

Unit 9 - week 7

Course outline

How does an NPTEL online course work?

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- Lecture 35 : Disinfection Basics
- Lecture 36 : Chlorination
- Lecture 37 : Other Disinfection Method: Ozone and UV Disinfection
- Lecture 38 : Sludge Management
- Lecture 39 : Advanced and Alternate Treatment Systems
- Lecture 40 : Advanced Oxidation Processes and Membrane Process
- Lecture 41 : Practice Problems
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Quiz : Assignment 7

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Detailed Assignment Solution

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Assignment 7

The due date for submitting this assignment has passed. **Due on 2020-03-18, 23:59 IST.**
 As per our records you have not submitted this assignment.

1) Disinfection can prevent infections spread through microbially contaminated drinking water. Which of the following diseases cannot be controlled by disinfection? 1 point

a. Typhoid and giardiasis
 b. Diarrhea and cryptosporidiosis
 c. Cholera and Hepatitis A
 d. Cancer and Arthritis

- a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 d.

2) The major difference between disinfection and sterilization is: 1 point

a. Disinfection aims at removal or inactivation of only pathogenic bacteria and viruses while sterilization aims at removal or inactivation of all microorganisms (including protozoa and parasites)
 b. Disinfection aims at either removal or inactivation of pathogenic microorganism while sterilization aims at complete destruction (killing) of all microorganisms
 c. Sterilization is usually cheaper than disinfection
 d. All of the above

- a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 b.

3) Which of these is the most effective chlorine residual for disinfection? 1 point

a. Monochloramine
 b. Dichloramine
 c. Hypochlorous acid
 d. Hypochlorite ions

- a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 c.

4) The better strategy to control Disinfection By-Products (DBPs) of chlorination is: 1 point

a. Reduce the chlorine dose
 b. Decrease the contact time with chlorine
 c. Prior-treatment for removal of organic matters from water
 d. Filter the water for DBPs removal after chlorination

- a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 c.

5) The 2.5 log removal of Giardia is equivalent to: 1 point

a. 95 % removal (or inactivation) of Giardia
 b. 99 % removal (or inactivation) of Giardia
 c. > 99 % removal (or inactivation) of Giardia
 d. > 99.9 % removal (or inactivation) of Giardia

- a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 c.

6) Which of these disinfection technologies is generally NOT considered suitable for large capacity water treatment plants? 1 point

a. UV Disinfection
 b. Chlorination
 c. Chloramination
 d. Ozonation

- a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 a.

7) Sludge produced from conventional water treatment plants, predominantly consists of: 1 point

a. Precipitated organic materials and washed out sand from filter media
 b. Naturally occurring suspended and colloidal matters and precipitated chemical coagulants added
 c. Activated biomass sludge and precipitated suspended and colloidal matters
 d. Precipitated chemical coagulants added and biomass

- a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 b.

8) Dissolved Air Flotation (DAF) may be used as a substitute for: 1 point

a. Filtration
 b. Chlorination
 c. Softener
 d. Sedimentation

- a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 d.

9) Which of these techniques are suitable for removal of emerging organic pollutants such as pesticides, pharmaceuticals and personal care products traces from water: 1 point

a. Coagulation-flocculation followed by rapid sand filtration
 b. Activated carbon adsorption or membrane processes such as ultra-filtration and reverse osmosis
 c. Ion exchange or electro dialysis
 d. Both, b) and c)

- a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 b.

10) A countercurrent ion-exchange or adsorption process usually mean: 1 point

a. Use of opposite ion resins or adsorbents for the removal of target contaminants
 b. Use of non-polar adsorbents or resins for the removal of polar contaminants
 c. Direction of flow is down-flow during normal service run while up-flow during regeneration or reactivation
 d. All of the above

- a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 c.

11) Which of these membrane processes are likely to have highest degree of rejection for water contaminants? 1 point

a. Micro filtration
 b. Ultra Filtration
 c. Nano filtration
 d. Reverse Osmosis

- a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 d.

12) One of the major disadvantages of RO units for treating drinking water is: 1 point

a. RO removes even essential nutrients from water, making it unhealthy for drinking
 b. There is no way to control or clean fouling in RO membranes
 c. The high pressure applied in RO units, create risk of rupturing the membranes
 d. All of the above

- a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 a.

13) A chlorination unit treating 26 MLD water feeds 32 kg chlorine daily. If the chlorine demand of water is 1 mg/L, the residual chlorine levels in treated water would be: 1 point

a. 0.23 mg/L
 b. 0.32 mg/L
 c. 0.77 mg/L
 d. 1.23 mg/L

- a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 a.

14) In a laboratory test, 20 minutes exposure of 2 mg/l ozone dose was found effective for 4-log inactivation of target pathogenic microbes. However, reactor size restriction forced to reduce the contact time to only 5 minutes during field installation of the ozone-disinfection system. What should be the recommended ozone dose (in mg/l system) to ensure same degree of inactivation of target pathogens 1 point

a. 2 mg/L
 b. 4 mg/L
 c. 8 mg/L
 d. 16 mg/L

- a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 c.

15) A RO process is installed to treat water having 1200 ppm TDS and bring it down to 50 ppm TDS level. If RO units reject 30% flow, the TDS in the RO Reject would be: 1 point

a. 350 mg/L
 b. 1150 mg/L
 c. 3650 mg/L
 d. 3883 mg/L

- a.
 b.
 c.
 d.

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 d.

16) A sludge thickening unit treating 135 m³/d sludge with 0.8 % solid content. If the thickener is able to increase solid content to 3.6 %, the percentage reduction in the total sludge volume (in m³/d) would be: 0 points

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (Type: Range) 27,33

17) A water treatment unit produces 2400 kg/d solids through a sludge stream with 2.4 % w/w solid content and a bulk density of 1.05 kg/L. The volume of sludge produced in a day (in m³/d) would be: 1 point

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (Type: Range) 90,100

18) Chlorine demand (in mg/L) of water: 1 point

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (Type: Range) 0.35,0.45

19) Chlorine dose (in mg/L) for ensuring 0.15 mg/L free residual chlorine in treated water: 1 point

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (Type: Range) 2.3,2.5

20) Daily requirement of chlorine (Kg/d) for treating 20 MLD flow ensuring 0.15 mg/L free residual chlorine: 1 point

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (Type: Range) 45,50

Information for Q18-Q20: For the given 20-mins contact time chlorine dose-residual chlorine curve for a water sample, determine the following:

