Contestant Name:_____ Key **Practicum Score:**_____

School: _____

2026 Kansas State Agriculture Technical and Mechanical Systems
Environment & Natural Resources Practicum Activity – 100 points

Instructions: Place all answers on this page. Follow all instructions carefully and completely in order to obtain full points for this activity. Each section will be completed separately by a team member.

Section 1 – Water Use Calculations

Calculate the amount of water use and loss for each of the irrigation systems as directed.

Formulas: Area – length x width Volume = length x width x height

Conversions: 1 mile = 5,280 feet 1 acre = 43,560 square feet
1 acre inch = 27,145 gallons 1 ft^2 with 1 inch of water = 0.62 gallons

Scenario A

Assume you are planning to irrigate 160 acres of corn in Western Kansas. Calculate the amount of water used by various systems and compare them. Assume that you are going to apply 10 inches of water by irrigating. (5 points each)

1. Total water used if applying 10 inches during the growing season - 43,432,000 gallons 10×160×27,145
2. Water loss from flood irrigation applying 10" (only 50% efficient) - 21,716,000 gallons lost 43,432,000×.5=
3. Water loss with a center pivot system – applying 10 inches - 4,343,200 gallons lost 43,432,000×.10
   (a well maintained system is 90% efficient)

Scenario B

A local homeowner has 2,500 square feet yard. They have typically watered with lawn sprinklers. In an average summer, they will apply 18 inches of water to the entire lawn. They are interested in installing an underground drip irrigation system. (5 points each)

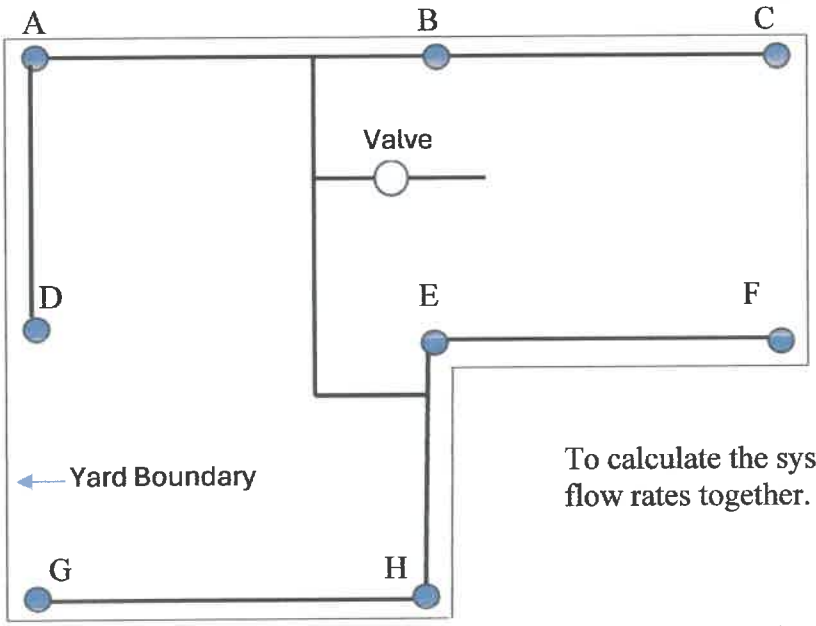
4. How much water are they applying each summer? 27,900 gallons 2,500×.62×18
5. How much is it costing them if water costs $9.55/1,000 gallons? $266.45 27,900/1,000×9.55
6. By installing a drip irrigation system, they can reduce the amount of water needed. How much water will they use if they only need 7 inches? 10,850 gallons 2500×.62×7
7. How much will it cost to use 7 inches if the cost is $9.55/1,000 gallons? $103.62 10,850/1,000×9.55

Section 2 – Practicum Skill Activity

A local homeowner is getting ready to install an underground sprinkler system. They have dry fit all of the connections and are almost ready to begin the installation. Each sprinkler head has a blue nozzle installed and the flow rate is stamped on the emitter. Check and record the flow rate for each nozzle in the diagram on the next page.

Contestant Name:_____ **Practicum Score:**_____

School: _____



The initial recommended flow rate for each nozzle is as follows:

¼ circle – 1.5 nozzle (1.5 gal/min)

½ circle – 2.0 nozzle (2 gal/min)

¾ circle – 3.0 nozzle (3 gal/min)

Full circle – 4.0 nozzle (4 gal/min)

To calculate the system flow rate – add the total nozzle flow rates together.

8. Using the system above, what SHOULD the flow rate for each nozzle be? (2 points each)

A. 1.5 B. 2.0 C. 1.5 D. 2.0 E. 3.0 F. 1.5 G. 1.5 H. 1.5

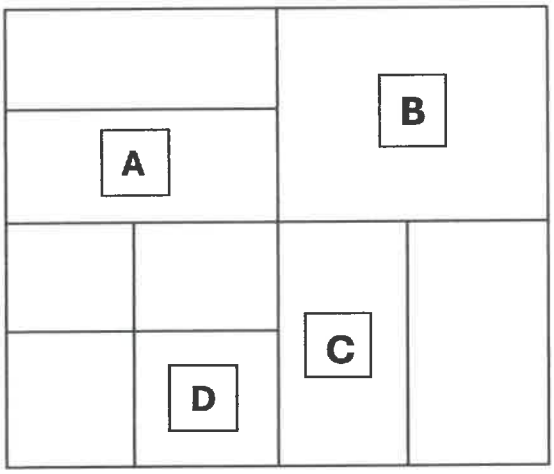
9. Inspect the assembled system and determine if the sprinklers have the correct nozzle installed. The nozzle size is stamped on the blue insert in each sprinkler head. Write YES or NO in each blank to indicate if the correct nozzle is installed in each sprinkler head. (2 points each)

A. Yes 1.5 B. No 3.0 C. Yes 1.5 D. Yes E. Yes 3.0 F. No 2.0 G. Yes H. Yes 1.5

10. What is the calculated flow rate using the nozzles that SHOULD be installed? (5 points)

14.5 gal/min

Section 3 – Legal Description Questions



This section of ground is 1 mile by 1 mile. It is Section 18 in Range 2 West and Township 15 South. Provide the COMPLETE legal description for each of the lettered land areas. (5 points each)

A. S½ 1½, NW¼ 1½, Sec. 18 1, R-2W ½, T-15-S ½

B. NE¼ 3, Sec. 18, R-2-W, T-15-S

C. W½ 1½, SE¼ ½, Sec. 18, R-2-W, T-15-S

D. SE¼ 1½, SW¼ 1½, Sec. 18, R-2-W, T-15-S

How many acres are in each tract? (2 points each)

A. 80 B. 160 C. 80 D. 40