



**THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED**

**Q.1. Answer the following short questions:**

**(15x2=30)**

1. Define Cation Exchange Capacity.
2. What is nutrient pollution?
3. The farm has two different fertilizers in the barn (A large farm building used for storing grain, hay). One is  $K_2SO_4$  and the other is  $KCl$ . The two fertilizers cost the same per ton, but we want to be conscious of costs by using the fertilizer with the highest percentage of potassium, since we won't have to apply as much. Which fertilizer should we use? Show your calculations.  
 $K_2SO_4 = 158.25 \%K = 78.12/158.25 \times 100 = 49\% K$   
 $KCl = 74.55 \%K = 39.1/74.55 \times 100 = 52\% K$
4. Why do plants die if they get too much fertilizer?
5. What is hydroponics?
6. Define lyotropic series.
7. What is water use efficiency?
8. Define ecotype.
9. Using water potential terminology, explain why: Over-fertilizing your lawn will cause the leaves wilt, to become dry and fall off.
10. Differentiate between essential and beneficial elements.
11. A farmer is trying to grow corn but has difficulty getting access to water for irrigation. Her region gets a lot of rain in the spring, so when she plants the seeds the soil is nice and moist, but no rain falls during the summer when the plants are growing. For the past few years, she has managed to grow tall, healthy looking plants, but although they flower, they set few seeds. What advice can you give this farmer to help her get a good grain harvest next year?
12. Which of the following nutrients would likely get flushed or leached out of the surface soil the fastest after a large rainstorm? What is its major reason?
13. If the upper, young leaves are showing a nutrient deficiency, which type of nutrient is most likely to be deficient in terms of its mobility?
14. Define critical nutrient range.
15. Give chemical composition of macro and micronutrients of Hoagland Nutrient Solution.

**Q.2. Answer the following questions.**

**(3x10=30)**

1. What is soil fertility evaluation? Briefly discuss various approaches employed to determine soil fertility status.
2. Describe the neutralizing value, physical properties and handling precautions of liming materials.
3. Give a detailed account of physiology of symbiotic nitrogen fixation.