2023-2024 Genetic PT

1. In Isoelectric Focusing, proteins separate based on their_____.

2. When extracting genetic material for GMO detection in seed, what is the target material?

   a) Plasmid DNA
   b) Genomic DNA
   c) Ribosomal DNA
   d) cDNA

3. True or False The copy number of the DNA target is squared during each cycle of PCR.

4. List the three components that DNA is made up of.

5. The genetic composition of an organism is known as its:

   a) gene pool
   b) allele
   c) genotype
   d) phenotype

6. An organism with two identical alleles for a give trait is:

   a) homozygous
   b) dominant
   c) segregating
   d) unusually rare

7. True or False F1 hybrids are usually more healthy and productive than their parents.

8. The phenotype of an organism refers to its:

   a) genetic makeup
   b) appearance
   c) ability to reproduce
   d) enzymatic structure

9. PAGE stand for_____?

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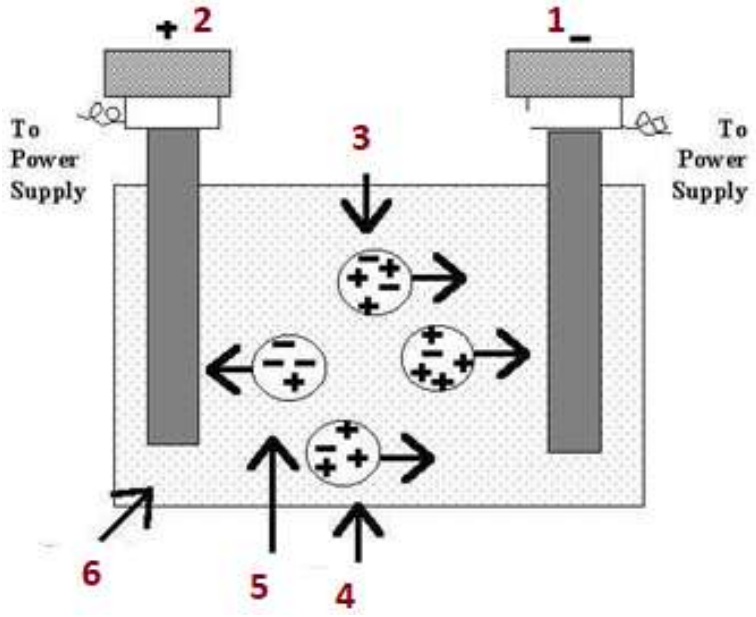
Label the parts of the basic electrophoresis configuration



10. Cation
    a) 1
    b) 2
    c) 3
    d) 4
    e) 5
    f) 6

11. Anion
    a) 1
    b) 2
    c) 3
    d) 4
    e) 5
    f) 6

12. Support Medium
    a) 1
    b) 2
    c) 3
    d) 4
    e) 5
    f) 6

13. Anode
    a) 1
    b) 2
    c) 3
    d) 4
    e) 5
    f) 6

14. Cathode
    a) 1
    b) 2
    c) 3
    d) 4
    e) 5
    f) 6

15. Protein Molecule
    a) 1
    b) 2
    c) 3
    d) 4
    e) 5
    f) 6

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16. List an advantage of starch gel electrophoresis.

17. List a disadvantage of starch gel electrophoresis.

18. List an advantage of SNP genetic purity testing.

19. List a disadvantage of SNP genetic purity testing.

20. What does the P in SNP stand for?
    a) Polyacrylamide
    b) Protein
    c) Polymorphism
    d) Parent

21. What is the PAGE detergent which denatures a protein and in doing so, causes proteins to develop a negative charge that is proportional to the size of the protein?
    a) Tween
    b) TRIS
    c) SDS
    d) PBS

22. SNP testing can be used to for applications such as
    a) Genetic purity
    b) Variety verification
    c) Genotyping
    d) All of the above

23. True or False The analyst cannot detect selfing of a hybrid tested with isozyme electrophoresis if the female and male parents have the same banding patterns on all loci tested.

24. Which loci can the analyst use to verify selfing of a hybrid tested with isozyme electrophoresis?

a b c d e f g h I j k l
m n o

Variety	Lot Number	Sample #	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
123	Female		4/4	4/4	4/4	7/7	4/4	6/6	6/6	3/3	16/16	12/12	12/12	2/2	5/5	9/9	4/4
789	Male		2/2	4/4	4/4	7/7	4/4	6/6	6/6	6/6	16/16	12/12	12/12	2/2	5/5	9/9	8/8
123789	Hybrid		2/4	4/4	4/4	7/7	4/4	6/6	6/6	3/6	16/16	12/12	12/12	2/2	5/5	9/9	4/8

Variety	Lot Number	Sample #	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
123	Female		4/4	4/4	4/4	7/7	4/4	6/6	6/6	3/3	16/16	12/12	12/12	2/2	5/5	9/9	4/4
789	Male		2/2	4/4	4/4	7/7	4/4	6/6	6/6	6/6	16/16	12/12	12/12	2/2	5/5	9/9	8/8
123789	Hybrid		2/4	4/4	4/4	7/7	4/4	6/6	6/6	3/6	16/16	12/12	12/12	2/2	5/5	9/9	4/8

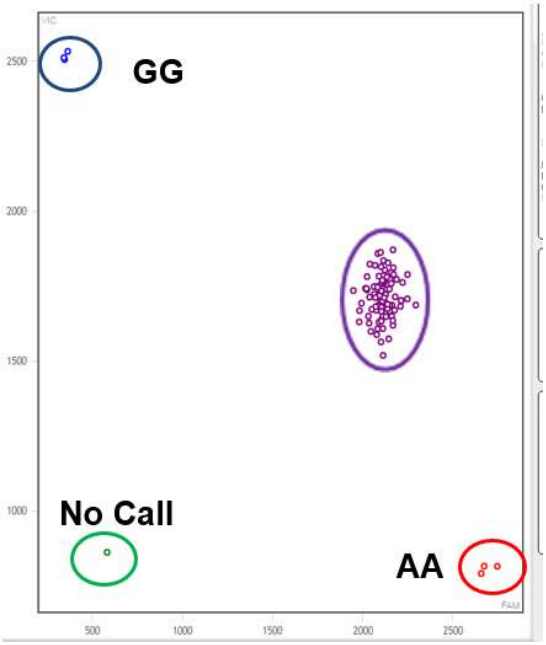
25. What is the % of total offtypes in these results?

# Seeds Tested	100
Variant	0
Female Selfs	1
Male Selfs	0
3L Offtypes	10
2L Offtypes	3

26. What is the % Total Purity?

# Seeds Tested	100
Variant	0
Female Selfs	1
Male Selfs	0
3L Offtypes	10
2L Offtypes	3

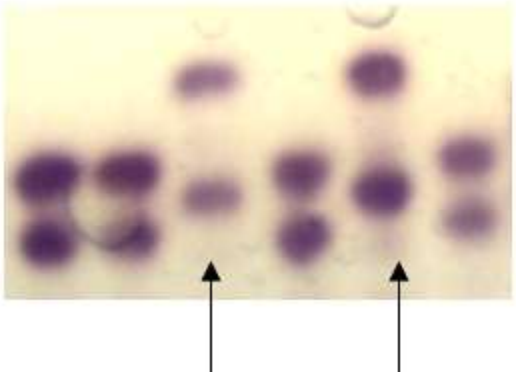
27. In this cluster plot, a hybrid was tested by SNP microarray. What is the expected phenotype of the purple cluster? _____



28. True or False To know if two unknown seeds are identical, an analyst should test at least 10 markers.

29. The hybrid in the arrows does not have genetics from either parent and is accounting for 20% of the seeds tested. What potential contamination has been evaluated?

_____



30. True or False Segregation in a seed population is desirable in a breeding program.