2018-2019 Genetic Written PT – Answer Key

1.) True/False: The color intensity in ELISA is proportional to the amount of conjugate bound.

2.) True/ False:: The acceptable MINIMUM number of seeds used for a germination test is 500.

3.) True/ False: In a herbicide bioassay test, if the positive trait check sample is not growing or the negative trait check sample is growing normally, this is a sign that the test is proceeding as it should.

4.) True/False: During an ELISA test, the purpose of a wash buffer is to remove unbound materials and keep bound components stable.

5.) True/ False: Though antibodies are usually very specific, the antibody for the Soybean Mosaic Virus will bind to the Bt-Cry1Ab antigen.

6.) True/False: Pipette tips used in ELISA can be reused if you rinse them out first.

7.) True/False: ELISA substrates are sensitive to light and exposure to light must be minimized.

8.) True/False In herbicide bioassays, the check samples must be exposed to the same conditions as each replicate from the test sample.

9.) Herbicides can be formulated as all of the following except:

a. Dry Flowable
b. Dry Granules
c. Compressed Gas
d. Liquid

10.) Which herbicide bioassay method involves adding the herbicide to water that moistens the medium and placing the seeds on the medium, allowing them to sit for 7 days?

a. Presoak Method
b. Substrate Imbibition
c. Seedling Spray

11.) In herbicide bioassays, test sample growth could be irregular for all the following reasons except:

a. Seed quality is low
b. Herbicide concentration is too high
c. Wrong check sample was used
d. Test sample is not tolerant to the herbicide

12.) Which herbicide bioassay method involves an herbicide pretreatment before the seeds are placed on the germination medium?

a. Presoak Method
b. Substrate Imbibition
c. Seedling Spray

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13.) In which type of ELISA is the antigen coated directly to the plate?

a. Double Antibody Sandwich (DAS) ELISA
b. Compound Direct ELISA
c. Compound Indirect ELISA

14.) The values given for each well by a microplate spectrophotometer during quantitative ELISA represent:

a. Optical density
b. Concentration in ug/mL
c. Volume

15.) The first seed soak method for herbicide bioassay was used to select for herbicide tolerant plants on which crop?

a. Sulfonylurea tolerant soybeans (STS)
b. Imidazolinone tolerant corn (IMI)
c. Buctryl resistant cotton
d. Roundup Ready cotton

16.) Which part of "ELISA" refers to the antibody-antigen interaction?

a. Enzyme
b. Linked
c. Immuno
d. Sorbent
e. Assay

17.) What is the minimum number of seeds that need to be planted to report results at a 99% confidence level in herbicide bioassay?

a.) 300
b.) 400
c.) 500
d.) 600

18.) In ELISA, what explanations should be considered for no color present in the wells? (select all that apply)

a. wrong antibodies used,
b. wrong enzyme conjugate used,
c. substrate not added,
d. wrong substrate used,
e. wrong buffers used,
f. enzyme conjugated not added

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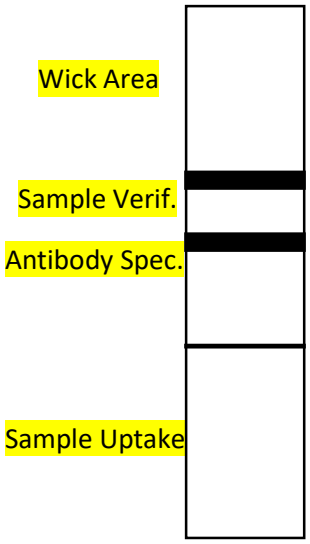
19.) Select the advantages of substrate imbibition. (all that apply)

A. automation of method,
B. ease of including check sample with each replicate,
C. less steps to plant
D. results available in 24 hours

20.) What are the advantages of the seedling spray method?

a. relates well to field conditions
b. turnaround time
c. seed quality is of less concern since only normal seedlings are sprayed
d. Cheapest method with little resources used.

21.) Labels the antigen-positive lateral flow strip with the following areas: wick area, sample verification area, antibody specific area, sample uptake area.



22.) How many grams of Lightning would you need to make one liter of 100 ppm stock solution from a 70% a.i. Lightning solution? Show your work.

x g Lightning (0.70 a.i.) / 1000 mL = 100 ppm
x g Lightning (0.70 a.i.) / 1000 mL = 0.0001
x g Lightning (0.70 a.i.) = 0.1
x g Lightning = 0.14 grams

23.) 4 normal non-trait seedlings, 2 abnormal seedlings, and 394 normal trait seedlings were obtained in a 400 seed test. What percentage of seedlings contained the desired herbicide trait?

400 seeds – 2 abnormals = 398 normal seeds
4 non-trait / 398 normal seeds = .010
0.010 x 100 = 1.0% non-trait

100% - 1.0% non-trait = 99.0% traited seeds

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24.) Which of the two most common ELISA enzyme conjugates is present is human and animal bodily fluids?

Alkaline phosphatase

25.) Name three symptoms non-trait soybeans could express when exposed to an herbicide.

Inhibition of secondary root growth and root hairs, shortened hypocotyl growth, browning of root and hypocotyl tissues, browning of root tip, inhibition of unifoliate leaf development

26.) What is the difference between how polyclonal antibodies and monoclonal antibodies are produced?

Polyclonal antibodies are produced by injecting animals with the target antigen. The animal's immune system responds to the introduction of foreign material by producing antibodies. After time, antibodies are collected and purified from the animal. The antibodies are then separated from the blood. This antiserum contains many different antibodies for the target antigen, thus the term "poly".

Monoclonal antibodies are produced by selecting antibody producing cells from an immunized mouse and hybridizing them with cells derived from myelomas creating "hybridoma" cells. The antibodies produced from such hybrid cells are identical to one another, thus the term "mono".

27.) Place the following components in order of reaction for use in Double Antibody Sandwich (DAS) ELISA. Enzyme conjugate, antibody, substrate, sample or antigen

1. Antibody
2. Sample or antigen
3. Enzyme conjugate
4. Substrate

28.) Name five crops that use herbicide traits.

Cotton, soybeans, corn, canola, sugar beets, rice

29.) Name three symptoms non-trait corn could express when exposed to an herbicide.

Inhibition of root growth, inhibition of secondary root growth, shortened shoot and root growth, browning of mesocotyl tissue, lack of chlorophyll development, clear coleoptiles with stunted plumule leaf growth

30.) What was the initial purpose of ELISA upon creation of the method?

The detection of seed-borne diseases

31.) You run an ELISA plate and the plate reader gives you the following optical density results for the first column – 0.984, 0.769, 0.039, 0.844, 0.046, 0.945, 0.052, & 0.799. How many would you consider as having a negative result?

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