

**CENTRAL PLATTE NATURAL RESOURCES DISTRICT
NITROGEN MANAGEMENT CERTIFICATION TEST**

NAME:

CERT #:

ADDRESS:

CITY:

Section A: The Nitrate Contamination Concern

- 1) The U.S. Environmental Protection Agency's maximum contaminant level for nitrate-nitrogen in public water supplies is _____ .
 - a. 5 ppm
 - b. 10 ppm
 - c. 15 ppm
 - d. 25 ppm

- 2) The only illness clearly caused by drinking water with elevated nitrate levels is _____.
 - a. Hypertension in adults
 - b. Birth defects of the central nervous system
 - c. Methemoglobinemia (blue baby syndrome) in infants under six months of age
 - d. None of the above

- 3) At some point, nitrate leaching occurs under all _____ fields that receive nitrogen fertilizer whether the field is irrigated or not.
 - a. Soybean
 - b. Sugar beet
 - c. Wheat
 - d. Corn

- 4) Depending on the geology of the area and the depth of drainage loss, nitrate-nitrogen can reach the top of a shallow aquifer _____.
 - a. In a few days
 - b. In a few weeks or months
 - c. One to two years
 - d. Ten to twenty years

Section B: Recent Trends in Nitrogen Fertilizer and Water Use in Irrigated Corn

- 5) Total Nitrogen Use Efficiency (NUE_T) is the grain or forage yield per unit of total nitrogen available to the crop. What factors does that include?
 - a. Manure N, groundwater N added via irrigation, soil residual N
 - b. Soil residual N, urea N, fertilizer N
 - c. Fertilizer N, soil residual N, groundwater N added via irrigation
 - d. Liquid formulations, urea N, groundwater N added via irrigation

- 6) The rotation effect on corn yield may be associated with a range of factors including _____.
 - a. Crop establishment issues
 - b. Greater plant-to-plant variation
 - c. Greater N immobilization by corn residue produced in continuous corn fields
 - d. All of the above

Section C: Soil Characteristics That Influence Nitrogen and Water Management

- 7) Two of the most important characteristics of a soil profile that change across the landscape are _____ .
- Parent material and organic matter
 - Clay accumulation and parent material
 - Organic matter and the density of the clay accumulation horizon
 - Surface residue and organic matter
- 8) Available water is the amount of water held by the soil between which two limits?
- Field capacity and field saturation
 - Field capacity and permanent wilting point
 - Field capacity and zero water content
 - Saturation and permanent wilting point
- 9) Plant available water is determined primarily by _____ .
- Soil texture
 - Average rainfall
 - Soil structure
 - Daytime temperatures
- 10) This type of soil has the greater infiltration rates than others:
- Clay
 - Loam
 - Silty
 - Sandy

Section D: What Happens when Nitrogen is Applied to the Soil?

- 11) Mineralization is the process by which organic nitrogen is converted to plant available nitrogen. The two processes of mineralization include:
- Nitrification and immobilization
 - Aminization and ammonification
 - Denitrification and volatilization
 - Fixation and nitrate leaching
- 12) The timing and application of nitrogen fertilizers is critical to nutrient management. There are “4R’s” that are suggested for consideration in that process. Which is NOT one of the “4R’s”?
- Right time of application
 - Right fertilizer type
 - Right placement
 - Right soil type
 - Right application rate

- 13) Under furrow irrigation, it is likely that nitrogen will be moved deeper in the profile during the growing season because depth of water applied with each irrigation is typically _____ than is required to refill the root zone.
- More
 - Less
 - About the same
 - None of the above

Section E: How to Determine the Optimum Rate of Nitrogen Fertilizer

- 14) In order to assess soil nitrate availability, the ideal sampling depth should be _____ .
- As deep as the effective rooting depth for the crop
 - Less than three feet
 - In the top foot of the root zone
 - Calculated based on last year's yield
- 15) The amount of nitrate-nitrogen in the soil is related to a combination of several management practices. Which of the following can contribute to a greater or lesser amount of residual nitrogen?
- Previous crop
 - Past amount of commercial nitrogen applied
 - Soil organic matter
 - All of the above
- 16) Calculate the nitrogen fertilizer needed (lb/acre) for corn for the following:

Expected yield	180 bu/acre
Soil organic matter	1.5 percent
Soil nitrate	12.0 ppm

- 98 lb/acre
- 112 lb/acre
- 117 lb/acre
- 123 lb/acre

Section F: Giving Credit for Non-fertilizer Nitrogen Sources

- 17) The minimum estimated nitrogen contributed to the crop from mineralization for a soil containing 2% organic matter is _____ .
- 10 to 20 lb/acre/yr
 - 30 to 40 lb/acre/yr
 - 40 to 55 lb/acre/yr
 - 50 to 60 lb/acre/yr
 - 60 to 70 lb/acre/yr
- 18) The estimated nitrogen credit for a crop following a 69% stand of alfalfa on a sandy soil is _____ .
- 80 (lb/acre nitrogen credit)
 - 120 (lb/acre nitrogen credit)
 - 70 (lb/acre nitrogen credit)
 - 140 (lb/acre nitrogen credit)

- 19) Irrigation water contains 25 ppm nitrate-nitrogen. The 5-year average irrigation water application depth is 12 inches per year. Using 80% of the 5-year average, how much crop available nitrogen is in the irrigation water?

Calculate the irrigation water nitrogen credit.

- a. 52.4 lb of nitrogen/acre
- b. 54.4 lb of nitrogen/acre
- c. 57.6 lb of nitrogen/acre
- d. 69.0 lb of nitrogen/acre

Section G: How to Properly Apply Nitrogen Fertilizer

- 20) The potential for leaching of nitrate by rainfall is highest in the _____ .
- a. Spring
 - b. Summer
 - c. Mid-summer during rapid nitrate uptake
 - d. Fall
- 21) Grain or forage yield per unit of nitrogen available to the crop is called _____ .
- a. Fertilizer demand
 - b. Nitrogen use ratio
 - c. Nitrogen factor
 - d. Nitrogen use efficiency
- 22) For a sandy soils, the best choice for nitrogen fertilizer timing is _____ .
- a. Apply all the nitrogen before planting
 - b. To apply most nitrogen prior to planting, with a small amount side dressed
 - c. To use a small amount of nitrogen as a starter, with the remainder side dressed or applied with a sprinkler irrigation system
 - d. None of the above
- 23) The nitrogen use efficiency for fall-applied nitrogen is _____ compared to side-dress applied nitrogen.
- a. Lower
 - b. Higher
 - c. The same as
 - d. None of the above

Section H: Nebraska Irrigation Water Resources Management

- 24) The return of water to the atmosphere as water vapor is referred to as _____ .
- a. Transpiration
 - b. Evaporation
 - c. Evapotranspiration
 - d. Recharge

- 25) What is NOT considered a beneficial use of consumptive water use?
- Increases crop yield
 - Evapotranspiration from weeds in road ditches
 - Production of electrical energy
 - Increases recreation at lakes
- 26) Losses of water from the field are represented by
- Surface runoff
 - Deep percolation
 - Evapotranspiration from the field
 - All of the above
- 27) Intentional stressing of the crop at certain crop stages to reduce water use while minimizing yield reduction is _____ .
- Furrow irrigation
 - Surge irrigation
 - Deficit irrigation
 - Sprinkler irrigation

Section I: Understanding Crop Water Use

- 28) Crop water use is made up of what two parts?
- Condensation and evaporation
 - Evaporation and transpiration
 - Evaporation and precipitation
 - Percolation and transpiration
- 29) Over a growing season, the majority of evapotranspiration (ET) is from
- Evaporation
 - Transpiration from the leaves
 - Equal amounts of evaporation and transpiration
 - The middle third of the root zone
- 30) Factors that affect ET rates are _____ .
- Air temperature
 - Solar radiation
 - Wind speeds
 - All of the above
- 31) What can have a significant effect on the evaporation of water from the soil surface at the end of the growing season?
- Crop residue
 - Crop type
 - Snow fall
 - Herbivores

Section J: Irrigation Management for Water Quality Protection

- 32) Components of water application efficiency do NOT include:
- Net irrigation depth
 - Gross Irrigation depth
 - Amount of nitrogen applied
 - Root zone
- 33) The total volume applied to an irrigated area is calculated by multiplying _____ .
- Flow rate and irrigation time
 - Irrigation time and area irrigated
 - Flow rate and area irrigated
 - Flow rate and the net application factor
- 34) Determine the gross irrigation depth for one revolution from the following center pivot irrigation information.

A center pivot irrigates 132 acres with a well that pumps 750 gpm. A revolution is made in 72 hours.

- .8 inches
 - .9 inches
 - 1.0 inches
 - 1.1 inches
- 35) Irrigation should be scheduled so that the plant's available soil water content remains above _____ of the total available water-holding capacity.
- 20%
 - 30%
 - 40%
 - 50%
- 36) Preferably _____ or _____ depths are required to properly represent root zone moisture conditions.
- Three
 - Both a and c
 - Four
 - Two

Section K: Irrigation Water Management for Furrow Irrigation

- 37) Which does NOT influence how quickly water advances down the furrow?
- Soil texture
 - Slope
 - Soil temperature
 - Surface conditions

- 38) The _____ has a direct impact, not only on how fast water advances down the field, but more importantly, on the total amount of water applied.
- Advance time
 - Set time
 - Stream size
 - Set size
- 39) To apply water uniformly and efficiently, surface irrigators must be willing to change _____ so that water advances down the field rapidly.
- Set size
 - Stream size
 - Set time
 - Both B and C

Section L: Irrigation Water Management for Sprinkler irrigation

- 40) System capacity considerations are influenced by _____ .
- Soil texture
 - Crop water requirements
 - Rainfall potential
 - All of the above
- 41) Sprinkler uniformity is NOT influenced by _____ .
- Sprinkler type
 - Nitrogen applied
 - Nozzle placing
 - Wetted diameter of the sprinkler
- 42) The best way to reduce runoff during the irrigation season is to _____ .
- Monitor weather conditions
 - Apply all of nitrogen in spring
 - Reposition the nozzle along the system
 - Control depth of application
- 43) Peak evapotranspiration is the greatest daily rate of water use that is expected by a crop over a series of _____ days.
- One to two
 - Two to three
 - Three to five
 - Four to five

Section M: Irrigation Water Management for Subsurface Drip Irrigation

- 44) What type of permit is required before a SDI system can be installed?
- Groundwater transfer
 - Underground injection
 - Surface water transfer
 - Well drillers

- 45) Some advantages to subsurface drip irrigation are _____ .
- Soil surface is not wetted
 - Small application depths
 - Both A and B
 - Neither A or B
- 46) What is NOT a disadvantage of subsurface drip irrigation?
- Rodent damage
 - Emitters become clogged
 - Deep percolation loss
 - Runoff

Central Platte NRD's Rules and Regulations

- 47) How early can commercial nitrogen fertilizer be applied in Central Platte NRD's Phase III Quality Management Area? _____
- After November 1st
 - When ground temperature is below 50 degrees
 - After March 1st
 - Anytime after harvest
- 48) A soils analysis must be submitted in Central Platte NRD's Phase II/III Quality Management Area: _____
- For each field or 80 acre tract growing corn, sorghum or potatoes
 - A composite sample must consist of a mixture from no less than one three-foot probe every five acres
 - Only shallow samples are required
 - A and B
 - A and C
- 49) To report corn, sorghum and potatoes on district forms, it should include: _____
- Test results from residual soil and water analysis
 - Expected yields
 - Credits for past legume crop and manure or sludge
 - All of the above
 - None of the above
- 50) Commercial nitrogen fertilizer can be applied to corn or sorghum in a Phase III area of Central Platte NRD's Quality Management Area _____
- All applied as pre-plant/pre-emergent if the total application for the year is less than 80 pounds
 - All applied as pre-plant/pre-emergent if the total application for the year is more than 80 pounds if an approved inhibitor is used
 - Split applied without an inhibitor if the majority of the fertilizer is applied as side dress/post-emergent.
 - All of the above