

**Diploma in Civil Engineering / Diploma
in Electrical & Mechanical Engineering**

Term-End Examination

June, 2006

**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 source of water, among the following is not an underground water source ?
- (i) Wells
 - (ii) Rivers
 - (iii) Springs
 - (iv) Infiltration galleries
- (b) As per National Building Code, domestic consumption of water in an Indian city under normal conditions, has been taken as
- (i) 135 kilo litre/head/day
 - (ii) 135 litre/head/day
 - (iii) 150 litre/head/day
 - (iv) 150 litre/head/hour

- (c) Which is the unit of turbidity ?
- (i) MTU
 - (ii) KTU
 - (iii) JTU
 - (iv) LTU
- (d) Higher values of pH indicate
- (i) Stronger acids
 - (ii) Stronger alkalies
 - (iii) High turbidity
 - (iv) None of the above
- (e) 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
- (f) Examples of the displacement pumps are
- (i) Reciprocating pumps
 - (ii) Rotary pumps
 - (iii) Both of the above
 - (iv) None of the above
- (g) The colour of water, contributed by dissolved solids is
- (i) Apparent colour
 - (ii) True colour
 - (iii) Natural colour
 - (iv) None of the above

- (h) 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
- (i) Detention period (t) for a rectangular sedimentation tank, passing discharge Q and having length = L, width = B and depth = H is given by
- (i) $B.L.H/2$
 - (ii) $2/B.L.H$
 - (iii) $\frac{2}{B.L}$
 - (iv) None of the above
- (j) Water-tap used in the houses is also known as
- (i) Sluice-tap
 - (ii) Ferrule
 - (iii) Stop cock
 - (iv) Bib-cock
- (k) Pick up the correct statement :
- (i) Aerobic bacteria flourish in the absence of oxygen
 - (ii) Anaerobic bacteria need oxygen to flourish
 - (iii) Facultative bacteria can flourish in absence as well as presence of oxygen
 - (iv) None of the above

- (l) Pick up the correct statement.
- (i) $BOD < COD$
 - (ii) $BOD = COD$
 - (iii) $BOD > COD$
 - (iv) None of the above
- (m) The activated sludge process is
- (i) attached growth aerobic process
 - (ii) attached growth anaerobic process
 - (iii) suspended growth aerobic process
 - (iv) suspended growth anaerobic process
- (n) The gas mainly evolved in anaerobic sludge digester is
- (i) nitrogen
 - (ii) ammonia
 - (iii) hydrogen sulphide
 - (iv) methane
- 14
2. (a) List commonly used underground water sources and discuss any two of them. 9
- (b) What do you understand by domestic water requirement? Give the approximate break-up of various types of water requirement, if the daily demand of water is 270 lpcd. 5
3. With the help of a neat sketch describe the working of Rapid Sand Filter. 14

4. What do you understand by water softening ? Discuss in detail the Ion-Exchange process of water softening. 14
5. Discuss the working principle of activated sludge process. Also draw a flow diagram in schematic form of waste water treatment plant that includes activated sludge process. 14
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 : $3\frac{1}{2} \times 4 = 14$
- (i) Water-borne disease
 - (ii) Turbidity
 - (iii) Cast Iron pipes
 - (iv) Coagulation
 - (v) Self cleaning velocity
 - (vi) Food to micro-organism ratio
 - (vii) Jet pump