Diploma in Civil Engineering

Term-End Examination

December, 2010

01759

BCE-033 : ENVIRONMENTAL ENGINEERING

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt **five** Questions in all. Q. No. **1** is **Compulsory**. All questions carry **equal** marks.*

1. (a) Which is not source of surface water among the following ? **14x1=14**

   (i) River (ii) Well

   (iii) Lake (iv) Stream

   (b) The factor affecting per capita demand is :

   (i) size of the city

   (ii) climatic conditions

   (iii) pressure in water mains

   (iv) cost of water

   (v) all the above

   (c) Alkalinity in water may be caused due to :

   (i) calcium and magnesium bicarbonate

   (ii) sodium carbonate

   (iii) potassium carbonate

   (iv) (i) and (ii)

   (v) (i) and (ii) and (iii)

(d) Examples of displacement pumps are :

(i) reciprocating pumps

(ii) rotary pumps

(iii) centrifugal pumps

(iv) (i) and (ii)

(v) (i) and (ii) and (iii)

(e) B.O.D. Of treated water should be :

(i) 10 ppm (ii) zero

(iii) 25 ppm (iv) 5 ppm

(f) The multiplying factor, as applied to obtain maximum hourly water demand, in relation to the annual average hourly demand is :

(i) 2.7 (ii) 1.5

(iii) 2.0 (iv) 1.8

(g) Overflow rate of a sedimentation tank, passing a discharge Q, and having length =L, depth = D, width = B is given by :

(i) $\frac{Q}{B.D}$ (ii) $\frac{Q}{B.L}$

(iii) Q.B.D (iv) $\frac{Q}{B.D.L}$

(h) The sewerage system originates from :

(i) outfall sewer (ii) main sewer

(iii) house sewer (iv) none of these

(i) Manholes are generally located at :

(i) all changes of direction of sewer

(ii) all changes of gradient of sewer

(iii) all junction of different sewer

(iv) all of the above

(j) Chemical Oxygen Demand (COD) of sewage is the :

(i) Oxygen required to oxidize biologically active organic matter

(ii) Oxygen required to oxidize biologically inactive organic matter

(iii) (i) and (ii)

(iv) none of these

(k) Primary treatment of sewage consists of :

(i) removal of large suspended organic solids

(ii) removal of oil and grease

(iii) removal of floating material

(iv) none of above

(l) The water tap is also known as :

(i) bib cock (ii) stop cock

(iii) check valve (iv) pillar cock

(m) In lime - soda process of water softening :

(i) only carbonate hardness is removed.

(ii) only non carbonate hardness is removed.

(iii) lime reduces carbonate hardness and soda removes non carbonate hardness.

(iv) none of these.

(n) Activated sludge is the :

(i) aerated sludge in the aeration unit.

(ii) sludge settled in the humus tank.

(iii) sludge in the secondary tank after aeration and rich in microbial mass.

(iv) sludge in the secondary tank after aeration and rich in nutrients.

2. (a) What is Fire Fighting water demand and how it is measured ? 4

(b) Differentiate between following using neat sketches :

(i) Artesian spring and Artesian well. 5

(ii) Dug well and Driven well. 5

3. (a) What do you mean by Hardness of water and how will you measure it ? An analysis of water sample shows following results - Ca^{++} = 60 mg/lit, Mg^{++} = 48 mg/lit. Find out Hardness of water sample as $CaCO_3$ if combining weight of Ca^{++}, Mg^{++} and $CaCO_3$ are 30, 16 and 60 respectively. 4+3=7

(b) Discuss any two tests that are used to test water microbiologically. 7

4. With the help of neat sketch describe the working of Rapid Sand Filter. 14

5. (a) List the various types of Lay-outs used in the Water Distribution System. With the help of suitable diagram, discuss any one of the Lay-outs. 7

(b) Explain the mechanism of corrosion in pipes and factors affecting it. 7

6. (a) Write the importance of following in the design of Sewer. 7

(i) Self cleaning velocity

(ii) Limiting velocity

(b) Draw a neat sketch of Drop Manhole and indicate where it is used. 7

7. Write short notes on ***any four*** of the following : 14

(a) Per capita water Demand

(b) Water softening

(c) Spigot and Socket Joint

(d) pH of water

(e) F/M Ratio

(f) Cast Iron Pipes