

## Multiple Choice

1. What are some purposes for germination testing? Select all that apply:
  - a. Buying and selling seed
  - b. Labelling of seed as required by state and federal laws
  - c. To make predictions for future planting seasons
  - d. Monitoring
  - e. Trait Testing
2. When both purity and germination tests are required for a sample, what are the two options to obtain seed for the germination test?
  - a. Seed for germ shall be taken from the pure seed component of the purity exam
  - b. Seed for germ shall be randomly selected from the noxious exam
  - c. Seed for germ shall be taken indiscriminately from the bulk sample if the sample is estimated to be at least 98% pure seed
3. You have received a sample of seed in your laboratory for germination only. It looks to contain approximately 96% pure seed. What processes do you need to follow to prepare this sample for germination testing?
  - a. Using the weights in Table 2A, complete a purity analysis to separate seed into three groups: 1. Pure Seed 2. Inert and 3. Other Crop and weed seed
  - b. Complete a full purity on the sample using the weights indicated in Table 2A
  - c. Separate seed into two groups: pure seed and everything else (other crop seed, weed seed and inert matter) using 25% of the quantity required for purity
4. It is determined that a sample is infected with a bacteria or fungi and potentially contaminating other seedlings. When should germination counts be made?
  - a. On the first and final count, as described in table 6A
  - b. End the test as soon as contamination is present
  - c. At approximately two-day intervals between the usual first and final count as described in table 6A
5. When do you retest a germination sample? Select all that apply:
  - a. The range of 100-seed replicates of a given test is within tolerance
  - b. There are indicators that a satisfactory germination has not been obtained
  - c. There is evidence of errors in seed evaluation
  - d. When a sample shows seedling injury or abnormality from chemical treatment
6. Which seed kind must be soaked for two hours before planting?
  - a. Bahiagrass
  - b. Endive

- c. Beets, Swiss chard
  - d. Rice
- 7. As indicated in table 6A, two numerals separated by a dash indicate an alternation of temperature. The test should be held at the first temperature for approximately \_\_\_\_\_ hours and the second temperature for approximately \_\_\_\_\_ hours per day.
  - a. 16, 8
  - b. 12, 12
  - c. 8, 16
  - d. 10, 14
- 8. The number of days stated for the first count in Table 6A, is approximate. A deviation of one to \_\_\_\_\_ days is permitted.
  - a. Two
  - b. Three
  - c. Four
  - d. Five
- 9. It is the end of the germination period for a garden bean sample and there are still swollen seeds present. What should you do?
  - a. End the test since it is the final count day described in Table 6A.
  - b. Remove all seeds, except for the swollen seeds, and continue the test for up to five days.
  - c. Pierce the seed coat of the swollen seeds and extend the test for five days.
  - d. Transfer the swollen seeds to a substrate moistened with gibberellic acid and continue the test for seven days.
- 10. What percent solution of potassium nitrate is used to moisten substrate of certain seed kinds?
  - a. 1.0%
  - b. 0.2%
  - c. 0.1%
  - d. 2.0%
- 11. Which definition best describes "double fertilization"?
  - a. Occurs when two cells from the pollen tube fuse with cells of the embryo sac.
  - b. An angiosperm ovule that produces twin seedlings.
  - c. When the embryo sac is fertilized by multiple pollen grains.
  - d. Happens when one or two ring-like layers of tissue form around the base of the nucellus.

12. What are the major functions of the root? Select all that apply:
- a. Anchor the plant in the soil
  - b. Hold dormant meristematic buds in case of terminal bud damage
  - c. Absorb water
  - d. Absorb dissolved salts from the soil
13. While considering the many causes of seed abnormalities, which one may cause seedlings to have grainy coleoptiles and spirally twisted leaves?
- a. Mineral deficiencies in the soil
  - b. Chemical treatment injury
  - c. Pathogenic infections
  - d. Frost damage
14. You get a new shipment of blotters in the lab. How would you go about testing the new substrata for phytotoxicity?
- a. No initial testing is needed, only test if stunted or arched roots are observed
  - b. Plant at least two types of seeds that are classified as a sensitive species (ex. Lettuce and Timothy) on the new and old blotters and compare daily.
  - c. Plant 50 corn kernels on the new and old blotters and compare daily, checking thickened, stunting or arching roots.
  - d. No testing is required, phytotoxicity only occurs on creped cellulose paper
15. How is a cultivar with multiple seed units counted during a standard germination test?
- a. If there are one or more abnormal seedlings that grows in the multiple seed unit, it is classified as abnormal
  - b. If there are one or more normal seedlings that grow in the multiple seed unit, it is classified as normal
  - c. It is necessary to break apart all multiple seed units before planting
16. For which species does the special procedure for germination include the use of calcium nitrate to combat collar rot?
- a. Green Needlegrass
  - b. Penland's beardtongue
  - c. Endive
  - d. Alyceclover
  - e. Garden Bean

### True or False

- T / F 17. Seedlings that have been seriously damaged by fungi from a source other than the specific seed shall be regarded as abnormal, even if all essential structures are present.

- T / F 18. For most kinds of seeds, blotters or other paper substrate should be wet enough that when pressed, a film of water forms around the finger.
- T / F 19. Seeds should be germinated in replicates of 100 seeds or less to avoid crowding on the substratum.
- T / F 20. Coated seed units in the Poaceae family should be planted in the condition in which they are received, unless they are decoated for a purity analysis prior to the germination test.
- T / F 21. The prechill period is included in the number of testing days given in Table 6A.
- T / F 22. The percentage of hard seed does not need to be reported with the percent germination.
- T / F 23. Soybeans are considered hypogeal plants.
- T / F 24. At least 400 seeds shall be tested for germination except in the case of mixtures where components present to the extent of 15 percent or less may be tested at 200 seeds.

### Fill in the blank

25. In seed laboratory practice, \_\_\_\_\_ is defined as the emergence and development from the seed embryo of those essential structures that, for the kind in question, are indicative of the ability to produce a normal plant under favorable conditions.

a. Germination

26. A cold, moist treatment applied to seeds to overcome dormancy prior to the germination test is \_\_\_\_\_.

b. Prechill

27. When light is prescribed in Table 6A, it should be provided by a cool white fluorescent or LED source. The illuminance for dormant seed should be \_\_\_\_\_ ft-c.

c. 75-125

What is the definition of the following in table 6A:

28. A. top of agar

29. B: between blotters

30. O: organic growing media

31. PP: **pleated filter paper**
32. TC: **on top of creped cellulose paper without a blotter**

### **Classify the following as Abnormal/Normal**

33. **AB** / N\_\_ Seedling that exhibits negative geotropism.
34. **AB** / **N**\_\_ Onion seedling that has the “knee” as well as other essential structures.
35. **AB** / N\_\_ Sweet corn seedling with a shoot that extends less than halfway up the coleoptile.
36. **AB** / N\_\_ Cotton seedling with yellowish areas on the root and the cotyledons are infected.
37. **AB** / **N**\_\_ Corn seedling with a coleoptile split more than 1/3 with an intact first leaf.
38. **AB** / **N**\_\_ Sunflower seedling with a hypocotyl lesion that does not extend into the conducting tissue.
39. **AB** / **N**\_\_ Wheat seedling covered with fungus from a fusarium infected seedling next to it.
40. **AB** / **N**\_\_ Soybean seedling with 2/3 of the cotyledon remaining.
41. **AB** / N\_\_ Seedling that is an albino no matter the crop type.
42. **AB** / **N**\_\_ Pepper seedling with the root bound in the seed coat.
43. **AB** / **N**\_\_ Radish seedling with 40% of the cotyledons necrotic.
44. **AB** / N\_\_ A lettuce seedling with no primary root but sufficient secondary roots.
45. **AB** / **N**\_\_ Dianthus seedling that has produced three cotyledons.
46. **AB** / N\_\_ Peanut seedling that contains less than one primary leaf.
47. **AB** / **N**\_\_ Watermelon seedling with a break in the cotyledons caused by test conditions.

### **Calculations**

Calculate the Pure Live Seed for this sample:

48. Pure seed= 98.23%; Germination = 45%; Dormant = 37%; Dead = 8%; Abnormal = 10%

- a. 90%
- b. 81%
- c. 45%
- d. 82%

49. The germination test results of a red clover sample are as follows:

	Germination %	Hard Seed %
Replicate 1	90	0
Replicate 2	89	1
Replicate 3	81	4
Replicate 4	92	2

What is the replicate tolerance for this test? Is a retest necessary?

- a. 13, yes
- b. 13, no
- c. 12, yes
- d. 12, no