

COMPREHENSIVE REVIEW
(Refer to slide set handout and notes)

1. According to a 2007 Survey of Texas golf course superintendents conducted by Dixon and Ray, what ranked as the most significant potential problem of using reclaimed water?
 - a. Complaints from golfers and neighbors
 - b. Clogged irrigation heads
 - c. Salinity
 - d. Public safety

2. What is the State regulatory agency in Texas that permits and governs use of reclaimed water in Texas for landscape irrigation?
 - a. Texas Oil and Gas Commission
 - b. Texas AgriLife Extension Service
 - c. Texas Water Development Board
 - d. Texas Commission on Environmental Quality

3. Reclaimed water pipe installed after February 12, 1997 must be distinguished from potable water pipes. What are the acceptable methods?
 - a. Manufactured in purple
 - b. Taped with red metallic tape
 - c. Painted purple
 - d. Both "a" and "c"

4. Color coding of reclaimed water pipe does not apply to graywater piping at single family dwellings. TRUE FALSE

5. According to 30TAC Chapter 210 – Use of Reclaimed Water, reclaimed water piping must be separated by a horizontal distance of _____ feet from potable water lines and _____ feet from sewer lines.
- a. 9, 3
 - b. 3, 9
 - c. 6, 6
 - d. 2, 2
6. Conventional above-ground hose bibs and faucets are allowed on reclaimed water systems as long as they are accompanied by a sign that reads “Reclaimed Water – DO NOT Drink”. TRUE FALSE
7. Screen filters are most effective for removing _____.
- a. Algae
 - b. Mold
 - c. Particulates such as sand
 - d. All of the above
8. _____ filters work by forcing water through a container filled with a small, sharp-edged material such as sand, and is effective at removing organic material such as algae.
- a. Screen
 - b. Media
 - c. Disk
 - d. Centrifugal
9. What steps must be taken to discourage the public from contact with irrigation water?
- a. Display a warning sign in English and Spanish at the irrigated property
 - b. Restrict access to irrigation equipment such as controllers and valves
 - c. Irrigate the property during hours when public contact is not likely
 - d. All of the above

10. What steps can be taken to protect the environment from any undesirable effects of treated wastewater?

- a. Maintain vegetative cover at all times
- b. Periodic testing of soil and water to track salinity and other constituents
- c. Both "a" and "b"
- d. None of the above

11. On-site reclaimed water storage facilities must be designed for "peak use" and must consider the following factors:

- a. Plant evapotranspiration rate
- b. Average rainfall
- c. Leaching requirement
- d. Irrigation system efficiency
- e. All of the above

12. Unauthorized discharge of reclaimed water from storage ponds into State waters is an acceptable disposal option if irrigation is not needed. TRUE FALSE

13. Drawdown (water level drop) from open air storage facilities depends upon _____.

- a. Size of the pond
- b. Irrigation requirement
- c. Surface evaporation
- d. All of the above

14. High concentrations of inorganic salts that accumulate at the soil surface will _____ water infiltration and _____ surface runoff.

- a. Increase, decrease
- b. Decrease, increase

15. Sodium chloride, Magnesium sulfate and Calcium carbonate are all examples of _____.

- a. Dissolved salts
- b. Heavy metals
- c. Pathogens
- d. Biological compounds

16. Water salinity concentration is usually reported as _____.

- a. Electrical conductivity (EC)
- b. Sodium absorption ratio (SAR)
- c. Total dissolved solids (TDS)
- d. Both "a" and "c"

17. List three "non-point" sources of inorganic salts.

- a. _____
- b. _____
- c. _____

18. Salts in treated wastewater may be added during the water treatment process.

TRUE FALSE

19. List two symptoms of excessive salt accumulation in plants.

- a. _____
- b. _____

20. Foliar damage caused by high salt concentrations in irrigation water is made worse if irrigation is:

- a. Applied by overhead spray methods
- b. Applied frequently in small amounts
- c. Applied in the heat of the day
- d. All of the above

21. _____ is a phenomenon that occurs when salts “precipitate” on the soil surface as water evaporates, leaving the soil surface in an impermeable, crust-like state.

- a. Evapotranspiration
- b. Osmotic effect
- c. Surface sealing
- d. Orographic effect

22. High salinity concentrations around the vicinity of plant roots can dehydrate plants due by pulling water from the plant. TRUE FALSE

23. What are three factors that affect the rate of salt accumulation in a soil?

- a. _____
- b. _____
- c. _____

24. List three management strategies for preventing salinity accumulation and potential damaging effects on landscapes.

- a. _____
- b. _____
- c. _____

25. _____ refers to that rate at which a sprinkler station applies water to a landscape (in inches per hour).

- a. Distribution uniformity
- b. Infiltration rate
- c. Soil water holding capacity
- d. Precipitation rate

26. The infiltration rate of a soil is influenced by _____.

- a. Vegetative surface conditions
- b. Soil type and texture
- c. Surface salinity accumulation
- d. All of the above

27. Soil infiltration rate does not vary with time, compaction or salt accumulation.

TRUE FALSE

28. _____ refers to the total amount of water evaporated from the soil and plant surface AND water transpired by the plant.

- a. Transpiration rate
- b. Evapotranspiration rate
- c. Percolation rate
- d. Soil water holding capacity

29. _____ is a management strategy used to flush accumulated salts beyond the root zone of the plant.

- a. Leaching
- b. Syringing
- c. Bleaching

30. The following table lists nitrogen, phosphorus and potassium (N-P-K) concentrations of treated wastewater used to irrigate your property. If you apply 4 inches of water during July, how much N was added by the treated wastewater (in lbs per 1,000 ft²)?

Hint: Refer to the slide set example.

Water Analysis Report

Nutrient	Concentration (ppm)
Nitrogen (N)	40
Phosphorus (P)	10
Potassium (K)	20

Remember: 1 ppm = 1 mg/l

31. What is the leaching fraction if a grass has maximum allowable conductivity of 5 ds/m and the electrical conductivity of the soil is 2 ds/m?

- a. 67%
- b. 25%
- c. 50%

32. What is the leaching requirement for a landscape that has a leaching fraction of 40% and a plant water requirement (ET) of 1 inch?

- a. 0.6 inches
- b. 0.4 inches
- c. 1.4 inches

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34. An irrigation station has a total flow rate of 16 gallons per minute and irrigates an area of 200 square feet. What is the station precipitation rate?

- a. .67 in/hr
- b. 0.85 in/hr
- c. 0.77 in/hr

35. An irrigated area has an irrigation requirement of 1.5 inches and a precipitation rate of 0.75 in/hr. What is the station runtime in minutes?

- a. 100 minutes
- b. 120 minutes
- c. 180 minutes