

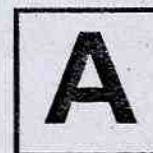
**DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO**

Booklet Serial No.

**000233**

**Test Booklet Series**


**TEST BOOKLET - 2022  
SCIENTIFIC OFFICER DNA  
(03)**



**Time Allowed: Two Hours**

**Maximum Marks: 120**

**INSTRUCTIONS**

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2. Please note that it is the candidate's responsibility to encode and fill in the Roll Number and Test Booklet Series Code A, B, C or D carefully and without any omission or discrepancy at the appropriate places in the OMR Response Sheet. Any omission/discrepancy will render the Response Sheet liable for rejection.
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4. This Test booklet contains **120** items (questions). Each item comprises of four responses (answers). You will select the response which you want to mark on the Response sheet. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **ONLY ONE** response for each item.
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6. All items carry equal marks.
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9. Sheets for rough work are appended in the Test Booklet at the end.
10. **Penalty for wrong answers:**  
**THERE WILL BE PENALTY FOR WRONG ANSWERS MARKED BY THE CANDIDATE.**
  - (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **0.25** of the marks assigned to that question will be deducted as penalty.
  - (ii) If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answers happens to be correct and there will be same penalty as above for that question.
  - (iii) If a question is left blank, i.e., no answer is given by the candidate, there will be no **penalty** for that question.

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**SEAL**



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1. The genetic code of a particular organism uses 4 base codons, out of which the 3rd base is completely unimportant and not informative. If each codon is associated with just one amino acid. And there exists a single stop codon, how many amino acids can possibly be used by the organism for protein synthesis?
  - A) 63
  - B) 255
  - C) 32
  - D) 20
  
2. A large segment of DNA was PCR amplified using a pair of primers. When the amplified product was run on a gel, 3 distinct bands were obtained. The largest band was cut out from the gel and again PCR amplified using the same pair of primers as before. Again 3 bands were observed when the amplified product was run on a gel. What is the most probable reason for this?
  - A) The segment of DNA is unstable and tends to break down into three fragments.
  - B) The segment of DNA is made up of 3 identical repeats.
  - C) The polymerase used for PCR amplification was a trimer with 3 identical subunits, hence the three bands in the amplified product.
  - D) The segment of DNA can associate with itself to form dimers or trimers.
  
3. mRNA will form hybrids only with the coding strand of DNA because
  - A) DNA contains phosphate group at 5' end that will not reanneal at high temperatures
  - B) DNA contains hydroxy group at 3' end that will not reanneal at low temperatures.
  - C) RNA:DNA hybridization follows the base-pairing rules
  - D) Denatured DNA is a helical structure and will not reanneal to form hybrid
  
4. Which of the following is a false statement?
  - A) Archaeobacteria mostly grow in the harsh habitat
  - B) Several bacteria are pathogenic
  - C) Viruses are cellular organism
  - D) Anabaena belongs to the group cyanobacteria
  
5. The rate of migration of the DNA fragments through an agarose gel is determined by the
  - A) Number of nucleotides in the fragment
  - B) Ratio of adenine to cytosine in the fragment
  - C) Hydrogen bonds between base pairs
  - D) Volume of the sample



6. According to Chargaff's rule, the concentration of guanine always equals that of the concentration of cytosine. A segment of double-stranded DNA has 120 adenine and 120 cytosine bases. What will be the total number of nucleotides present in the segment?
- A) 60
  - B) 480
  - C) 120
  - D) 240
7. During the synthesis of DNA by DNA polymerase, which of the following phosphate groups of the deoxynucleotide triphosphates (dNTPs) is incorporated into the DNA?
- A) Alpha
  - B) Beta
  - C) Gamma
  - D) Epsilon
8. In a phenol-chloroform method for DNA extraction, the DNA is separated in the
- A) Interphase
  - B) Organic layer
  - C) Aqueous layer
  - D) Precipitate
9. Short sequence of DNA used for identification of complementary sequence is called as
- A) Probe
  - B) Marker
  - C) Aptamer
  - D) Expressed sequence tag
10. Phase-contrast microscopy is preferred over bright-field microscopy to study
- A) Stained Samples
  - B) Colourless samples
  - C) Viruses
  - D) Plant cells
11. Which one of the following techniques cannot be used to determine the molecular weight of a protein?
- A) UV absorption
  - B) Light Scattering
  - C) Viscosity
  - D) Osmotic Pressure Measurement



12. A double-stranded DNA will be more stable in
- A) Pure Water
  - B) 0.05 M NaCl
  - C) 1 M urea
  - D) 20% formamide
13. Suppose white-furred rabbit breeds with a black-furred rabbit and all of their offspring have a phenotype of gray fur. What does the gene for fur colour in rabbits appear to be an example of?
- A) Mosaicism
  - B) Codominance
  - C) Incomplete dominance
  - D) Complete dominance
14. FTA card can be used in
- A) Collection and storage of blood
  - B) Confirmatory test of blood
  - C) Digestion of DNA
  - D) Ligation of DNA
15. Plasmids are
- A) Extrachromosomal self-replicating DNA molecules
  - B) Not extrachromosomal DNA molecules
  - C) Chromosomal DNA molecules
  - D) Extrachromosomal RNA molecules
16. Competent bacteria can
- A) Replicate
  - B) Incorporate naked DNA
  - C) Survive in presence of antibiotics
  - D) Remain dormant for thousands of years
17. DNA differs from RNA in having
- A) Presence of deoxyribose sugar
  - B) Presence of thymine base
  - C) Property of replication
  - D) All the above



18. DNA Molecules make a complete turn after every
- A) 20 Å
  - B) 38 Å
  - C) 3.4 Å
  - D) 34 Å base pairs
19. Which of the following enzyme is required to release the tension imposed by the uncoiling of strands?
- A) Endonuclease
  - B) DNA helicase
  - C) DNA ligase
  - D) DNA gyrase
20. DNA fingerprinting is based on
- A) Occurrence of VNTR's
  - B) Cloned DNA
  - C) Knowledge of human karyotype
  - D) Recombinant DNA
21. A nucleotide is formed of
- A) Pentose sugar, phosphate and nitrogen base
  - B) Pentose sugar and phosphate
  - C) Phosphate and a nitrogen base
  - D) Pentose sugar and nitrogen base
22. Restriction endonuclease is employed for cutting
- A) A single-stranded DNA
  - B) RNA fragment
  - C) Double-stranded DNA
  - D) mRNA
23. Which type of nucleotide is employed in the Sanger sequencing method?
- A) Nucleotide lacking oxygen at 5' carbon
  - B) Nucleotide lacking oxygen at 3' carbon
  - C) Nucleotide lacking oxygen at 3' and 2' carbon both
  - D) Nucleotide lacking oxygen at 3' and 4' carbon



24. The technique utilizing probes for the specific DNA sequences is known as
- A) Southern blot
  - B) Northern blot
  - C) Western blot
  - D) Eastern blot
25. Which of the following are pyrimidines?
- A) Adenine and cytosine
  - B) Guanine and thymine
  - C) Cytosine and thymine
  - D) Adenine and thymine
26. Which is the source of most inherited mitochondrial DNA in an organism?
- A) The nucleus of the sperm
  - B) The nucleus of the egg
  - C) The cytoplasm of the sperm
  - D) The cytoplasm of the egg
27. Which one of the following enzymes join the DNA molecule?
- A) DNA polymerase
  - B) Restriction endonuclease
  - C) DNA ligase
  - D) Topoisomerase
28. Polymerase chain reaction (PCR) is used for
- A) Cutting a specific gene
  - B) Amplification of specific DNA sequence
  - C) Sequencing the DNA
  - D) Amplification of specific protein
29. Restriction endonucleases are obtained from
- A) Plants
  - B) Flowers
  - C) Nematodes
  - D) Bacteria
30. Mitochondrial DNA is
- A) Simple, double-stranded linear DNA molecule
  - B) Simple, single-stranded circular DNA molecule
  - C) Simple, single-stranded linear DNA molecule
  - D) Simple, double-stranded circular DNA molecule



31. How the supercoiled DNA is melted during PCR?
- A) By helicase
  - B) By heating
  - C) By topoisomerase
  - D) All of these
32. The initiator codon for translation is
- A) GUA
  - B) AUG
  - C) UAA
  - D) AGG
33. Which of the following chemical is used for the Kastle-Meyer test?
- A) Benzidine
  - B) Phenolphthalein
  - C) Precipitin
  - D) Safranin
34. Which of the following would be accepted as legal proof of paternity?
- A) ABO blood type evidence
  - B) HLA typing evidence
  - C) Kastle-Meyer test evidence
  - D) Similarity in hair colour
35. In the acid phosphatase test, the seminal stains produce
- A) White colour
  - B) Pink colour
  - C) Red colour
  - D) Purple colour
36. Individual producing A, B and H blood group-specific substances in body fluids are called as
- A) Lewis's negative
  - B) Secretors
  - C) Lewis's positive
  - D) Non-secretors
37. The inner mitochondrial membrane possesses
- A) NADH dehydrogenase complex
  - B) Cytochrome oxidase complex
  - C) b-c1 complex
  - D) All of above



38. Which is a semiautonomous organelle in the cell?
- A) Golgi bodies
  - B) Peroxisomes
  - C) Mitochondria
  - D) Lysosome
39. The pH of the lysosome is
- A) Acidic
  - B) Basic
  - C) Variable concerning the cellular condition
  - D) Neutral
40. Which antibody is known for an allergic reaction?
- A) IgM
  - B) IgE
  - C) IgG
  - D) IgA
41. The three-dimensional shape of tRNA is
- A) L-shaped
  - B) X-shaped
  - C) Clover leaf-like
  - D) Y-shaped
42. Nucleic acid was analyzed and found to contain 32% A, 18% G, 18% C, and 32 % T. The nucleic acid must be
- A) Single-stranded RNA
  - B) Double-stranded RNA
  - C) Single-stranded DNA
  - D) Double-stranded DNA
43. The enzyme DNA polymerase can synthesize DNA in
- A) 3' to 5' direction
  - B) 5' to 3' direction
  - C) Both (A) and (B)
  - D) 5' to 2' direction



44. The enzyme required for removing RNA primer during DNA replication is
- A) DNA primase
  - B) DNA polymerase I
  - C) DNA ligase
  - D) DNA polymerase III
45. A Strand of DNA has a base sequence CATGACTAG. The base sequence on the resulting mRNA strand would be
- A) CAUUAGGAC
  - B) GTACTGATC
  - C) GUACUGAUC
  - D) UACACUGCU
46. What is the promotor site?
- A) The site where RNA polymerase binds to DNA.
  - B) The site where RNA polymerase binds to free nucleotides.
  - C) The site where RNA polymerase binds to protein.
  - D) The site where RNA polymerase binds to AAA.
47. The Shine-Dalgarno sequence is
- A) A short sequence on mRNA that acts as a ribosomal binding site
  - B) The open reading frame of a gene
  - C) The other name for a stop codon UAG
  - D) None of these
48. Which of the following isoenzymes is used for forensic protein profiling?
- A) Esterase K
  - B) Adenosine dekeratinase
  - C) Erythrocyte acid phosphatase
  - D) All of these
49. Differential extraction method does not work well in
- A) Azoospermic semen
  - B) Dried vaginal fluid stains
  - C) Dried semen stains
  - D) None of these



50. Common PCR inhibitors in forensic cases are
- A) Proteins
  - B) Haemoglobin and indigo dyes from denim
  - C) Leukocytes
  - D) Albumins
51. The tips of the Y chromosome are also called as
- A) The pseudoautosomal repeats
  - B) The pseudoautosomal regions
  - C) Nonrecombining portion
  - D) None of these
52. Agarose gels have relatively large pore sizes and are used for separating
- A) Larger protein molecules
  - B) Larger DNA molecules
  - C) Smaller RNA molecules
  - D) Smaller protein molecules
53. Polymerase chain reaction takes place in three steps. They are in order of
- A) Annealing, synthesis, denaturation
  - B) Denaturation, annealing, synthesis
  - C) Synthesis, annealing, denaturation
  - D) Denaturation, synthesis, annealing
54. DNA microarrays are used for
- A) Sequencing the DNA
  - B) Gene expression analysis in genome
  - C) Sequencing the Protein
  - D) Cutting the tissue
55. What would the generally expected effect on the PCR reaction be of adjustments that decrease the temperature of the annealing phase and the length of the elongation phase?
- A) Precision and yield will be reduced
  - B) Precision will be reduced, but yield will be increased
  - C) Precision will be increased, but yield will be reduced
  - D) Precision and yield will be increased



56. What outcome would you least expect if the amount of template in a multiplex PCR fell significantly below the optimal amount?
- A) Longer targets amplify poorly or fail to amplify
  - B) Allelic drop out
  - C) Increased yield
  - D) Heterozygote imbalance
57. What is the minimum threshold limit for peak detection in STR profiling?
- A) 10
  - B) 20
  - C) 50
  - D) 150
58. Which of the following kit can differentiate the distant cousin sisters?
- A) Global Filer
  - B) Powerplex Fusion 6C
  - C) Investigator Argus X-12 QS
  - D) Investigator 24plex
59. Which kit can be used for the reliable differentiation of forensic samples derived from related individuals?
- A) Investigator HDplex
  - B) Powerplex Fusion 6C
  - C) Investigator Argus X-12 QS
  - D) AmpFISTR Identifiler Direct
60. In fluorescence, the emitted light
- A) Has higher wavelength than the absorbed light
  - B) Lower wavelength than the absorbed light
  - C) Is polychromatic
  - D) Has more energy than the absorbed light



61. Which of the following is NOT the correct reason why DNA quantification is required in forensic cases?
- A) A narrow concentration range works best with multiplex short tandem repeat (STR) typing.
  - B) Too much DNA results in overblown electropherograms that make interpretation of results more challenging and time consuming to review.
  - C) Extracted DNA contains a lot of Non-human DNA.
  - D) Multiplex PCR of target DNA is highly sensitive and do not require an optimum quantity .
62. Why there is no detectable fluorescence in the samples after the first few PCR cycles?
- A) Because Taq polymerase degrades the TaqMan probe molecules.
  - B) Because Taq polymerase degrades the primers.
  - C) Because there is no DNA synthesis.
  - D) Because the fluorescence detector is not sensitive enough to detect real signal in the background of the noise.
63. Why fluorescence does not increase after cycle 30 in real time PCR?
- A) Because all primer molecules have been used
  - B) Because all TaqMan probe molecules have been used.
  - C) Because all template molecules have been used.
  - D) All of these
64. What maximum analytical threshold is set for STR chromatogram analysis
- A) 10
  - B) 50
  - C) 150
  - D) 250
65. What is the full form of FRET?
- A) Frequency Resonance Energy Transfer
  - B) Frequency Resistance Energy Transfer
  - C) Fluorescence Resonance Energy Transfer
  - D) Fluorescence Resonance Energy Termination
66. The PCR cycle number at which signal can be discriminated from background noise is referred to as
- A) CT - threshold cycle
  - B) Cp - crossing point
  - C) TOP - take-off point
  - D) All of these



67. Which is the correct formula for the calculation of fold increase/decrease in the gene expression level?
- A)  $2^{-\Delta CT}$
  - B)  $2^{-(\Delta CT)}$
  - C)  $2^{\Delta CT}$
  - D)  $2^{-\Delta CT-2}$
68. Which of the following control is used for the detection of the presence of inhibitors in the samples?
- A) No Template control
  - B) Positive control
  - C) Blank
  - D) IPC
69. Which passive dye is used for signal normalization in Real-Time PCR?
- A) SYBR Green
  - B) ROX
  - C) VIC
  - D) PET
70. Which polymorphism is used in DNA profiling?
- A) Sequence Polymorphism
  - B) Size Polymorphism
  - C) SNP
  - D) Copy number variations
71. Which of the following characteristic is not correct for any forensic DNA markers?
- A) Should be highly polymorphic (varying widely between individuals)
  - B) Should be easy and cheap to characterize
  - C) Should give profiles that are simple to interpret and easy to compare between Laboratories
  - D) Should be under any selective pressure
72. Which markers are highly polymorphic?
- A) Amelogenin
  - B) VNTRs
  - C) STRs
  - D) All of these



73. Which of the following markers is used for sex determination in humans?
- A) TPOX
  - B) SE33
  - C) VWA
  - D) AMEL
74. How many markers are there in the latest CODIS set of STRs?
- A) 13
  - B) 15
  - C) 20
  - D) 24
75. The DNA isolated by the Chelex® method is not suitable for RFLP because
- A) It is degraded
  - B) It is single-stranded
  - C) It is highly coiled
  - D) It has RNA contamination
76. Which agent is used to inhibit the action of nucleases during DNA extraction
- A) SDS
  - B) Chloroform
  - C) EDTA
  - D) Proteinase K
77. What will heterozygous single nucleotide substitution look like on your chromatogram?
- A) Two peaks of equal height at the same position
  - B) One peak twice the height of those around it
  - C) Three peaks of equal height at the same position
  - D) Two peaks in the same position, one twice the height of the other
78. Which gel is used for RFLP analysis?
- A) Agarose
  - B) Polyacrylamide
  - C) Cellulose
  - D) Silica



79. Which of the following factors does not influence electrophoretic mobility?
- A) Molecular weight
  - B) Shape of molecule
  - C) Size of molecule
  - D) Stereochemistry of molecule
80. The charge of the tracking dye used in the electrophoresis of DNA should be
- A) Positive
  - B) Negative
  - C) Neutral
  - D) Amphiphilic
81. If you want to separate a DNA molecule in the range of 20 bp - 100 bp, which of the following gels is the best choice?
- A) Agarose
  - B) Polyacrylamide
  - C) 1.5% Agarose
  - D) Silica gel
82. Which of the followings acts as a chain terminator in Sanger Sequencing?
- A) Exonuclease
  - B) Deoxyribonucleotide
  - C) Dideoxyribonucleotide
  - D) Bovine Serum albumin
83. Which of the following reagents is used to denature the DNA before electrophoresis in Sanger sequencing?
- A) 1 M Urea
  - B) Formaldehyde
  - C) Deionized Formamide
  - D) Glutaraldehyde
84. Which of the following is a chemical sequencing method?
- A) DNA chip sequencing
  - B) Edman's Method
  - C) Sanger's Method
  - D) Maxam Gilbert Method



85. In automated Sanger's sequencing method
- A) Fluorescently labeled dNTPs are used
  - B) Radio labeled dNTPs are used
  - C) Radio labeled ddNTPs are used
  - D) Fluorescently labeled ddNTPs are used
86. How many primers are used in the cycle sequencing reaction of Sanger's Method?
- A) 1
  - B) 2
  - C) 3
  - D) 4
87. Which of the following methods is the best method for human DNA quantification during forensic DNA analysis?
- A) Nano-spectrophotometer
  - B) qPCR
  - C) Microplate Reader
  - D) Fluorimeter
88. Nucleic acids absorb the maximum radiation at
- A) 230 nm
  - B) 260 nm
  - C) 250 nm
  - D) 280 nm
89. Which is the most stable form of DNA in normal physiological conditions?
- A) A-DNA
  - B) Z-DNA
  - C) C-DNA
  - D) B-DNA
90. If two molecules of DNA have the same length of nucleotide but the different compositions of nucleotides,
- A) Both the molecule will migrate at the same distance on agarose gel
  - B) The molecule with higher GC the content will migrate faster on agarose gel
  - C) The molecule with lower GC content will migrate faster on agarose gel
  - D) The molecule with higher GC content will not migrate at all on agarose gel



91. Which of the following statements about DNA ligase is false?
- A) It forms a phosphodiester bond between a 5' hydroxyl and a 3' phosphate in duplex DNA
  - B) It requires a cofactor, either NAD<sup>+</sup> or ATP, depending on the source of the enzyme.
  - C) It catalyzes its reaction by a mechanism that involves the activation of a DNA phosphate through the formation of an adenylated intermediate.
  - D) It is required for in DNA replication.
92. Heat-denatured DNA exhibits \_\_\_\_\_ UV absorbance as compared to double-stranded DNA.
- A) Increased
  - B) Identical
  - C) Decreased
  - D) Cannot be determined
93. On the genetic map, distances between markers are measured in terms of
- A) Hertz
  - B) Centimorgans
  - C) Decibel
  - D) Base pairs
94. In a double-stranded DNA, which of the following ratios is/are always equal to 1? A, T, G, and C denote the number of bases.
- A)  $(A+T)/(G+C)$
  - B)  $(A+G)/(T+C)$
  - C)  $A/G$
  - D)  $(G+T)/(A+C)$
95. Both strands of a DNA molecule are labeled with radioactive thymidine and are allowed to duplicate in an environment containing non-radioactive thymidine. The number of DNA molecules that will contain radioactive thymidine after three duplications is
- A) 2
  - B) 4
  - C) 6
  - D) 8
96. The total number of DNA molecules present after 5 cycles of polymerase chain reaction (PCR) starting with 3 molecules of template DNA is \_\_\_\_\_.
- A) 24
  - B) 48
  - C) 96
  - D) 72



97. Match the entries in Group I with the entries in Group II

**Group I**

- P) DNA replication
- Q) Genetic code
- R) Life on Earth
- S) DNA as Genetic material

**Group II**

- 1) Hershey and Chase
- 2) Miller and Urey
- 3) Meselson and Stahl
- 4) Nirenberg and Khorana

A) P-2, Q-1, R-3, S-4

B) P-3, Q-4, R-2, S-1

C) P-4, Q-3, R-2, S-1

D) P-3, Q-4, R-1, S-2

98. If the SARS-CoV-2 virus possesses DNA as the genetic material,

- A) It cannot be detected by qPCR.
- B) It will require the reverse transcriptase for infection.
- C) It can be detected by normal PCR
- D) Both (A) and (B)

99. Which one of the following techniques/tools is NOT used for inserting a foreign gene into a cell?

- A) DNA microarray
- B) Electroporation
- C) Gene gun
- D) Microinjection

100. Which one of the following BLAST search programs is used to identify homologs of a genomic DNA query in a protein sequence database?

- A) blastp
- B) blastn
- C) blastx
- D) tblastn

101. 5' capping of mRNA transcripts in eukaryotes involves the following events: Addition of GMP on the 5' end Removal of  $\gamma$ -phosphate of the triphosphate on first base at the 5' end 5'-5' linkage between GMP and the first base at 5' end addition of methyl group to the N7 position of guanine

- A) P, Q, R, S
- B) P, R, Q, S
- C) Q, P, R, S
- D) Q, P, S, R



102. Which of the following accreditations is required for an analytical laboratory?
- A) ISO 17025:2005
  - B) ISO 9001:2005
  - C) NABH
  - D) FDA
103. What is the full form of SWGDAM?
- A) Social Working Group in DNA Analysis Methods
  - B) Scientific Working Group in DNA Advances Methods
  - C) Scientific Working Group in DNA Analysis Methods
  - D) Social Working Group in DNA Advance Methods
104. Which region of mitochondrial DNA is useful for forensic investigation of humans?
- A) 16S rRNA
  - B) COI
  - C) D-loop
  - D) CytB
105. The alleles having the same length but the different sequence is known as \_\_\_\_\_.
- A) Heterozygous alleles
  - B) Homozygous alleles
  - C) Silent alleles
  - D) Isoalleles
106. In genetic analyzer, the light source is \_\_\_\_\_.
- A) Halogen lamp
  - B) Laser
  - C) UV-Lamp
  - D) Mercury lamp
107. The capillary used in the DNA sequencer is made up of \_\_\_\_\_.
- A) Gold
  - B) Glass
  - C) Platinum
  - D) Silver
108. The sample loading process in the Sanger method is known as \_\_\_\_\_.
- A) Electrokinetic injection
  - B) Electroporation
  - C) Electro charging
  - D) Electrothermy



109. Which method is used for the extraction of DNA from vaginal swabs in rape cases?

- A) Magnetic bead-based extraction
- B) Phenol-chloroform Method
- C) Automate Express Method
- D) Differential extraction

110. The existence of various polymorphism in DNA is due to

- A) Mutation
- B) Crossing over
- C) Migration
- D) Both (A) and (B)

111. Which of the following cells cannot be used for DNA fingerprinting?

- A) WBC
- B) RBCs
- C) Macrophages
- D) Neurons

112. Which of the following contains the highest amount of DNA per ml?

- A) Blood
- B) Semen
- C) Saliva
- D) Serum

113. DNA binds reversibly with silica gel in the presence of

- A) Anionic ions
- B) Cationic ions
- C) Chaotropic salts
- D) Acidic solution

114. Which region of the Y-Chr is very difficult to sequence?

- A) PAR
- B) Heterochromatin region
- C) SRY region
- D) Euchromatic region



115. Which of the following is not a lineage marker?
- A) mtDNA markers
  - B) Amelogenin
  - C) Y-STRs
  - D) X-STRs
116. In mitochondrial DNA analysis, if there are two or more nucleotide differences between the questioned and known samples, the samples can be
- A) Excluded
  - B) Included
  - C) Inconclusive
  - D) None of these
117. When a person carries two types of mitochondrial DNA, it is known as
- A) Heteroplasmy
  - B) Homoplasmy
  - C) Heterogamy
  - D) Homogamy
118. Which of the following is NOT true for an ideal STR marker?
- A) High discriminating power with observed heterozygosity about 70%
  - B) Separate (or widely spaced) chromosomal locations to ensure that closely linked loci are not chosen
  - C) Robustness and reproducibility of results when multiplexed with other markers
  - D) High mutation rate
119. What is the ideal quantity of DNA templates for STR typing?
- A) 1 ng
  - B) 10 ng
  - C) 100 ng
  - D) 1000 ng
120. Which of the following is NOT a PCR inhibitor?
- A) Heme
  - B) Bile salts
  - C) Humic acid
  - D) Glucose



## **ROUGH WORK**



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