2022-2023 SCST Genetic Technology Written AP Proficiency Test

1. One of the biggest issues with AP/LLP testing is _____.
    a. Reagent availability
    b. Sampling
    c. Equipment
    d. Cost

2. A U.S. based company produced a non-gmo seed corn variety and would like to sell it internationally to as many markets as possible. Which one test method should the company use to test for AP/LLP? (chose the one best answer)
    a. Qualitative Lateral Flow Strip
    b. Quantitative PCR
    c. ELISA
    d. Herbicide Bioassay

3. The object of sampling is defined by the International Rules for Seed Testing as "To obtain a sample of a size suitable for tests, in which…"
    a. "… the probability of a constituent being present is determined only by its level of occurrence in the seed lot"
    b. "… the probability of a constituent being present is determined only by its level of occurrence in nature"
    c. "… the probability of a constituent being present is determined both by its level of occurrence in the seed lot and its level of occurrence in nature"
    d. "… the probability of a constituent being present is determined by neither its level of occurrence in the seed lot nor by its level of occurrence in nature"

4. Too much template was added to your PCR. Which one of the following may occur to your sample?
    a. Excessive annealing
    b. Sample contamination
    c. Polymerase inhibition
    d. Repetitive sequences

5. Referring back to question #4, which of the following actions could NOT be reasonably expected to correct the issue?
    a. Reducing the number of cycles
    b. Increasing the denaturation time
    c. Increasing the denaturation temperature
    d. Decreasing the denaturation time

6. Name the three components of deoxyribonucleotide
    a. mRNA, tRNA, rRNA
    b. DNA, RNA, protein
    c. DNA ligase, RNA polymerase, RNA primase
    d. 2-deoxyribose, nitrogenous base, phosphate backbone

7. The PCR product that you are looking for is called the _____.
    a. Primer
    b. Polymerase
    c. Template
    d. Amplicon

8. Adventitious presence testing:
    a. Refers to trueness to type and is measured as the percentage of contamination from seeds/genetic material of other varieties/species within a desired seed lot.
    b. Refers to the testing for the presence of expected genetically modified or naturally occurring traits in a seed lot.
    c. Determines the presence and/or quantity of GM material in products where the absence of GM material is desired.
    d. Refers to trueness to phenotype specifically and is measured during field inspections

9. What does the acronym SNP stand for in terms of genetic testing in seed?
    a. Simple Nucleotide Polymorphism
    b. Single Nucleotide Polymorphism
    c. Six Nucleotide Protein
    d. Single Number Polynucleotide

10. What are the three stages of PCR?
    a. priming, reaction, measurement
    b. denaturation, annealing, synthesis
    c. optimization, selection, amplification
    d. setup, isolation, recovery

11. Which bacterium was the *Taq* DNA polymerase isolated from?
    a. *Thermus aquaticus*
    b. *Agrobacterium tumefaciens*
    c. *Saccharomyces boulardii*
    d. *Bradyrhizobia*

2022-2023 SCST Genetic Technology Written AP Proficiency Test

True or False:

12. The copy number of the DNA target is squared during each cycle of PCR.
    TRUE FALSE

13. It is very important that all dNTP concentrations are equal to prevent denaturing of bases.
    TRUE FALSE

14. It is acceptable to lay a pipet down on the countertop after filling the tip with sample so that you can open the microcentrifuge tube that you need to transfer the sample to.
    TRUE FALSE

15. A negative qPCR result may mean contamination is present at a lower level than the lower limit of detection of the test.
    TRUE FALSE

16. Multiplex PCR is the modification of conventional PCR in which two or more different PCR products are amplified.
    TRUE FALSE

17. DNA codes for the production of messenger RNA (mRNA) during transcription.
    TRUE FALSE

18. The terminator sequence switches on or off the expression of a gene.
    TRUE FALSE

19. Most genes are expressed only when and where they are needed.
    TRUE FALSE

20. One of the advantages of quantitative lateral flow strips is that protein from different traits expresses the same in different tissue types (seed or leaf).
    TRUE FALSE

2022-2023 SCST Genetic Technology Written AP Proficiency Test

Use the Qual Purity Estimation tab in SeedCalc8 answer the following 5 questions.
Seedcalc8 is a free application used for statistical analysis of seed testing.
It can be downloaded from the International Seed Testing Association website at:
https://www.seedtest.org/en/services-header/tools/statistics-committee/statistical-tools-seed-testing.html

A 400 seed herbicide bioassay is conducted on soybeans for a glyphosate tolerance AP/LLP test.
395 seeds germinated and were able to be evaluated in the assay.
389 seeds germinated, and 6 were nontolerant.
At the 95% confidence level.

21. What is the % Purity in the sample?
    a. 99.90%
    b. 98.46%
    c. 98.73%
    d. 98.62%

22. What is the upper bound of the true % impurity?
    a. 2.01%
    b. 1.05%
    c. 3.02%
    d. 3.45%

23. What is the lower bound of the true % purity?
    a. 96.98%
    b. 95.00%
    c. 3.02%
    d. 99.20%

24. What is the 2-sided Cl for true % purity?
    a. 96.67 to 99.43
    b. 0.08 to 1.13
    c. 98.87 to 99.92
    d. 1.00 to 99.00

25. When the desired confidence level is changed from 95% to 99% it does NOT affect the following
    a. Upper bound of true % impurity
    b. 2-sided CL for true % purity
    c. % purity in sample
    d. desired confidence level