuss the relative advantages and disadvantages of aerobic and anaerobic sludge digestion process. 14

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

(i) Turbidity

(ii) Coagulation

(iii) Selection of pumps

(iv) Water softening process

(v) Infiltration galleries

(vi) Thermal reduction of sludge

(vii) Jet pumps