Mid Semester Examination (Monsoon Semester 2021)
Question Paper
Forensic Biotechnology

M.M 20 **Time 1:00 hr**

Section I

Instruction for Question 1-10: Choose the correct option to the following Questions. (1X10=10)

1. A genetic locus that is analyzed in many forensic and paternity testing laboratories is the human leukocyte antigen locus known as HLA-DQ alpha. There are four major alleles at this locus known as 1, 2, 3, 4,5,6 and 7. How many different genotypes are possible for these seven alleles?

A. 7
B. 14
C. 21
D. 28

2. Which of the following technique is used in DNA fingerprinting

A. Western blotting
B. ELISA
C. Northern blotting
D. Southern blotting

3. Short stretches of DNA used to identify complementary sequence in a sample is called

A. Probes
B. Markers
C. VNTRs
D. Minisatellites

4. The Y-STR's utility in the forensic sciences is that:

A. it is shorter by six bases on the Y chromosome then the X chromosome.
B. the frequency of occurrence in the general population is very small.
C. it originates only from a male donor of DNA.
D. replication of the DNA takes less than one hour.

5. Current forensic DNA typing procedures analyze STR loci that are found in non-coding regions of the human genome that are known as:

A. "Junk" DNA
B. HV1 regions
C. HV2 regions
D. HLA-DQA1

6. If one strand of the DNA molecule has the base sequence 5'-AAGG-3', what would be the base sequence on the other strand?

A. 3'-GCAT-5'
B. 3'-GGAA-5'
C. 3'-TTCC-5'
D. 3'-AAGG-5'

7. A child has the genotype 12, 15 at the THO1 STR locus, which of the following couples could be its parents?

A. Woman 3, 5; man 12, 10.
B. Woman 12, 15; man 8, 14.
C. Woman 10, 11; man 12, 15.
D. Woman 12, 10; man 8, 15

8. Comparing SNP markers to STR based analysis, which of the following are true?

A. For a given number of STR loci, it would require the same number of SNP loci to achieve the same discrimination.
B. For a given number of STR loci, it would require a higher number of SNP loci to achieve the same discrimination.
C. For a given number of STR loci, it would require a lower number of SNP loci to achieve the same discrimination.
D. SNP loci could not be used for DNA profiling.

9. Comparing SNP markers to STR based analysis, which of the following are true?

A. There are many more STR loci in the genome.
B. The number of SNP loci is about the same as the number of STR loci in the genome.
C. SNP loci generally have more alleles than STR loci.
D. There are many more SNP markers in the human genome than STR loci.

10. At the crime scene, if the body fluid stain suspected to be present on jeans then, it should be packed in

A. Plastic Bag
B. Paper Bag
C. Clothing Bag
D. Zip lock Bag

Section II

1. Illustrate the law of progressive change in terms of forensic science with suitable example? (1+1=2)

2. Spikes are the sharp peak generally found in an electropherogram with the alleles present on the STR loci. What are the reason of forming spikes and how can it be detected, while, the intensity of the spikes are very similar to alleles ? (1+1=2)

3. Why stuttering is observed in STR Profiling? How can it be detected in electropherogram? (1+1=2)

4. Describe the role of Phenol/chloroform, Proteinase K, EDTA and isopropyl alcohol in DNA extraction procedure? (1/2+1/2+1/2+1/2=2)

5. What do you understand by star activity. How can it affect to VNTR Profiling? (2)