Exam #2

SOIL 4463

Soil and Water Conservation Management

#1: Which of the following are important considerations when designing a terrace system?

1. Channel length
2. Channel grade
3. Spacing between terraces
4. All of the above

#2: Can the revised universal soil loss equation (RUSLE) be used to determine the spacing between terraces required to reduce erosion to below tolerable levels? Yes or no?

#3: The minimum grade of a terrace channel must be steep enough to minimize the ponding of water and resulting water logged conditions that cause crop yield reductions. Briefly explain what dictates the maximum grade of a terrace channel.

#4: Briefly explain why a terrace should NOT be longer than 2000 ft. Specifically, what problems might occur with excessively long terraces?

#5: Terrace channels are designed by the NRCS to control or contain a:

1. 10 year, 24 hour rainstorm
2. 100 year, 24 hour rainstorm
3. 1 year, 24 hour rainstorm
4. 10 year, 1 hour rainstorm

#6: Removing a terrace from a no-till field will increase the volume of water that must be controlled by terraces remaining downslope. Briefly describe the problems that could occur if this were done.

#7: Briefly describe the differences between saltation and suspension.

#8: Provide three examples of ON-SITE damage resulting from wind.

#9: At 2m above the soil surface the wind velocity must be equal to or greater than which of the following for wind erosion to occur:

1. 1 m/s (2.25 miles/hour)
2. 8 m/s (18 miles/hour)
3. 20 m/s (45 miles/hour)
4. 15 m/s (34 miles/hour)

#10: Saltation begins with a particle leaping into the air as a result of a pressure differential where the air pressure is lower above the particle compared to that found below the particle. True or false?

#11: The increasing rate of erosion as wind blows farther across a field is called avalanching. Provide two reasons why the rate of wind erosion can increase field length.

#12: Very fine sand sized particles are the most easily detached by wind. True or false?

#13: Provide a brief explanation of why silt and clay particles cannot be detached from a smooth flat soil surface without resulting in saltation.

#14: Which of the following is expected to be the dominant wind transport mechanism for soil particles eroded from a very fine sandy loam?

1. Saltation
2. Suspension
3. Creep
4. Sheet erosion

#15. Which of the following ridge heights are most affective at reducing erosion by wind:

1. 2-4 inches
2. 18 inches
3. 1 inch
4. 1 foot

#16: The length of exposed area required to reach the carrying capacity of a specific wind will be **longer or shorter (circle one)** for a structure-less fine sand than for a cloddy loam soil.

#17: The (I’) factor used in the wind erosion equation expresses the potential annual wind erosion from a site that is wide, level, unsheltered and isolated; has a bare, smooth, loose and non-crusted surface and has climate conditions like those in the vicinity of Garden City, Kansas. Where can this value be found?

1. Dictionary
2. Soil survey
3. Soil taxonomic name
4. All of the above

#18: The wind erosion prediction system is the most recently developed model for wind erosion and can estimate suspension separate from saltation and creep. True or false?

#19: Maintaining permanent vegetation and/or residue is the most effective way to minimize wind erosion. True or false?

#20: Wind breaks will do which of the following?

1. Trap eroded material
2. Shorten the length of an eroding surface
3. Reduce wind speeds
4. All of the above

#21: List three reasons to till the soil.

#22: Traditionally the NRCS defined conservation tillage as any system that results in:

1. 30% or less residue cover on the surface at planting
2. 70% or more residue cover on the surface at planting
3. 30% or more residue cover on the surface at planting
4. 30% or more residue cover after the final tillage operation

#23. Strip tillage is a tillage system that only disturbs 30% of the soil surface and leaves the remaining 70% intact. Is strip tillage considered no-till by current NRCS standards? Yes or no?

#24: Multiple cropping is a system often used by subsistence farmers in which a single species is grown at multiple times or different crops are grown simultaneously in the same field. In terms of labor, erosion control, or risk management, briefly describe the advantages of this system.

#25: Relay cropping is when a crop is planted into a standing crop prior to harvest. Briefly provide an example of when this might be a useful option **OR** provide an explanation of why a producer might want to implement this practice.

#26: Strip cropping with alternating winter and summer crops can reduce wind and water erosionby:

1. Decreasing the length of unprotected soil surface
2. Making no-till management more successful
3. Reducing the intensity of tillage use
4. None of the above

#27: Provide 3 benefits of crop rotation.

#28: Which of the following is responsible for the greatest loss of water from a wheat fallow system in Oklahoma?

1. Transpiration
2. Drainage
3. Evaporation
4. Runoff

#29: List 3 factors that should be considered when developing a crop rotation.

#30: A leguminous cover crop can decrease the supplemental N requirement for the following cash crop. True or false?

#31: Cover crops with fibrous root systems can improve near surface soil structure. True or false?

#32: High biomass cover crops, such as cereal rye, will:

1. Protect the soil surface from crusting
2. Maintain cooler soil temperatures for following summer crops
3. Improve soil structure when incorporated into low residue cropping systems such as continuous soybeans
4. All of the above

#33: Provide 2 examples of how the incorporation of cover crops into a crop rotation might provide benefits to water quality.

#34: Subsurface injection of fertilizer with low disturbance applicators is allowed by the NRCS in a no-till operation. True or false?

#35: Provide 2 benefits of manure injection in a no-till system.

#36: One of the primary differences between no-till planting equipment and conventional equipment is the down force that can be applied. True or false?

#37: List 4 benefits of no-till crop management.

#38: List 2 environmental challenges that can result from the adoption of no-till management.

#39: Maintenance of surface residues is critically important no-till systems because:

1. They protect the surface from crusting
2. Provide organic matter for biological activity
3. Reduce the rate of evaporation from the soil surface
4. All of the above

#40: Will converting to a no-till system always increase crop yields due to improved soil structure and microbial activity?

#41: Tram lines can be used to control traffic where precision GPS guidance systems are not available. True or false?

#42: The adoption of no-till in the U.S. has been on a steady increase since the early 1990s. True or false?