

**S/SO/2013/16**

**FORENSIC SCIENCE & FORENSIC SEROLOGY**

<b>Roll No.</b>						<b>BOOKLET NO.</b>	<b>16044</b>
Candidate should write his/her Roll No. in the box above. ↑						<b>Total No. of Questions : 150</b>	
<b>Time : 2 Hours]</b>		<b>No. of Printed Pages : 40</b>				<b>[Total Marks : 300</b>	

**INSTRUCTIONS FOR CANDIDATES**

1. *All* questions are compulsory.
2. *All* questions carry equal marks.
3. The question paper contains **150** questions. The examinee should verify that the requisite number of questions are printed in the question paper, otherwise he should ask for another question paper.
4. The cover page indicates the number of printed pages in the question paper. The examinee should verify that the requisite number of pages are attached in the question paper otherwise he should ask for another question paper.
5. Read carefully the instructions given on the answer-sheet supplied and indicate your answers accordingly.
6. Kindly make necessary entries on the answer-sheet only at the places indicated and nowhere else.
7. Examinees should specially pay attention that **2** marks will be awarded for correct answer.
8. Examinees should do all rough work on the space meant for rough work on the last page of the question paper and nowhere else, not even on the answer-sheet.

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**Section A****(Forensic Science)**

1. Forensic Science is :
  - (A) Application of scientific methods and techniques for the purpose of justice
  - (B) Application of scientific methods and techniques for the purpose of law
  - (C) Application of scientific methods and techniques for police investigation
  - (D) Application of scientific methods and techniques for criminal investigation
  
2. Edmond Locard belonged to which country among the following ?
  - (A) USA
  - (B) UK
  - (C) France
  - (D) Vienna
  
3. Arrange the following in the proper order of investigation of crime at the scene of crime :
  - (i) Collection of clue material
  - (ii) Protection of scene of crime
  - (iii) Packing and labelling
  - (iv) Sketching and photographing of crime scene

*Codes :*

- (A) (ii), (iii), (iv), (i)
- (B) (ii), (iv), (i), (iii)
- (C) (i), (iv), (ii), (iii)
- (D) (iv), (ii), (iii), (i)

4. Why is photography the prerequisite in crime scene investigation ?
- (A) An unaltered condition
  - (B) To have it as a record for I.O.
  - (C) To keep it for future investigation
  - (D) To convince the court
5. Corroborative evidence is :
- (A) Evidence that refutes other evidence
  - (B) Evidence that links an individual with a particular location
  - (C) Evidence that supports other evidence
  - (D) Evidence that associates an individual with another individual
6. Which of the following statements is *not* true ?
- (A) Class characteristics enable an object to be placed into a particular category
  - (B) A class characteristic is one that enables an object to be uniquely identified
  - (C) A questioned sample is sometimes referred to as a disputed sample
  - (D) Individual characteristics are unique to a particular group

7. Which of the following statements is *true* ? The risk of contamination of evidence is controlled and/or minimized by :
- (A) Using chain of custody labels
  - (B) Minimising the number of people handling the evidence
  - (C) Opening each package in an area other than where it was originally sealed
  - (D) Storing packages in a dedicated secure area
8. The major limitation of crime scene reconstruction is that the evidence :
- (A) Can overwhelm the crime laboratory
  - (B) Usually provides less information than needed
  - (C) May have been staged
  - (D) Supports only one sequence of events
9. Why do forensic photographers often use scales in their photographs ?
- (A) They provide important information about the relative size of the objects
  - (B) They are particularly useful in courtroom situations
  - (C) Both (A) and (B) are correct
  - (D) They provide complete information

10. What do you mean by Hash in respect of Computer Forensics ?
- (A) Mathematical formula that generates a numerical identifier based on input data
- (B) If any bit of the input data changes, the output number changes
- (C) Both (A) and (B) are involved
- (D) None of the above is correct
11. Which of these instruments produces unique fragmentation pattern and works like Fingerprint for drug identification ?
- (A) GLC (B) HPLC
- (C) MS (D) AAS
12. The IR spectrum of a compound is equivalent to :
- (A) Fingerprint (B) DNA typing
- (C) Specific in identification (D) Invaluable
13. Narco-analysis technique is against which Article of Indian Constitution ?
- (A) Article 7 (B) Article 21(3)
- (C) Article 20(3) (D) Article 22(3)

14. Many ultra wide-angle or very short focal length lenses are known as :
- (A) Fish-eye lenses (B) Wide-eye lenses  
(C) Shallow lenses (D) A class lenses
15. Atomic absorption spectroscopy is used for the analysis of :
- (A) Solvents (B) Volatile compound  
(C) Non-metallic elements (D) Metallic elements
16. FTIR stands for :
- (A) Fourier Transform IR spectroscopy  
(B) Fourier Transmittance IR spectroscopy  
(C) Former Transform IR spectroscopy  
(D) None of the above
17. The device used for measuring brain response in brain fingerprinting is :
- (A) Electroencephalograph (B) Electroencephalogram  
(C) CT Scan (D) MRI

18. The rate of migration of a molecule in electrophoresis depends on :
- (A) Strength of the field
  - (B) Net charge, size and shape
  - (C) Ionic strength and viscosity
  - (D) All of the above
19. Among the following detectors used in HPLC which is considered as a universal Detector :
- (A) The UV detector
  - (B) The fluorescence detector
  - (C) The refractive index detector
  - (D) The electrochemical detector
20. Among the following which is the least important factors affecting the reproducibility of  $R_f$  values in TLC :
- (A) Stationary phase
  - (B) Mobile phase
  - (C) Temperature
  - (D) Development distance
21. A difference in the two indices of refraction exhibited by some crystalline materials is called :
- (A) Double refractive index
  - (B) Reflection
  - (C) Birefringence
  - (D) None of these

22. The microspectrophotometer employs the light :
- (A) UV (B) IR  
(C) Oblique light (D) None of these
23. The scientist who gave chromatography concept was :
- (A) Berzelius (B) Avogadro  
(C) Tswett (D) Lavosier
24. An examination of the development stages of the insects present on the decomposing corpse may yield valuable information about :
- (A) The circumstances surrounding the death  
(B) The post-mortem interval  
(C) The identification of the deceased  
(D) The age of the deceased
25. The scientific name of chiru is :
- (A) *Antilope cervicapra* (B) *Vulpes bengalensis*  
(C) *Capra aegagrus* (D) *Pantholops hodgsonii*



26. The most versatile detector available today is :
- (A) FID (B) NPD  
(C) MS (D) None of these
27. Substances having nearly equal values of Lambda maximum can be differentiated by :
- (A) UV visible spectrophotometry  
(B) HPLC  
(C) GC  
(D) Derivative spectrometry
28. Beer-Lambert's law gives a linear correlation with positive gradient between :
- (A) Absorbance and concentration  
(B) Absorbance and wavelength  
(C) Molar extinction coefficient and absorbance  
(D) Molar extinction coefficient and concentration
29. The light that has all its waves pulsating in unison is called :
- (A) Laser (B) Oblique light  
(C) UV light (D) IR rays

30. In order to determine RI of glass which microscope is used ?
- (A) Polarizing microscope (B) Compound microscope  
(C) Hot stage microscope (D) Stereomicroscope
31. Dr. Lawrence A. Farewell discovered :
- (A) Narco analysis (B) Brain fingerprinting  
(C) DNA fingerprinting (D) Polygraphy
32. As we travel from visible region to radio waves in the electromagnetic spectrum, the frequency of rays :
- (A) Increases (B) Decreases  
(C) Remains constant (D) All are correct
33. Name the filters used in PLM beneath the stage :
- (A) Polarizer (B) Analyzer  
(C) Objective (D) None of these
34. All types of chromatography :
- (A) Have a stationary phase and a mobile phase  
(B) Have chromatograms with peaks on a chart  
(C) Can be used to separate explosive residues from the debris of an explosion  
(D) Have a liquid mobile phase

35. The substances that vaporizes at temperature not higher than 300 celsius should be analysed by :
- (A) GC (B) HPLC  
(C) MS (D) Py
36. In Forensic laboratory Pyrolysis-Gas chromatography can be used for the analysis of :
- (A) Paints only (B) Fibres only  
(C) Plastics and Rubber only (D) All of these
37. A stereoscopic microscope is used for :
- (A) Comparing tool marks  
(B) Separating useful evidence from contaminating materials  
(C) Examinations requiring high magnification  
(D) All of the above
38. Electron microscopes have higher powers of magnification than optical microscopes do because :
- (A) The human eye is more sensitive to electrons than to light rays  
(B) The electron beam displaces electrons in the specimen  
(C) The electron beam is not subject to refraction  
(D) The electron beam operates at shorter wavelengths than light does

39. The operating principle of the mass spectrometer :
- (A) Is a function of the ionization rate of the sample compound
  - (B) Is the same as the gas chromatograph but more accurate
  - (C) Depends on the mass to charge ration of ionized particles
  - (D) Was discovered in the 1960's
40. In Neutron activation analysis the sample is bombarded with :
- (A) Alpha rays
  - (B) Beta rays
  - (C) Gamma rays
  - (D) Neutrons
41. When the temperature of a liquid is raised :
- (A) Its RI increases
  - (B) Its RI decreases
  - (C) Its RI disappears
  - (D) Its RI remains constant
42. In Frye Vs. United States :
- (A) The trial judge admitted the results of the systolic blood pressure deception test, but he was reversed by the appeals court
  - (B) Frye was found not guilty of murder
  - (C) The appeals court set a standard of "general acceptance by the relevant scientific community"
  - (D) The US Supreme Court ruled that the results of the deception test were inadmissible because of the decision in Daubert V. Merrill Dow

43. In microscopy, resolution is a measure of :
- (A) The ability of the lenses to separate two tiny details that are close together
  - (B) The total magnification power of the microscope
  - (C) The empty magnification of the microscope
  - (D) The ability of an electron microscope to determine the presence of a large number of elements
44. If a spectrophotometer has a photocell detector and xenon lamp source, it is a/an :
- (A) Mass spectrometer
  - (B) Infrared spectrophotometer
  - (C) Microwave instrument
  - (D) UV-visible spectrophotometer
45. The type of spectrometry that uses electrons to bombard a sample is :
- (A) Scanning electron microscopy
  - (B) Mass spectrometry
  - (C) Infrared spectrometry
  - (D) Microwave spectrometry

46. The parent peak in a mass spectrum refers to :
- (A) a substance used to calibrate the instrument
  - (B) the most abundant ion
  - (C) an ion that has lost two electrons
  - (D) the molecular ion
47. The part of the comparison microscope that allows the examiner to view two objects simultaneously is called the :
- (A) Comparator
  - (B) Comparison bridge
  - (C) Spectroscope
  - (D) Stage
48. In SEM, secondary electrons :
- (A) strike the object releasing other electrons
  - (B) strike the object and then reflect off the surface
  - (C) are emitted when a beam of primary electrons strikes the object
  - (D) are emitted by the nucleus of the various elements when the object is struck by a beam of X-rays
49. One of the major difference between GC and HPLC is that :
- (A) GC has liquid mobile phase
  - (B) GC uses columns to hold the mobile phase whereas HPLC does not
  - (C) GC columns are heated whereas HPLC columns are kept at room temperature
  - (D) HPLC always uses at least two liquids in its stationary phase

50. Potentiometry and colorimetry are ..... techniques.
- (A) Optical (B) Electrical  
(C) Chemical (D) Electro-chemical
51. Meta-analysis is :
- (A) Analysis of several analysis  
(B) Analysis of large data  
(C) Analysis of meaningful data  
(D) Attempt to test the data
52. Karl Pearson's coefficient is the method :
- (A) For studying correlation  
(B) For calculating probability  
(C) For sampling  
(D) For studying correlation and calculating probability
53. If a coin is tossed one time, what is the probability of occurring head ?
- (a)  $\frac{1}{2}$   
(b) 1  
(c) 0.5  
(d)  $\frac{2}{3}$
- (A) (a) is correct (B) (b) is correct  
(C) (a) and (c) are correct (D) (a) and (d) are correct

54. Wildlife (Protection) Act in India was enacted in :
- (A) 1974 (B) 1973  
(C) 1972 (D) 1970
55. India became signatory to CITES in :
- (A) 1977 (B) 1985  
(C) 1970 (D) 1976
56. Pugmark length or PML is :
- (A) The measurement between the outer edges of the first and last toe  
(B) The measurement from the tip of the farthest toe to the base of the pad along the line of walk  
(C) Both (A) and (B) are correct  
(D) None of the above
57. The National Academy of Sciences in the year 2009 issued a report on "The polygraph and lie detector" concludes that the evidence collected using it is :
- (A) Reliable and justified  
(B) Can be admitted in court as an evidence  
(C) Unreliable, unscientific and biased  
(D) None of the above



58. Narco analysis was first done by :
- (A) William Bleckwenn (B) Charles Darwin  
(C) Robert House (D) Mathew Orfila
59. In polygraph application irrelevant questions :
- (A) Draw out a stressed response  
(B) Evoke a deceptive response to a question  
(C) Establish a base-line of subject's guilty-free reaction  
(D) None of the above
60. Which of the following is considered to be an acceptable crime scene search pattern ?
- (A) A strip search (B) Spiral search  
(C) Quadrant search (D) All of these
61. Which of the following regions of mt. DNA is used for species identification ?
- (A) HV 1 (B) Cyt b  
(C) HV 2 (D) Loop
62. The examination of physical evidence by a forensic scientist is usually undertaken for :
- (A) Proving a suspect's innocence in a courtroom  
(B) Proving a suspect's guilty in a courtroom  
(C) Identification or comparison purposes  
(D) Assisting law enforcement in the apprehension of an offender

63. Computer forensics involves all of the following stated activities *except* :
- (A) Manipulation of computer data
  - (B) Interpretation of computer data
  - (C) Presentation of computer data
  - (D) Extraction of computer data
64. The forensic examination or analysis of static data (stored) is often called :
- (A) Computer forensics
  - (B) Media forensics
  - (C) Media analysis
  - (D) All of these
65. According to the analysis of digital evidence, what should be the best practice ?
- (A) Forensic examination performances directly
  - (B) Design an examination process
  - (C) Create one or more duplicates of the original evidences
  - (D) The documentation and data reduction steps
66. The analysis of digital evidence comprise phases :
- (A) Documentation
  - (B) Data recovery
  - (C) Data reduction and extraction
  - (D) All of the above

67. The process of use of standards and controls for digital evidence is substantially different than those used in other forensic discipline :
- (A) Digital evidence examiners do not compare unknown evidence with known reference materials obtained from a reliable source
  - (B) Digital examiners cannot run known material in conjunction with the unknown evidence
  - (C) The process varies among laboratories
  - (D) All the above are true about the standards and controls for digital evidence process

68. Arrange in a proper sequence :

- (i) Reverse phase chromatography
- (ii) Partition chromatography
- (iii) Adsorption chromatography
- (iv) Gas chromatography

*Codes :*

- (A) (iii), (ii), (iv) and (i) are correct
- (B) (i), (iii), (iv) and (ii) are correct
- (C) (ii), (iii), (i) and (iv) are correct
- (D) (iv), (iii), (ii) and (i) are correct

69. The various definitions of quality *do not* include :
- (A) The value-based approach
  - (B) The transcendent approach
  - (C) The manufacturing-based approach
  - (D) The minimum specification approach
70. Accreditation as defined by ISO is :
- (A) Third party attestation related to a conformity assessment body conveying formal demonstration of its competence to carry out specific conformity assessment tasks
  - (B) Third party attestation related to products, processes, systems or persons
  - (C) Establishment of the status, legitimacy or appropriateness of an institution, programme or module of study
  - (D) Process in which certification of competency, authority, or credibility is presented
71. Which was the first Forensic lab. in India that got accreditation from NABL in 2001 ?
- (A) Central Forensic Science Laboratory, Hyderabad
  - (B) Central Forensic Science Laboratory, Kolkata
  - (C) Central Forensic Science Laboratory, Chandigarh
  - (D) Central Forensic Science Laboratory, CBI, Delhi

72. NABL is an autonomous body in India under the aegis of :
- (A) Council of Industrial and Scientific Research
  - (B) Department of Science and Technology
  - (C) University Grants Commission
  - (D) Indian Standardization Institute
73. The ISO 9000 series on quality management and QA/QC was established in :
- (A) 1991
  - (B) 1985
  - (C) 1987
  - (D) 2000
74. The isoelectric point (pI) of an amino acid or protein is :
- (A) The pH at which the amino acid or protein has no net charge
  - (B) Zero at pH 7.0
  - (C) The pH at which amino acid or protein is neither hydrophobic nor hydrophilic
  - (D) The measure of the hydropathy of an amino acid or protein
75. By adding SDS (Sodium Dodecyl Sulfate) during the electrophoresis of proteins, it is possible to :
- (A) Determine a protein's isoelectric point
  - (B) Determine an enzyme's specific activity
  - (C) Preserve a protein's native structure and biological activity
  - (D) Separate protein's exclusively on the basis of molecular weight

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**Section B****(Forensic Serology)**

76. The principle "A person's blood can't have antibodies against his own cells" is given by :
- (A) Wassermann and Scheuetze      (B) Paul Uhlenhuth  
(C) Karl Landsteiner                      (D) None of these
77. The tools and techniques used in Forensic analysis should be :
- (A) Sensitive  
(B) Specific  
(C) Non-destructive as far as possible  
(D) All of the above
78. How much blood does healthy adult human being possess ?
- (A) 4-5 liters                                      (B) 10-15 liters  
(C) 15-20 liters                                      (D) 20-25 liters
79. Blood group of an individual is controlled by :
- (A) Haemoglobin                                      (B) Shape of RBCs  
(C) Shape of WBCs                                      (D) Genes

80. Red blood corpuscles (RBCs) are formed in :
- (A) Liver kidneys (B) Kidney  
(C) Bone marrow (D) Small intestine
81. The germs of diseases which enter into blood are destroyed by :
- (A) Platelets (B) White blood corpuscles  
(C) Red blood corpuscles (D) Capillaries
82. CASTLE MEYER TEST for blood testing is also known as :
- (A) Benzidine Test (B) Phenolphthalein Test  
(C) Haemochromogen Test (D) None of these
83. Blood consists of :
- (A) Erythrocytes (B) Leucocytes  
(C) Thrombocytes (D) All of these
84. A person's blood will *not* have any antibodies if its blood group is :
- (A) A (B) B  
(C) C (D) AB



85. Life of a human blood is :
- (A) 30-40 days (B) 100-120 days
- (C) 150-170 days (D) 15 hours
86. Titer is required to check :
- (A) Antisera (B) Cells
- (C) Proteins (D) Enzymes
87. Which of the following are *not* components of blood ?
- (A) Plasma (B) Blood cells and platelets
- (C) Semin protein (D) All of these
88. The  $P^{30}$  test is used to identify conclusively the stains of :
- (A) Saliva (B) Urine
- (C) Vaginal secretion (D) Semen

89. Full form of VNTR is :

- (A) Variable Number of Tendon Repeats
- (B) Variable Number of Tensile Repeats
- (C) Variable Numericals of Tendon Repeats
- (D) Ventricular Number of Tendon Repeats

90. Secretion of Seminal vesicle in male reproductive organs is :

- (A) Acidic in nature
- (B) Alkaline in nature
- (C) Neutral in nature
- (D) Variable in nature

91. Secretion of Prostate gland in male reproductive organs is :

- (A) Acidic in nature
- (B) Alkaline in nature
- (C) Neutral in nature
- (D) Variable in nature

92. Mucin test is conducted to identify :

- (A) Semen
- (B) Menstrual blood
- (C) Saliva
- (D) Urine

93. Creatine test is to identify :
- (A) Urine (B) Saliva  
(C) Semen (D) Blood
94. Colostrum is linked to :
- (A) Body fluid (B) Gene  
(C) Enzyme (D) None of these
95. Fibrinogen and LDH are used for identification of :
- (A) Saliva (B) Semen  
(C) Menstrual blood (D) All of these
96. In vasectomies person, the secretion of the ..... is missing.
- (A) Seminal vesicle (B) Vas deference  
(C) Prostate gland (D) Cowper's gland
97. Saliva converts :
- (A) Starch into glucose (B) Starch into glycogen  
(C) Lubricate the food (D) Both (B) and (C)

98. Serum proteins are :

- (A) Gm (B) Km  
(C) Both (A) and (B) (D) None of these

99. Species origin can be determined by :

- (A) Precipitin tube technique (B) Cross over electrophoresis  
(C) Double diffusion technique (D) All of these

100. Cellular antigens are :

- (A) ABO (B) Km  
(C) Hp (D) Transferrin

101. Blood group 'O' represents :

- (A) No antigen (B) Both antigens  
(C) No antibodies (D) Both antibodies

102. In absorption Elution Technique the percentage of indicator cell is :

- (A) 10% (B) 5%  
(C) 2% (D) 0.25%

103. Which of the following techniques is preferred to determine the ABO blood group from saliva ?
- (A) Absorption Inhibition Technique
  - (B) Absorption Elution Technique
  - (C) Mixed Agglutination Technique
  - (D) None of the above
104. In Absorption Elution Technique, the chilled saline is used :
- (A) To increase the speed of the reaction
  - (B) To decrease the speed of the reaction
  - (C) To avoid breaking of antigen and antibody bonds
  - (D) None of the above
105. Genes are positioned on thread like bodies :
- (A) Chromosomes
  - (B) Golgi bodies
  - (C) Ribosomes
  - (D) None of these

106. Human Male Sperm Cell contains ..... pairs of chromosomes.
- (A) 23 pairs (B) 32 pairs  
(C) 22 pairs (D) 13 pairs
107. In Rh blood group system C, c, D, e, E are :
- (A) Type of blood (B) Type of Rh antigen  
(C) Type of Rh antibody (D) None of these
108. Watson and Crick gave double helical structure of DNA molecule in :
- (A) 1960 (B) 1953  
(C) 1925 (D) 1990
109. Which one of the following is responsible for transferring the genetic information from one generation to the next ?
- (A) Codon (B) DNA  
(C) RNA (D) mRNA

110. Which of the following techniques is *not* used in DNA Analysis ?

- (A) RFLP (B) Y-STR  
(C) SNPs (D) Birefringence

111. Parentage can be established by :

- (A) Blood groups (B) Serum proteins  
(C) Isozymes (D) All of these

112. Isoenzymes typing can be performed with :

- (A) Cavity tiles (B) Electrophoresis  
(C) Chromatography (D) None of these

113. Which of the following cell types would *not* be suitable for DNA fingerprinting ?

- (A) Hair  
(B) Buccal (cheek) cells  
(C) Erythrocytes (mature red blood cells)  
(D) Skin cells

114. Uracil is replaced by ..... in RNA.
- (A) Thyamine (B) Adenine  
(C) Cytosine (D) Guanine
115. The 'Center of Excellence' for Biological Sciences CFSL is situated at :
- (A) Kolkata (B) Hyderabad  
(C) Chandigarh (D) Guwahati
116. The Rh blood group was discovered in :
- (A) 1959 (B) 1901  
(C) 1940 (D) None of these
117. The Rh antigens are found at :
- (A) Red Cells (B) White Blood Cells  
(C) Both (A) and (B) (D) None of these
118. In-vivo serological reactions are :
- (A) Outside the Body (B) Inside the Body  
(C) Both (A) and (B) (D) None of these



119. The M and N Blood Group antigens were discovered by :
- (A) Weiner (B) Landsteiner
- (C) Landsteiner and Levine (D) Murray and Clark
120. The operation to sterilize male is called :
- (A) Spermectomy (B) Tubectomy
- (C) Vasectomy (D) Hysterectomy
121. Fluid part of Blood is known as :
- (A) Serum (B) Plasma
- (C) Mucous (D) Serum and Plasma
122. Serum constitute of :
- (A) Blood group antigens (B) Blood group antibodies
- (C) Neither (A) nor (B) (D) Both (A) and (B)

123. Lattes test is for :

- (A) Reverse grouping of blood stains
- (B) Determination of species
- (C) Individualization technique
- (D) DNA profiling

124. The Duffy Blood group system is *not* very frequently used in Forensic Analysis, because :

- (A) Majority population has only one type of blood group
- (B) Many types of blood group exist in the given population
- (C) Antiserum is not available
- (D) All of the above

125. Disadvantage of RFLP technique :

- (A) Takes a lot of time
- (B) Requires large intact sample
- (C) Produces large (30,000 base pair) DNA strand
- (D) All of the above

126. The Pyrimidine bases in DNA and RNA :
- (A) Cytosine (B) Thymine  
(C) Uracil (D) All of these
127. The ..... is a location in a genome where a short nucleotide sequence is organized as a tandem repeat.
- (A) Centromeres (B) Telomeres  
(C) Microsatellite (D) VNTRs
128. In DNA, the complementary bases of TAG are :
- (A) GAT (B) ATC  
(C) TAG (D) ATG
129. Sequential steps involved in DNA profiling :
- (A) Isolation, Amplification, Statistical Interpretation and Visualization  
(B) Isolation, Statistical Interpretation, Amplification and Visualization  
(C) Isolation, Visualization, Statistical Interpretation and Amplification  
(D) Isolation, Amplification, Visualization and Statistical Interpretation

130. Electroendosmotic property of a gel is used in :
- (A) Ring test (B) Cross over electrophoresis  
(C) Both (A) and (B) (D) None of these
131. In Absorption Inhibition Technique, the positive results with Anti B indicate the :
- (A) 'A' Blood group (B) 'B' Blood group  
(C) 'AB' Blood group (D) 'O' Blood group
132. A healthy person has ..... erythrocytes in his blood.
- (A) 4 to 6 millions (B) 1.5 millions  
(C) 1 million (D) 0.5 million
133. Antibodies will react with :
- (A) Any antigen (B) Only specific antigen  
(C) Both (A) and (B) (D) RBCs

134. Gunzberg's test is to ascertain :

- (A) For the presence of free HCl
- (B) Preliminary test for vomit
- (C) Both (A) and (B)
- (D) To determine content of urine

135. Vomit test includes :

- (A) Presence of mucus
- (B) Free HCl
- (C) Endothelial cell
- (D) All of these

136. The term ..... describes the study of antigen antibody interaction.

- (A) Agglutination
- (B) Amplification
- (C) Phagocytosis
- (D) All of these

137. PGM-1 Enzyme 1-1 type is characterized by :

- (A) A and C bands
- (B) B and D bands
- (C) A and B bands
- (D) A, B, C and D bands

138. Multisystem of Electrophoresis to analyse Isoenzymes was developed by :
- (A) Wraxall and Stolorow                      (B) Culliford  
(C) Brinkmann                                      (D) Rothwell
139. Blood group can pass through one generation to another is discovered by :
- (A) Landsteiner                                      (B) Epstein and Ottenberg  
(C) Dungern and Hirzfield                      (D) Lutheran
140. DNA is supercoiled with :
- (A) Histone proteins                                (B) Gene  
(C) Carbohydrates                                 (D) No protein
141. The nucleotides are attached with sugar through :
- (A) Hydrogen bond                                 (B) N-glycosidic linkage  
(C) Phosphodiester bond                         (D) None of these
142. Which of the following techniques is most commonly used to separate DNA molecules by size ?
- (A) Chromatography                                (B) PCR  
(C) RFLP    (D) Gel electrophoresis

143. Variations in restriction enzyme cutting patterns of DNA from different individuals are called :
- (A) RFLP (B) VNTRs  
(C) Microsatellite (D) Minisatellite
144. DNA sequence is written from :
- (A) 3' to 5' (B) Left to right  
(C) Both (A) and (B) (D) 5' to 3'
145. Single-stranded DNA molecules that can bind to and be used to detect other DNA molecules are called :
- (A) Primers (B) LINES  
(C) STR (D) Probes
146. The DNA profiling database of offenders in USA are maintained by :
- (A) The Human Genome Project  
(B) APHIS  
(C) CODIS  
(D) Gene bank

147. Denature, Annealing and Thermocycling are related with :

- (A) RFLP (B) VNTRs  
(C) PCR (D) STRs

148. VNTR analysis involves :

- (A) Analyzing specific loci for 2 base repeating units usually less than 100 bp in size  
(B) Analyzing specific loci for 2 to 4 bp repeating units  
(C) PCR amplification of specific genes  
(D) Cutting DNA with restriction enzyme and analyzing the banding pattern of fragments

149. Indicate the antigen which is *not* related to RBCs :

- (A) A and B (B) M and N  
(C) Rh (D) HLA

150. Final opinion of DNA profile comparison can be :

- (A) Matching  
(B) Matching or exclusionary  
(C) Matching or exclusionary or inconclusive  
(D) None of the above