There are 12 questions plus a Bonus question. Each question requires a short answer. Please be thorough yet concise and show your work where calculations are involved.

10 pts. 1. Describe each of the following for commercial dent corn in central Indiana:

a) V stage by which the potential number of rows of ovules on an ear is determined.

b) The number of the node which is at the top of the first visibly elongated internode seen when splitting the base of a corn stalk.

c) Approximate kernel moisture content at R4 (% on a weight to weight basis).

d) Visible indicator that a plant has reached R5.

e) Kernel moisture content (percent of weight) when the milk line (or starch line) is half way between the crown and the tip of a kernel.

4 pts. 2. For a medium texture soil at field capacity, approximately how much water is available to young corn plants with roots reaching down 12 inches into the soil profile?

10 pts. 3. Compare the drought tolerance of soybean yield to that of corn yield. Provide at least two reasons for the greater yield stability of the most drought-tolerant crop.
4. a) What is the optimum seeding date for Soft Red Winter Wheat in the Midwestern U.S.? (Note: Your answer should apply equally well to any location in the Soft Wheat area.)

b) Please explain the reasoning behind this seeding date goal and include in your discussion an explanation of what happens when wheat is seeded too early and when it is seeded too late.

5. a) What is the optimum established stand density for Soft Red Winter Wheat in Indiana?

\[ \text{plants / square foot} \]

b) How many inches of row length comprise one square foot of area where row width is 9 inches?

\[ \text{inches of row length / square foot} \]

c) Estimate the yield potential of a stand of wheat which has an average density (after jointing has begun) of 25 plants per square foot with the plants producing an average of 1 main stem plus 1 tiller. Please your calculation.

\[ \text{Bushels / acre} \]

6. The following pertain to a proposed crop of Indiana wheat;

Yield goal = 80 bushels per acre

Previous crop = soybeans

a) What N rate is appropriate to recommend?

\[ \text{Lbs. N / Acre} \]

b) What maintenance P\textsubscript{2}O\textsubscript{5} rate should be applied per acre?

\[ \text{Lbs. P\textsubscript{2}O\textsubscript{5} / Acre} \]

c) What maintenance K\textsubscript{2}O rate should be applied per acre?

\[ \text{Lbs. K\textsubscript{2}O / Acre} \]
7. At what wheat developmental stage should topdress N be applied in the Spring?

Why at this stage? Please be specific and provide two reasons for this timing.

a) 

b) 

8. Note the appropriate maintenance P$_2$O$_5$ and K$_2$O rates for 60 bushel per acre soybeans. (Please show your work).

_______ Lbs. P$_2$O$_5$ / Acre

_______ Lbs. K$_2$O / Acre

9. a) What is the approximate recommended target plant population (plants per acre) for soybeans drilled in a 7 inch row width vs. planted in a 30 inch row width?

b) How critical is it to try to establish precisely the recommended plant population for a given soybean row width? Please explain.

c) Please compare the potential for irregular emergence through surface-crusted soil conditions when soybeans are seeded with a drill vs. when soybeans are planted in 30 inch row width (include an explanation for any difference you note).

10. Compare indeterminate vs. determinate soybean varietal characteristics with respect to each of the following (assume both are Maturity Group III planted in central Indiana). Please explain your answer for each.

a) Mature plant height.
b) Size and number of pods on top of main stem.

c) Size of leaves at top of plant main stem.

8 pts. 11. Note a quantifiable characteristic (i.e. identified by the size or position of a plant part) which uniquely indicates that a soybean plant is at each of the following:

a) V 3 growth stage?

b) R 3 growth stage?

c) R 5 growth stage?

d) R 6 growth stage?

8 pts. 12. Assume a hoop with diameter 30 inches has been used to estimate stand counts in a drilled soybean field. The average plant density in the area surrounded by the hoop was 25. What is the estimated stand density for this field? (Please show your work).

________ Plants / Acre

5 pts. BONUS. What rule of thumb can be used to indicate whether a decrease in soybean row width (e.g. from 30 inches down to 7 inches) is likely to produce a potential yield increase in a given situation? Please explain your answer.

HAVE A BLESSED AND MERRY CHRISTMAS!
CONGRATULATIONS TO THE GRADUATES!