

Scientific Paper - II

FSA2

Booklet Series **A**

Register Number

2010  
FORENSIC SCIENCE

Time Allowed : 3 Hours ]

[ Maximum Marks : 300

Read the following instructions carefully before you begin to answer the questions.

IMPORTANT INSTRUCTIONS

1. This Booklet has a cover ( this page ) which should not be opened till the invigilator gives signal to open it at the commencement of the examination. As soon as the signal is received you should tear the right side of the booklet cover carefully to open the booklet. Then proceed to answer the questions.
2. This Question Booklet contains 200 questions.
3. Answer all questions.
4. All questions carry equal marks.
5. The Test Booklet is printed in four series e.g. **A** **B** **C** or **D** (See Top left side of this page). The candidate has to indicate in the space provided in the Answer Sheet the series of the booklet. For example, if the candidate gets **A** series booklet, he/she has to indicate in the side 2 of the Answer Sheet with Blue or Black Ink Ball point pen as follows :



6. You must write your Register Number in the space provided on the top right side of this page. Do not write anything else on the Question Booklet.
7. An Answer Sheet will be supplied to you separately by the Invigilator to mark the answers. You must write your Name, Register No. and other particulars on side 1 of the Answer Sheet provided, failing which your Answer Sheet will not be evaluated.
8. You will also encode your Register Number, Subject Code etc., with Blue or Black Ink Ball point pen in the space provided on the side 2 of the Answer Sheet. If you do not encode properly or fail to encode the above information, your Answer Sheet will not be evaluated.
9. Each question comprises four responses (A), (B), (C) and (D). You are to select ONLY ONE correct response and mark in your Answer Sheet. In case you feel that there are more than one correct response, mark the response which you consider the best. In any case, choose ONLY ONE response for each question. Your total marks will depend on the number of correct responses marked by you in the Answer Sheet.
10. In the Answer Sheet there are four brackets [ A ] [ B ] [ C ] and [ D ] against each question. To answer the questions you are to mark with Ball point pen ONLY ONE bracket of your choice for each question. Select one response for each question in the Question Booklet and mark in the Answer Sheet. If you mark more than one answer for one question, the answer will be treated as wrong. e.g. If for any item, (B) is the correct answer, you have to mark as follows :



11. You should not remove or tear off any sheet from this Question Booklet. You are not allowed to take this Question Booklet and the Answer Sheet out of the Examination Hall during the examination. After the examination is concluded, you must hand over your Answer Sheet to the Invigilator. You are allowed to take the Question Booklet with you only after the Examination is over.
12. Failure to comply with any of the above instructions will render you liable to such action or penalty as the Commission may decide at their discretion.
13. Do not tick-mark or mark the answers in the Question Booklet.

Tear here ✗ DO NOT TEAR THIS COVER OF THE QUESTION BOOKLET UNTIL YOU ARE ASKED TO DO SO ✗ Tear here

1. The chemically erased writings can be deciphered by using

- A) hand magnifier                      B) stereoscopic microscope  
 C) electrostatic detection apparatus    D) video spectral comparator.

2. Match **List I** correctly with **List II** and select your answer using the codes given below the lists :

**List I**

**List II**

- |                    |                                    |
|--------------------|------------------------------------|
| a) Normal phase    | 1. Hydrophobic small pore packing  |
| b) Reverse phase   | 2. Silica packing                  |
| c) Ion exchange    | 3. C <sub>18</sub> packing         |
| d) Small molecules | 4. Anion-cation exchange material. |

Codes :

- |    | <b>a</b> | <b>b</b> | <b>c</b> | <b>d</b> |
|----|----------|----------|----------|----------|
| A) | 2        | 3        | 4        | 1        |
| B) | 1        | 2        | 3        | 4        |
| C) | 4        | 3        | 2        | 1        |
| D) | 3        | 2        | 1        | 4.       |

3. Any object that contains handwriting or typewriting and whose source or authenticity is in doubt is referred to as

- A) questioned documents                      B) disputed documents  
 C) anonymous documents                      D) all of these.







22. The best Institute in India where neutron activation analysis can be done is
- A) Central Forensic Science Laboratory, Chandigarh
  - B) Bhabha Atomic Research Centre, Trombay.
  - C) Central Forensic Science Laboratory, Kolkata
  - D) None of these.
23. In Atomic absorption spectroscopy which of the following events occur(s) ?
- A) Evaporation of solvent leaving a solid residue
  - B) Solid dissociates into its atoms in ground state
  - C) Some atoms may be excited in the flame and attain a condition in which they radiate energy
  - D) All of these.
24. Prime factors for determining good colour prints are
- I. Contrast
  - II. Colour balance
  - III. Graininess
  - IV. Illumination.
- Of these*
- A) I alone is correct
  - B) I, II & III are correct
  - C) I & II are correct
  - D) II & IV are correct.
25. What is the colour temperature at the higher end ( 10000 K ) of the Kelvin scale ?
- A) Red
  - B) White
  - C) Blue
  - D) Yellow.

26. A method to decipher a painted message in a case is
- A) ultraviolet photography      B) infrared photography  
C) ultrafluorescence photography      D) ultraviolet reflected photography.
27. A suitable method to photograph in detecting additions and alterations made in a forged document is
- A) reflected UV photography      B) fluorescent photography  
C) infrared photography      D) none of these.
28. 'Reversal processing' means
- A) negative image is produced instead of positive  
B) positive image is produced instead of negative image  
C) no image is produced  
D) none of these.
29. Non-colour sensitized film(s) is/are sensitive to
- A) blue-violet regions      B) ultraviolet regions  
C) blue regions      D) all of these.
30. Which angle produces the maximum effect using a polarizing filter ?
- A) 90°      B) 80°  
C) 35°      D) 10°
31. Among the following, which lens is used for document evidence photography ?
- A) Macro lens      B) Normal lens  
C) Wide angle lens      D) None of these.





37. The crater shaped hole in glass on the side where the projectile has entered is
- A) wider
  - B) narrower
  - C) shallower
  - D) no difference.
38. The comparison of glass pieces by 'immersion method' using refractive index as a physical property is done with
- A) coconut oil
  - B) silicone oil
  - C) sulphuric acid
  - D) water and coconut oil.
39. The smaller lines perpendicular to the rib marks found at the fractured edges of the glass are called as
- A) Linear marks
  - B) Hackle marks
  - C) Griffith marks
  - D) Stress marks.
40. Where there have been successive penetrations of glass, it is frequently possible to determine the sequence of impact
- A) by observing the existing fracture lines and their points of termination
  - B) by observing the shape of the holes
  - C) by observing the size of the holes
  - D) by studying the rib and hackle marks at the cross-section of the fractured glass.
41. When a high-velocity projectile such as a bullet, penetrates a glass, it often leaves a
- A) round, crater-shaped hole surrounded by a nearly symmetrical pattern of radial and concentric fractures
  - B) irregular hole surrounded by a nearly symmetrical pattern of radial and concentric fractures
  - C) round, crater-shaped hole surrounded by a nearly asymmetrical pattern of radial fractures
  - D) irregular hole devoid of radial or concentric fractures.

42. The change in refractive index value for tempered and non-tempered glass, upon annealing, is
- A) significantly greater                      B) significantly lesser  
C) almost nil                                      D) none of these.
43. Laminated glass used as windshields in automobiles is usually made by
- A) sandwiching one layer of plastic between two pieces of ordinary window glass  
B) sandwiching one layer of paper between two pieces of ordinary window glass  
C) sandwiching a thin layer of iron mesh between two pieces of ordinary window glass  
D) sandwiching a thin layer of sun control film between two pieces of heat resistant glass.
44. Which one of the following is useful to estimate the range of fire ?
- A) Shot patterns                                      B) Wad distribution  
C) Powder patterns                                      D) All of these.
45. When a shot is fired from an automatic pistol the empty shell
- A) remains in the chamber                      B) invariably be found at the scene  
C) rarely found at the scene                      D) will be shattered into pieces.
46. Wads are used in the cartridge
- A) to keep the propellant and shot charge in their respective position  
B) to prevent escape of gases from the barrel  
C) to avoid reduction in velocity of projectiles  
D) all of these.









70. Match **List I** correctly with **List II** and select your answer using the codes given below the lists :

<b>List I</b>	<b>List II</b>
a) Shellac in alcohol	1. Easy separation
b) Talcum powder	2. Hastening material
c) Wire mesh	3. Cohesion among the particles
d) Common salt	4. Reinforcing material

Codes :

	<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>
A)	4	3	2	1
B)	3	1	4	2
C)	3	2	4	1
D)	4	2	1	3.

71. In a firearm case, the bullet and cartridge cases were recovered. The correct procedure for marking the identification ( initials ) to be made by the I.O. on the seized item will be

- A) initial the cartridge case on the base and the bullet on the sides
- B) initial inside of the cartridge case near bullet end and initial the bullet on the base
- C) both (A) & (B) are incorrect
- D) both (A) & (B) are incorrect.





77. The rifled firearm involved in a shooting incident can be determined by
- A) presence of rimfire cartridge
  - B) size and striations on outer surface of bullet
  - C) presence of land and grooves
  - D) all of these.
78. Arsenic metal poisoning is more evident by taking samples from
- A) hair
  - B) nails
  - C) both (A) & (B) are incorrect
  - D) both (A) & (B) are correct.
79. The correct system to be followed for Gun Shot Residue ( GSR ) collection is
- A) rubbing the right and left palms of the suspect with wooden shafted cotton swab with 5% nitric acid
  - B) rubbing the right and left palms of the suspect with plastic shafted cotton swab with distilled water
  - C) rubbing the right and left palms of the suspect with plastic shafted cotton swab with 5% nitric acid
  - D) all of these.
80. The order of steps to be followed by a forensic scientist in the scene of crime is
- A) Recognition, Documentation, Collection and Preservation
  - B) Documentation, Recognition, Collection and Preservation
  - C) Preservation, Recognition, Documentation and Collection
  - D) Recognition, Preservation, Documentation and Collection.

81. In genuine currency notes, the security thread is introduced
- A) at the time of printing
  - B) at the time of manufacture of paper
  - C) after printing
  - D) before printing.
82. What should not be done to the recovered tool marks ?
- A) To transport the tool to the laboratory
  - B) To make test tool marks at the crime scene
  - C) To take photographs of the tool
  - D) To protect the cutting portion of the tool.
83. Passing a jet of steam is to restore the obliterated marks on
- A) plastics
  - B) leather
  - C) wood
  - D) stainless steel.
84. How are punched marks made ?
- A) By engraving
  - B) By casting
  - C) By striking the metal surface with a die
  - D) By moulding.
85. Whether is it possible to restore a erased cast marks ?
- A) Possible
  - B) Sometimes possible
  - C) Always possible
  - D) Not possible.





97. Which is the world's largest Forensic Science Laboratory ?
- A) Central Investigation Agency
  - B) Central Forensic Science Laboratory
  - C) Federal Bureau of Investigation
  - D) None of these.
98. The French man who demonstrated how the principle enunciated by Gross could be incorporated within a workable laboratory, is
- A) Edmond Locard
  - B) Hans Gross
  - C) Albert S. Osborn
  - D) Leone Lattes.
99. Who undertook the first definitive study of fingerprint and developed a methodology of classifying them for filing ?
- A) Leone Lattes
  - B) Alphonse Bertillon
  - C) Francis Galton
  - D) Mathieu Orfila.
100. The Detective Novel 'A Study in Scarlet' was published in
- A) 1887
  - B) 1886
  - C) 1885
  - D) 1884.
101. Laser detection of fingerprints is done with
- A) argon laser
  - B) continuous wave of argon laser
  - C) neon laser
  - D) krypton laser.
102. Fingerprint loop pattern is subdivided into
- A) radial loop and ulnar loop
  - B) radius loop and ulnar loop
  - C) radial loop and ultimate loop
  - D) restored loop and ulnar loop.



108. The latent fingerprints developed with gold and red bronze powders are lifted on
- A) black tape
  - B) white tape
  - C) red tape
  - D) yellow tape.
109. In silver nitrate method of developing fingerprints, it reacts with
- A) sodium chloride in the fingerprint
  - B) sweat in the fingerprint
  - C) fat in the fingerprint
  - D) amino acid in the fingerprint.
110. Fingerprints dusted with metallic powders can be recorded by
- A) emission spectrography
  - B) absorption spectrography
  - C) emission electronography
  - D) atomic absorption spectrometry.
111. Physical developer fingerprint processing solution contains among other things
- A) Silver ions
  - B) Copper ions
  - C) Gold ions
  - D) Nickel ions.
112. The following are the sequences of examination and development of latent and bloody fingerprints on non-porous surfaces in crime scene. Identify the correct sequence.
- A) Optical detection techniques, aluminium powder, iodine spray, diaminobenzidine
  - B) Optical detection techniques, iodine spray, aluminium powder, diaminobenzidine
  - C) Optical detection techniques, diaminobenzidine, iodine spray, aluminium powder
  - D) Optical detection, iodine spray, diaminobenzidine, aluminium powder.

113. Latent fingerprint on cartridge cases can be developed by

- A) silver nitrate
- B) sodium chloride
- C) disodium hexapalladate
- D) physical developer.

114. The microscope which has the advantage of presenting a distinctive three-dimensional image of an object, is

- A) comparison microscope
- B) compound microscope
- C) stereo microscope
- D) polarizing microscope.

115. Empty magnification is referred to

- A) increasing the total magnification beyond 1000 times the numerical aperture of the objective being used in a microscope
- B) increasing the total magnification beyond 10 times the numerical aperture of the objective being used in a microscope
- C) increasing the total magnification beyond 100 times the numerical aperture of the objective being used in a microscope
- D) absence of objective lens in a microscope.

116. In compound microscope, the objective produces

- A) a real image of an object
- B) a virtual image of an object
- C) an enlarged virtual image of an object
- D) not an enlarged real image of the object.



117. For obtaining a total magnifying power of 40X, a microscopist should use
- A) an eyepiece of 10X in combination with an objective of 4X
  - B) an eyepiece of 10X in combination with an objective of 30X
  - C) an eyepiece of 10X in combination with an objective of 40X.
  - D) an eyepiece of 5X in combination with an objective of 40X.
118. A type of image that cannot be viewed directly is called
- A) virtual image
  - B) real image
  - C) image that is projected on to a motion picture camera
  - D) both (B) & (C).
119. 'Conoscopic observation' is possible in
- A) petrographic microscope
  - B) stereo microscope
  - C) binocular compound microscope
  - D) scanning electron microscope.
120. Three-dimensional image can be obtained in
- A) binocular compound microscopes
  - B) compound microscopes
  - C) stereo microscopes
  - D) both (A) & (C).
121. In Transmission Electron Microscope, the electrons used in forming the image
- A) pass through the sample
  - B) do not pass through the sample
  - C) are scanned across the sample in a raster pattern
  - D) both (A) & (C).

122. The purpose of explaining to the subject to be tested about the plans for a polygraph examination, a reasonable time in advance of the scheduled examination, is
- A) to give truthful person a chance 'to cool off'
  - B) to increase the apprehension of detection on the part of a lying subject
  - C) to allay whatever apprehension a truthful person may have with respect to physical harm from the instrument attachments
  - D) all of these.
123. Reid polygraph is an instrument used for recording
- A) change in blood pressure, pulse and respiration of a subject
  - B) the Galvanic Skin Reflex of a subject
  - C) certain muscular activity, particularly, muscular pressure exerted by the subject's body, forearms, thigh or feet
  - D) all of these.
124. The instrument which Cesare Lombroso used for detecting deception, was
- A) hydrosphygmograph
  - B) polygraph
  - C) polysomnograph
  - D) galvanometer.
125. The instrument that measures physiological changes of the body that are triggered by emotional responses to specific verbal questions is called
- A) brain mapping
  - B) brain fingerprinting
  - C) narco-analysis
  - D) polygraph.

126. Where a person is in police custody or deprived of his freedom in any significant way by the police, he must be told, prior to any interrogation (i) that he had a right to remain silent; (ii) that anything he said could be used against him; (iii) that he had a right to a lawyer; and (iv) that if he could not afford a lawyer, one would be provided for him without costs. This procedure is referred to as

- A) Miranda warnings
- B) Rule of discovery
- C) General rejection rule
- D) General inadmissibility rule.

127. The chief source of energy for the production of speech sound is

- A) expiratory air
- B) inspiratory air
- C) blood pressure
- D) either (A) or (B).

128. An instrument that converts speech into a visual graphic display is called as

- A) sound spectrograph
- B) video spectral comparator
- C) UV-VIS spectrograph
- D) either (A) or (B).

129. The polygraph is a technique used for

- A) detecting deception
- B) detecting lies
- C) obtaining information from an uncooperative suspect
- D) extracting information from the brain.

130. Phonetics is a subject that studies

- A) how humans speak
- B) how the speech is transmitted acoustically
- C) how the speech is perceived
- D) all of these.



136. Consider the following statements :

- I. The weight of the person has a great deal of influence on the rate of wear
- II. The manner in which a person walks also influences the wear
- III. The sex and body type of the wearer also can play a role in the wear
- IV. The occupation and habit of the wearer can also have impact on shoe wear.

*Of these statements :*

- A) I alone is correct
- B) I & II are correct
- C) I, II & III are correct
- D) all are correct.

137. Footwear random characteristic means

- A) intentional characteristics
- B) characteristics that depend upon chance
- C) characteristics specified during manufacture
- D) characteristics that are present on a new shoe.

138. Carbon paper can be used for lifting footwear residue impressions

- A) if the impression is tightly bound to the surface
- B) if the impression is not tightly bound to the surface
- C) if the impression is wet
- D) if the impression is dry.

139. Consider the following statements :

- I. It is normal for gait characteristics to vary within the same individual
- II. The gait characteristics change with increased speed of walking
- III. Gait characteristics will not vary within the same individual
- IV. There is no change in gait characteristics with increased speed of walking.

*Of these statements*

- A) I alone is correct
- B) I & II are correct
- C) I, II & III are correct
- D) all are correct.

140. Which one of the following is used as a releasing agent in footprint casting process ?

- A) Talc powder
- B) Shellac
- C) Plaster of Paris
- D) Dental stone.

141. Impressions of wet origin on dirty surfaces are lifted with

- A) Plaster of Paris
- B) dental stone
- C) commercial gelatin materials
- D) transparent tapes.

142.  $\beta$ -calcium sulphate hemihydrate is commonly known as

- A) Plaster of Paris
- B) dental stone
- C) silicone
- D) alginates.

143. The stones' compression strength ranges from

- A) 100 to 500 PSI
- B) 500 to 1000 PSI
- C) 1200 to 2000 PSI
- D) 8000 to 15000 PSI.

144. Front tyre stance is

- A) the distance between front axle and rear axle
- B) the distance between centre to centre of front tyres
- C) the distance between front left tyre and rear right tyre
- D) the distance between road surface and top of tyre.

145. The type of two-dimensional impression that occurs when a footwear deposits material on to a surface is

- A) positive impressions
- B) negative impressions.
- C) surface impressions
- D) sunken impressions.

146. Gait characteristics of a person are

- A) individual characteristics
- B) class characteristics
- C) neither individual nor class characteristics
- D) random characteristics.

147. When a vehicle hits a tree head on, the occupants of the vehicle will move

- A) backward with reference to the direction of impact
- B) forward with reference to the direction
- C) sideways with reference to the direction
- D) upwards with reference to the direction.

148. In motor vehicle accident cases paint smear at the point of contact is

- A) light and thin
- B) heavier
- C) strong and thick
- D) lighter.

149. In motor vehicle accidents wheel 'lock up' shows

- A) skid mark
- B) yaw mark
- C) collision mark
- D) acceleration mark.

150. A skid mark depends on factors including

- A) history of the motor-cycle
- B) type and conditions of the tyres
- C) conditions of road surface
- D) all of these.

151. In vehicular accidents paint smear along the direction of contact is heavier due to

- A) dragging
- B) heat and friction
- C) force
- D) collision.

152. To bring the vehicle to stop one has to

- A) reduce the kinetic energy of the vehicle to zero
- B) convert kinetic energy to some other than energy
- C) convert kinetic energy into another type of energy
- D) all of these.

153. The conservation of energy law shows that

- A) the total energy of the system at the beginning of the process is not equal to the total energy of the system at the end of the process
- B) the total energy of the system at the beginning of the process is equal to the total energy of the system at the end of the process
- C) both (A) & (B)
- D) none of these.



154. Cross-section of multilayered paint flakes indicate
- A) the number of layers of paint      B) the colour of each layer  
C) soil and debris inclusion      D) all of these.
155. The metallic paints in automobiles contain
- A) iron      B) lead  
C) aluminium      D) nickel.
156. In case of examination of typewritten documents, examination is possible because of
- A) the wear and tear of the typewriter  
B) the make and model of the typewriter  
C) typed by inexperienced typist  
D) all of these.
157. While obtaining the standard or request writing from the accused
- A) he should be shown the questioned document  
B) he should be provided with instructions to spell  
C) he should be corrected in his punctuations  
D) none of these.
158. Forged signatures may be
- A) traced      B) simulated  
C) simple forgery      D) all of these.



164. Jumping genes are also called as

- A) Pseudogenes
- B) Microsatellites
- C) Minisatellites
- D) Transposons.

165. The genetic material consists of

- A) nucleic acids
- B) amino acids
- C) protein molecules
- D) adenosine triphosphate.

166. While investigating a case of sexual assault on a post-pubescent virgin girl you observe blood drops at the scene of crime and recover blood stained clothing from the victim and accused because

- A) blood stain evidence would be useful to substantiate violence
- B) in the absence of seminal stains, blood stain would not be sufficient to prove sexual assault
- C) even in the absence of seminal stains, blood stain would be sufficient to prove the charge of sexual assault if epithelial cells are located in the blood stains
- D) blood stain would be useful in establishing the scene of crime beyond doubt.

167. Antibodies are carried in the

- A) Serum
- B) Plasma.
- C) Red Blood Cells
- D) White Blood Cells.

168. Precipitin test is also specific for

- A) blood
- B) tissues
- C) seminal fluid
- D) all of these.







188. The preliminary test done to identify the explosive substance in the scene of crime is

- A) Spot test
- B) Ion scan - 400
- C) X-ray
- D) Laboratory test.

189. Crater formation is significant of

- A) high explosive
- B) low explosive
- C) cracker composition
- D) gas cylinder explosion.

190. 1, 3, 5 trinitro 1, 3, 5 triazo cyclohexane is

- A) TNT
- B) Tetryl
- C) RDX
- D) HMX.

191. Double-base smokeless powder is/are

- A) Liquid explosive
- B) ANFO
- C) NC + NG ( Nitrocellulose + Nitroglycerine )
- D) Acetylene gas + Air mixture.

192. An I.E.D. is of

- A) service pattern
- B) any size or any shape
- C) designed by military personnel
- D) ballistically shaped device.

193. Dogs can sniff accelerants efficiently by

- A) taking longer duration of time
- B) covering small areas in short time
- C) covering large areas in short time
- D) by giving multiple breaks.

194. The mass of flame that detached from the fire and rise into the air is called

- A) pyrolysis
- B) fireball
- C) flash point
- D) none of these.

195. A chemical transformation in which heat energy is liberated, is referred to as

- A) exothermic reaction
- B) endothermic reaction
- C) heat of combustion
- D) explosion.

196. A substance that supplies oxygen to a chemical reaction is

- A) reducing agent
- B) oxidizing agent
- C) accelerant
- D) catalyst.

197. The minimum temperature at which a fuel burns is referred to as

- A) spark temperature
- B) starting temperature
- C) ignition temperature
- D) primary temperature.



198. A rug soaked in linseed oil is an example of

- A) exothermic reaction                      B) endothermic reaction  
C) spontaneous ignition                      D) all of these.

199. A typical burn pattern resulting from the use of liquid accelerants is called

- A) spalling                                      B) incendiarism  
C) puddling                                      D) both (A) & (B).

200. Thermochemistry is the study of

- A) how heat is propagated during chemical reaction  
B) how heat is generated during chemical reaction  
C) how heat is radiated during chemical reaction  
D) all of these.
-