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ET-507(A)

B.Tech. Civil (Construction Management) /
B.Tech. Civil (Water Resources Engineering)

Term-End Examination

00230

December, 2014

ET-507(A) : POLLUTANTS AND WATER SUPPLY

Time : 3 hours *Maximum Marks : 70*

Note : *Answer* ***six*** *questions in all. Question No.* ***1*** *is* ***compulsory****. Use of calculator is permitted.*

1. Choose the correct answer from the given choices : *10×1=10*

(a) Ozone layer depletion is caused due to the reaction of ozone with *1*

(i) Carbon monoxide

(ii) Chlorine

(iii) Sulphur dioxide

(iv) Nitrous oxide

(b) By volume, the average composition of nitrogen in air is normally taken as *1*

(i) 78%

(ii) 28%

(iii) 48%

(iv) 58%

(c) Which source of water among the following is ***not*** a surface water ? *1*

(i) River

(ii) Well

(iii) Lake

(iv) Ocean

(d) Hard water in public water supply is discarded because *1*

(i) it consumes more soap

(ii) it contains lot of turbidity

(iii) it contains pathogenic bacteria

(iv) None of the above

(e) Biochemical Oxygen Demand (B.O.D.) of safe drinking water must be *1*

(i) 20

(ii) 15

(iii) 5

(iv) Nil

(f) Disinfection of drinking water is done to remove *1*

(i) odour

(ii) turbidity

(iii) bacteria

(iv) colour

(g) If L, B and D are length, breadth and depth of water in a rectangular sedimentation tank of total discharge Q, the settling velocity is *1*

(i) Q / H

(ii) Q / D

(iii) $\frac{Q}{H \times D}$

(iv) $\frac{Q}{L \times B}$

(h) The most commonly used pumps for lifting water in water supply main is *1*

(i) axial-flow pump

(ii) reciprocating pump

(iii) centrifugal pump

(iv) rotary type pump

(i) Summits are the points of *1*

(i) High pressure

(ii) Low pressure

(iii) Equal pressure

(iv) None of these

(j) The treatments, which are generally given to treat raw water supplies, follow the sequence *1*

(i) Screening, Sedimentation, Disinfection, Filtration

(ii) Screening, Sedimentation, Filtration Disinfection

(iii) Sedimentation, Screening, Filtration Disinfection

(iv) Screening, Sedimentation, Disinfection, Aeration

2. (a) What is global warming and how does it affect our life ? 5

(b) With the help of a schematic diagram, discuss the Gaussian Plume Model of distribution of air pollutants. 7

3. (a) Composting is an engineered biological system. Discuss. Also differentiate between Indore and Bangalore process of composting of solid wastes. 7

(b) A stream with a flow of 0·4 m^3/sec and chloride concentration of 50 mg/litre receives a discharge of a factory drainage water with a flow of 0·05 m^3/sec and chloride concentration of 1600 mg/litre. Calculate the downstream concentration. 5

4. (a) Discuss the precautions that should be kept in mind while collecting the water samples for laboratory examination. 6

(b) What is meant by "per capita demand of water" ? Discuss the factors affecting it. 6

5. (a) With the help of suitable sketch(es) differentiate between confined and unconfined aquifer. 6

(b) What is "aeration" ? Discuss the conditions where aeration of raw water is considered necessary. 6

6. Design a sedimentation tank rectangular in shape to treat 2 million litres of raw water with detention period of 2 hours and overflow rate less than 48,000 litres per day per unit surface area. Water contains 600 mg/litre of suspended solids 40% of which are settleable. Calculate the volume of sludge storage of one month cleaning period. *12*

7. (a) What is meant by Disinfection ? Discuss the factors influencing the disinfection efficiencies of chlorine while treating public water supplies. *6*

(b) Discuss the methods of removing, temporary and permanent hardness of water. *6*

8. (a) With the help of line diagram describe the working of Hydraulic RAM. *6*

(b) A town requires 20 million litres of water per day. Half of the daily supply is to be delivered in 8 hours. The reservoir is 5 kilometres away. Estimate the size of main to furnish the supply if the head available is 12 metres. Take C = 45 in Chezy's formula. *6*

9. Write short notes on any ***four*** of the following : *4×3=12*

(i) Electrostatic Precipitator

(ii) Dissolved Oxygen

(iii) MPN

(iv) Water Borne Disease

(v) Reverse Osmosis

(vi) Ferrules

(vii) Flanged Joint

(viii) Eutrophication