

**DIPLOMA IN CIVIL ENGINEERING
DCLE(G) / DCLEVI**

Term-End Examination

00357

December, 2017

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 the correct alternative. *14×1=14*

(a) Which of the following is a source of surface water ?

- (i) Wells
- (ii) Springs
- (iii) Rivers
- (iv) None of these

(b) MPN (Most Probable Number) is used to determine

- (i) Microbiological quality of water
- (ii) Quantity of nitrogen in water
- (iii) Turbidity in water
- (iv) None of these

- (c) The sewer which transports sewage to the point of treatment is called
- (i) House sewer
 - (ii) Outfall sewer
 - (iii) Branch sewer
 - (iv) Main sewer
- (d) The bacteria which can survive with or without free oxygen is known as
- (i) Aerobic bacteria
 - (ii) Anaerobic bacteria
 - (iii) Facultative bacteria
 - (iv) None of these
- (e) If the average daily water consumption of a city is 24,000 cu m, the peak hourly demand will be
- (i) 1000 cu m/hr
 - (ii) 1500 cu m/hr
 - (iii) 1800 cu m/hr
 - (iv) 2700 cu m/hr
- (f) At breakpoint chlorination
- (i) Chlorine is used to oxidise
 - (ii) Residual chlorine is zero
 - (iii) Residual chlorine is maximum
 - (iv) Residual chlorine reappears

- (g) For an unplanned city, which type of layout of distribution pipes is generally adopted ?
- (i) Grid system
 - (ii) Ring system
 - (iii) Dead end system
 - (iv) Radial system
- (h) Fresh sewage is generally
- (i) Alkaline
 - (ii) Acidic
 - (iii) Highly decomposed
 - (iv) A source of objectionable odour
- (i) The turbidity of raw water is a measure of
- (i) Suspended solids
 - (ii) Acidity of water
 - (iii) B.O.D.
 - (iv) None of these
- (j) The water-tap of your house is known as
- (i) Sluice tap
 - (ii) Stop cock
 - (iii) Bib cock
 - (iv) Ferrule

- (k) The gas which is generally found in sewers is
- (i) H_2S
 - (ii) CO_2
 - (iii) CH_4
 - (iv) All of these
- (l) BOD_5 represents 5 days biochemical oxygen demand at a temperature of
- (i) 0°C
 - (ii) 20°C
 - (iii) 30°C
 - (iv) 35°C
- (m) The detention period adopted for grit chambers is of the order of
- (i) 1 minute
 - (ii) 30 minutes
 - (iii) 2 – 4 hours
 - (iv) 12 hours
- (n) High COD to BOD ratio of an organic pollutant represents
- (i) High biodegradability of the pollutant
 - (ii) Low biodegradability of the pollutant
 - (iii) Presence of free oxygen
 - (iv) None of these

2. (a) What is meant by 'average daily per capita water requirement' ? Discuss the factors affecting it. 7
- (b) What is meant by water-borne diseases ? As a civil engineer, what steps will you take to prevent the spread of such diseases ? 7
3. (a) Distinguish between grab, composite and integrated methods of collection of water samples. Also explain as to why the determination of temperature, pH and dissolved gases in water samples should be done in the field only. 7
- (b) Explain the significance of sedimentation process in water treatment. List the factors that govern the quantum of impurities removed in the sedimentation tank. 7
4. (a) Distinguish between slow sand and rapid sand filters in context of the following : 8
- (i) Rate of filtration
 - (ii) Grain size distribution of sand in the filter
 - (iii) Under-drainage system
 - (iv) Method of cleaning
- (b) With the help of a neat sketch, explain the flanged joint for connecting water pipes. 6

5. (a) What are the objectives of providing a manhole in the sewer line? With the help of a neat sketch, describe the components of a manhole. 7
- (b) With the help of a neat sketch, discuss the working of a jet pump. 7
6. (a) What do you understand by the unit operation 'flotation'? Briefly describe its various methods. 7
- (b) Differentiate between aerobic and anaerobic processes of biological conversions. 7

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

$$4 \times 3 \frac{1}{2} = 14$$

- (a) Artesian Spring
- (b) Breakpoint Chlorination
- (c) Flocculation
- (d) Bib Cock
- (e) Sewer Rehabilitation
- (f) Sludge Bulking
- (g) Oxidation Ditch
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