

## SECTION III – AGRONOMY EXAM

### What is the agronomy exam?

- Exam questions will test general agronomic knowledge of the participant.
- Suggested objectives should be considered when studying for the exam.
- A list of references that will be used to write examinations can be found on page 37

### What do participants need to provide?

- Clipboard
- No. 2 Pencil(s)
- Non-scientific calculator
- Purdue Extension Corn and Soybean Field Guide
  - **Note:** Questions written from this source will be based on information provided in the **2021 2022** Corn and Soybean Field Guide. Participants may, if they wish, use another book, but there will be no guarantee that all questions can be answered using a different year book. To receive copies of the **2021 2022** field guide, see page 37
- Purdue Extension Forage Guide

### What are participants provided with by contest officials for the exam?

- Agronomy exam
- Scantron form

### Rules for this portion of the contest

- The exam will consist of 40 multiple choice questions (200 points).
- Participants will have 60 minutes to complete the exam.
- Each question is worth 5 points and will be counted wrong if omitted or incorrectly answered.

### How to prepare participants for this portion of the contest

- See page 37 for a list of reference material used to write the exam
- Questions may also be written from material found on pages 39-41

# AGRONOMY EXAM OBJECTIVES

**To successfully complete the portion of the multiple choice exam pertaining to corn production, soybean production, and general agronomic knowledge; the participant will be able to:**

1. Assess fertility needs and make nutrient recommendations for corn and soybeans using tables.
2. Calculate fertilizer needs and costs to satisfy a specific nutrient requirement.
3. Diagnose fertility, pest, compaction, and disease problems related to specific field situations.
4. Calculate insecticide and herbicide needs for a specific field situation.
5. Calculate area, length and volume measurements related to agriculture.
6. Explain how crop residue is measured by the Natural Resources Conservation Service (NRCS) and why crop residue is measured after planting.
7. Recognize methods to achieve crop residue percentages required to meet conservation compliance on highly erodible land for corn & soybeans rotations.
8. Identify the herbicide mode of action group most likely responsible for specific herbicide injury symptoms.
9. State a procedure for diagnosing crop production problems in a field.
10. Recommend nozzle tips that would be best suited for spraying in a specific field situation.
11. Determine the growth stage of a corn or soybean plant.
12. Define a soybean relative maturity group and predict what would happen if a variety is planted outside its recommended maturity range (e.g. move group II to southern Indiana).
13. Explain the effect and use of temperature developmental units for agriculture.
14. Use current weather information to calculate growing degree days.
15. Consult tables and charts to obtain information from reference materials
16. Use corn and soybean moisture conversions to calculate actual pounds per bushel.
17. Define the cation exchange capacity of a soil and state the two factors that influence the cation exchange capacity of a soil.

18. Complete the process necessary to submit plant, soil or insect samples to a lab in order to reduce sampling error (often the largest source of error).
19. Contrast features of conventional versus reduced tillage systems related to temperature, moisture, and soil erosion.
20. Describe what the user of any herbicide should find on a label of the product.

**To successfully complete the portion of the multiple choice test pertaining to wheat, the participant will be able to:**

1. List varietal characteristics important in wheat variety selection.
2. Schedule a nitrogen fertility program for optimum wheat production.
3. Use tables and soil test information to determine nitrogen, phosphorous, and potassium needs.
4. Schedule a fertility program for double-cropping no-till soybeans following wheat.
5. State factors that affect the planting date of wheat.
6. List conditions when it is appropriate to plant seed from your own bin.
7. Suggest the proper seeding depth and soil conditions for ideal wheat growth.
8. State the typical seeding rate and plant population of soft red winter wheat.
9. State two conditions that lead to lodging (falling over) of wheat.

**To successfully complete the portion of the multiple choice test related to forages, the participant will be able to:**

1. List 3 reasons a pure stand is advantageous over a mixed stand.
2. List 5 reasons a mixture is advantageous over a pure stand.
3. Contrast the suitability of Alfalfa, Timothy, Smooth brome grass, and Orchardgrass to a 3 vs. 4 cutting system.
4. Contrast the suitability of Alsike clover, Red clover, Alfalfa, Reed canarygrass, Tall fescue, Orchardgrass, and Smooth brome grass to various levels of soil drainage and fertility.
5. State the benefits of legume-renovated pastures.
6. Describe the common problems encountered when renovating pastures.
7. State the steps required to achieve successful pasture renovation.

8. Describe the effect of improper liming, phosphorous and potassium fertilization in Alfalfa.
9. Determine factors that lead to heaving of tap rooted plants such as Alfalfa.
10. Identify alfalfa weevil, potato leaf hopper, grass hoppers, anthracnose, phytophthora root rot, fusarium wilt and bacterial wilt.

**In order to complete the portion of the multiple choice test pertaining to plant physiology, the participant will be able to:**

1. Differentiate the three (3) major components: pericarp, endosperm, and embryo in a grass caryopsis (grain kernel).
2. Distinguish between hypogeal and epigeal emergence.
3. Determine differences in root systems, stems, and leaf structures between dicot and monocot plants.
4. Compare and contrast specialized stems such as rhizomes, tubers, stolons, corms, bulbs, culms and stalks in growth location and physical appearance.
5. Label a diagram of the external features of a Red clover, Alfalfa, and grass leaf.
6. Label the parts of a basic flower, a legume flower, and a grass flower.
7. Differentiate among the spike, raceme, panicle, and head types of inflorescence.

**In order to complete the portion of the multiple choice test related to grain grading, the participant will be able to:**

1. State the top 3 grain crops and their quantity that Indiana contributes to the market place.
2. Recognize the usual grade of market quotes and where market quotes may be obtained.
3. List the grains for which standards have been established.
4. Explain procedures used in determining grades for corn, soybeans and wheat.