

**Forensic Chemical Sciences****Answer Key****(Correct Answers are marked in bold letters)****Section - A****Forensic Aptitude**

1. Vijay Singh (Golf player) is from which country?
  - a) UK
  - b) USA
  - c) India
  - d) **Fiji**
  
2. Which of these is the plant important in sericulture?
  - a) Cassia
  - b) Legumes
  - c) Pea
  - d) **Mulberry**
  
3. Which of the following Himalayan regions is called "Shivalik's"?
  - a) Upper Himalayas
  - b) Lower Himalayas
  - c) **Outer Himalayas**
  - d) Inner Himalayas
  
4. United Arab Emirates is federation of how many Emirates
  - a) 6
  - b) **7**
  - c) 5
  - d) 8
  
5. Who amongst the following is a winner of Ramon Magsaysay Award?
  - a) Vinobha Bhave
  - b) Dara Khurody
  - c) Tribhuvandas patel
  - d) **All of the above**
  
6. Cinder Cone is a type of
  - a) Dress
  - b) **Volcano**
  - c) Human Disease
  - d) None of the above
  
7. Who of the following is not a hockey player?
  - a) Birendra Lakra

- b) Dhyan Chand  
c) Dhanraj Pillai  
d) **Bajrang Punia**
8. There are \_\_\_\_\_ views on the issue of giving bonus to the employees  
a) independent  
b) **divergent**  
c) modest  
d) adverse
9. What is the missing letter in this series?  
b e h k n ? t  
a) **q**  
b) r  
c) s  
d) u
10. There are twenty-four students in a certain class. For every nine girls there are three boys. How many girls and how many boys are there in the class?  
a) 19 and 5  
b) **18 and 6**  
c) 15 and 9  
d) 14 and 10
11. FISH: SCHOOL  
a) **wolf: pack**  
b) cow: farm  
c) herd: peacock  
d) elephant: jungle
12. While making Crime Scene Sketch location of interest on the walls or elsewhere in the enclosed space are best shown using  
a) Triangular method of sketching  
b) Base line method of sketching  
c) **Cross projection method of sketching**  
d) Compass point method
13. Magnification range from 2X to 250000X is possible from:  
a) Fluorescence microscope  
b) Polarizing microscope  
c) **Electron microscope**  
d) Stereo zoom microscope
14. Who conducts the assessment during the accreditation process?  
a) Lab technicians

- b) Competent authorities  
c) **External assessors**  
d) Police officers
15. Which principle emphasizes the use of Scientific methods and Techniques in Forensic Analysis?  
a) Frye Standard  
b) **Daubert Standard**  
c) Principle of Exclusion  
d) Alphonse Bertillon's Principle
16. What is the full form of RTGS?  
a) Ready Transaction and Gross Settlement  
b) **Real Time Gross Settlement**  
c) Real Transaction and General Settlement  
d) Real Transaction Gross Settlement
17. The founder of the Innocence Project, an organization dedicated to using DNA evidence to exonerate wrongfully convicted individuals, is:  
a) Dr. Michael Baden  
b) Dr. Henry C. Lee  
c) **Dr. Barry Scheck**  
d) Dr. Paul L. Kirk
18. If the sum of two number is 32 and their difference is 16, the smaller number would be  
a) 6  
b) **8**  
c) 16  
d) 18
19. In India Inquest in Dowry Death is done by  
a) Police  
b) Coroner  
c) **Magistrate**  
d) Medical examiner
20. Hands of a clock overlap/coincide in a day  
a) 24 times  
b) **22 times**  
c) 6 times  
d) 12 times
21. How many cores and deltas are present in a whorl  
a) **Two deltas and one core**  
b) One delta and two cores

- c) Two deltas and two cores  
d) One delta and one core
22. Detection of deception means  
a) Psychological profiling of a suspect  
b) Examining mental condition of suspect  
c) **To find out whether the suspect is misleading**  
d) To elicit number of crimes committed by the suspect
23. Order for exhumation can be given by  
a) District Collector  
b) Additional District Magistrate  
c) Sub-collector  
d) **Any of the above**
24. The Electromagnetic Spectrum's Infrared region stretches from:  
a) 380-740 nm  
b) 500-1mm  
c) 165-525 nm  
d) **760-1 mm**
25. Which of the following is used for three-dimension image?  
a) Compound Microscope  
b) Simple Microscope  
c) Transmission Electron Microscope (TEM)  
d) **Scanning Electron Microscope (SEM)**
26. Presence of a functional group in a compound can be established by using  
a) Chromatography  
b) **IR Spectroscopy**  
c) Mass Spectroscopy  
d) X-ray diffraction
27. Which of the following Microscope best for observing colorless cells  
a) Bright field microscope  
b) **Dark field microscope**  
c) Simple microscope  
d) Stereo microscope
28. A written or recorded statement made by someone who is not testifying in court is classified as:  
a) Physical evidence  
b) Demonstrative evidence  
c) **Hearsay evidence**  
d) Expert evidence

29. Which method involves searching a Crime Scene in a back-and-forth pattern, covering the area systematically?
- Spiral search method
  - Strip search method
  - Grid search method**
  - Quadrant search method
30. What is the purpose of using a baseline in Crime Scene sketching?
- To establish a reference line for measurements**
  - To indicate the direction of entry
  - To mark the location of evidence
  - To create a visual representation of the crime scene
31. What is the recommended procedure for Photographing individual pieces of evidence at a crime scene?
- Capture only one angle for each item
  - Use a flash for better visibility
  - Photograph each item in context and from multiple angles**
  - Avoid photographing evidence to prevent contamination
32. Which is the only nation to have won both the FIFA Football World Cup and the FIFA Women's Football World Cup?
- Brazil
  - Italy
  - Argentina
  - Germany**
33. These are Sketching methods in crime scene, except
- Rectangular co-ordinate method
  - Spiral co-ordinate method**
  - Triangular co-ordinate method
  - Polar co-ordinate method
34. In crime scene reconstruction, what does the term "trajectory analysis" refer to?
- The path of a projectile through space**
  - The sequence of events leading up to the crime
  - The psychological profile of the suspect
  - The time of day the crime occurred
35. ISO/IEC 17025 accreditation for forensic laboratories in India ensures:
- Adherence to forensic procedures only
  - Quality and competence in testing and calibration**
  - Compliance with international trade regulations

- d) Exemption from regulatory audits
36. Which technique is suitable for separating large DNA fragments or whole chromosomes?
- Agarose gel electrophoresis
  - SDS-PAGE
  - Pulse-field gel electrophoresis**
  - Capillary electrophoresis
37. What role does the loading buffer play in electrophoresis?
- Provides mechanical support
  - Enhances sample conductivity**
  - Separates molecules based on charge
  - Regulates temperature
38. Determine the mode of the decision received seven days in a row:  
11,13,13,17,19,23,25
- 11
  - 13**
  - 17
  - 23
39. Chromatic aberration is also known as
- Colour fringing**
  - Colour filter
  - Both a & b
  - None of the above
40. In which of the following causing death a human being will be Culpable Homicide not amounting to murder:
- Causing an injury which is likely to cause death
  - Doing something which so imminently dangerous that it will cause death in all probability
  - Injury which the offender knows that it is likely to cause death of the person to whom the harm is caused
  - causing Injury which is sufficient in the ordinary course of nature to cause death**
41. For which offence can the Police arrest without a court order?
- Cognizable offences**
  - Bailable offences
  - Detention offences
  - Non-cognizable offences

42. Which of the following fibre is of mineral origin?
- Mohair
  - Nylon
  - Asbestos**
  - Rayon
43. Which of the following measures the spread of data?
- Mean
  - Median and interquartile range
  - First and third quartiles
  - Standard deviation and variance**
44. The term 'Eddy Diffusion' is used in which of the following analytical techniques?
- Microscopy
  - Chromatography**
  - Spectrophotometry
  - Differential thermal analysis
45. In an air crash case, the following method of survey is most useful
- Strip method
  - Spiral method
  - Zonal method
  - Wheel method**
46. In SEM, the incident beam is focused by means of
- Lens
  - Mirrors
  - Electromagnets**
  - Slits
47. In the following question, find the correctly spelt word
- Quintessance
  - Quintesance
  - Quintessence**
  - Quintassence
48. Which of the following is a robust tool for Analysis of adulteration of Petrol, Diesel and Kerosene
- Gas chromatography**
  - Spectrophotometry
  - Thin layer chromatography
  - Electrophoresis

49. Which of the following is designed to control the operations of a computer?
- User
  - Application Software
  - System Software**
  - Utility Software
50. Which of the following is not a characteristic of a computer?
- Versatility
  - Accuracy
  - Diligence
  - I.Q.**

**Section-B**  
**Forensic Chemical Sciences**

51. What specific symptoms characterize McEwan's sign?
- Pulse is slow and temperature is subnormal
  - Pulse is rapid and temperature is high
  - Pupils dilated initially and slowly return to their original size**
  - Pupils contracted and rapidly return to their original size
52. What is McLafferty rearrangement observed in mass spectrometry?
- The loss of an alkane fragment by a cyclic rearrangement of a carbonyl compound with  $\gamma$ -hydrogen
  - The loss of an alkyne fragment by a cyclic rearrangement of a carbonyl compound with  $\gamma$ -hydrogen
  - The loss of an alkene fragment by a cyclic rearrangement of a carbonyl compound with  $\gamma$ -hydrogen**
  - The loss of an alkane fragment by a cyclic rearrangement of a carbonyl compound with  $\beta$ -hydrogen
53. Which compound is excreted in urine during parathion poisoning?
- P-nitrophenol**
  - O-nitrophenol
  - M-nitrophenol
  - None of the above
54. Which mode in GC-MS offers a sensitivity boost of 100-fold?
- Full scan mode
  - SIM mode**
  - MIC mode
  - EIC mode



55. Which statement is true about stand-off detection methods?
- Detection of devices and explosives after detonation
  - Detection of devices and explosives during detonation
  - Detection of devices and explosives before detonation**
  - None of above
56. What are the distinguishing features of solvents employed in NMR?
- It should be chemically inert.
  - It should not be magnetically isotropic.
  - It should dissolve the substance to a reasonable extent.
  - A and C both**
57. What does the number of signals in an NMR spectrum indicate or reveal?
- The number of the sets of equivalent protons in a molecule**
  - The number of the sets of equivalent electrons in a molecule
  - The number of the sets of equivalent neutrons in a molecule
  - All the above

58. Match the following:

	Poison	Toxic substance
1.	Rat poison	a. Lead arsenate
2.	Fungicides	b. Barium carbonate
3.	Cough syrup	c. benzoin
4.	Antiseptics	d. Codeine

- 1(a); 2(b); 3(d); 4(c)
  - 1(a); 2(d); 3(b); 4(c)
  - 1(b); 2(a); 3(c); 4(d)
  - 1(b); 2(a); 3(d); 4(c)**
59. What does the acronym QuEChERS stand for?
- Quick, easy, cheap, effective, rugged and safe**
  - Quick, easy, cheap, error free, rugged and safe
  - Quick, easy, cheap, effective, rapid and safe
  - Quick, easy, cheap, effective, rugged and slow
60. Which category is related to bending vibrations?
- Symmetric
  - Asymmetric
  - Rocking**
  - All of the above

61. Which color test is utilized to identify CO poisoning?
- Kunkel's test
  - Trinder reagent test
  - Hoppe-Seyler's test
  - A and C both**
62. In what spectral region do absorption bands for vinyl =C-H usually show up?
- 3100-3000 cm<sup>-1</sup>**
  - 2100-1000 cm<sup>-1</sup>
  - Below 1500 cm<sup>-1</sup>
  - None of above
63. Which statement is not true regarding Sinsemilla?
- First appeared in 1998**
  - A seedless and more potent form of cannabis
  - Produced from the unfertilized flowering tops of female cannabis plants
  - None of above
64. What is the fatal dose of aluminium phosphide, particularly with a 0.5 g tablet?
- 1-3 tablets**
  - 4-6 tablets
  - 6-8 tablets
  - 8-10 tablets
65. What chemical is needed to convert erythritol into ETN?
- KNO<sub>2</sub> and nitric acid
  - KNO<sub>2</sub> and sulfuric acid
  - KNO<sub>3</sub> and nitric acid
  - KNO<sub>3</sub> and sulfuric acid**
66. Which of the following is the most sensitive technique to isolate petroleum products without using any solvents?
- Solvent extraction
  - SPE
  - SPME**
  - Steam distillation
67. What specific reducing agent is included in blood when measuring carboxyhemoglobin levels via spectrophotometry?
- Sodium carbonate
  - Sodium nitrate
  - Sodium dithionite**
  - Sodium sulphate

68. What acids are utilized in the wet ashing procedure?
- Nitric, sulphuric and perchloric acids**
  - Hydrochloric, sulphuric and perchloric acids
  - Hydrochloric and sulphuric acids
  - Carboxylic and sulphuric acids
69. Which is the main metabolite of cocaine found in both blood and urine?
- Benzoyllecgonine**
  - Ecgonine
  - Ecgonine methyl ester
  - Cocaethylene
70. How can the problem of backflush be resolved in GC-MS?
- Using a smaller injection volume
  - Using a less expansive solvent
  - A lower injector temperature
  - All of the above**

71. Match the following:

	Plant poison	Active constituents
1	Naepala	a. Calotoxin
2	Bhilawa	b. Crotin
3	Madar	c. Ecgonine
4	Cocaine	d. Semecarpol

- 1(a); 2(b); 3(d); 4(c)
  - 1(b); 2(d); 3(a); 4(c)**
  - 1(b); 2(a); 3(c); 4(d)
  - 1(b); 2(a); 3(d); 4(c)
72. Which of the following instrumental technique is best suitable for fire debris analysis:
- HPLC
  - GC-MS**
  - FTIR
  - AAS
73. Which food overconsumption does lead to the Lathyrism disease?
- Maize
  - Kodra
  - Darnel
  - Kesari dal**
74. Which toxin does clostridium botulinum produce?

- a) **Enterotoxin**
  - b) Exotoxin
  - c) Thermolabile toxin
  - d) Cholera toxin
75. Which statement is correct about pathways of drug metabolism?
- a) Phase I include conjugation reactions and remove functional group
  - b) Phase I include conjugation reactions and oxidation
  - c) **Phase II include conjugation reactions and remove or mask functional group**
  - d) Phase II include oxidation and sulfoxide formation
76. What factors should be taken into account when conducting calibration for an IR spectrometer?
- a) Stray light
  - b) Absorbance scale
  - c) Time scale of measurement
  - d) **All of the above**
77. In what instances is a hair sample required?
- a) Species origin
  - b) Grouping
  - c) GSR analysis
  - d) **A and B both**
78. Why does hair cease to grow after death?
- a) **Drying and shrinkage of skin**
  - b) Swollen of skin
  - c) Blister on the skin
  - d) None of above
79. During the dry ashing method, what colour is assumed by the tissue sample in the presence of zinc residue?
- a) Blue colour
  - b) Red colour
  - c) **Yellow colour**
  - d) Bluish-green colour
80. What does PTFE stand for?
- a) Polytetrafluoroethane
  - b) **Polytetrafluoroethylene**
  - c) Polytetrafluoroepoxy
  - d) Polytetrafluoroethe

81. Which plant serves as the source of the drug Mescaline?
- Erythoxylem coca
  - Rye ergot
  - Peyote**
  - Dhakur
82. Which of following is the most appropriate sample to be preserved during an autopsy in case of poisoning by digitalis purpurea?
- Spleen
  - Uterus
  - Spinal cord
  - Heart**
83. Which of the following toxic salts of lead is known as “Sugar of Lead”?
- Lead acetate**
  - Lead monoxide
  - Lead chromate
  - Lead carbonate
84. What colour tests are employed for detecting opium?
- Meconic acid test
  - Porphyroxine test
  - Deninges oliver’s test
  - All of the above**
85. Which statement is true about anthracene?
- It is colourful substance and its electronic absorption spectrum lies in the UV region
  - Pure sample of anthracene when viewed in the UV light give off a red-visible light
  - It is colourless substance and its electronic absorption spectrum lies in the UV region**
  - None of the above
86. Which of the following precursor is used in the synthesis of amphetamines?
- N-methylformamide
  - methylamine
  - phenyl-2-propanone**
  - N-methyl-benzodioxol butanamine
87. Which of the following is correct combination of chemical names and their synonyms?
- Lead acetate: Litharge
  - Copper acetate: Verdigris
  - Antimony chloride: Butter of antimony
  - Mercuric sulphide: Cinnabar.**

88. On what does the intermolecular hydrogen bonds depend?
- Intensity
  - Frequency
  - Concentration**
  - None of above
89. What does Stoke's lines refer to?
- The line with higher frequency
  - The line with same frequency
  - The line with lower frequency**
  - The line without frequency
90. The correct order of analysis of petrol using TLC method
- Activation of TLC plate
  - Development and separation of petrol spot inside TLC chamber
  - Application of petrol spot to the plate
  - Visualization of developed TLC plate
  - Calculation of Rf value
- Choose the correct answer from the options given below:
- 1, 3, 4, 2, 5
  - 3, 1, 4, 2, 5
  - 3, 4, 1, 2, 5
  - 1, 3, 2, 4, 5**
91. Which solvents are commonly used in NMR spectroscopy?
- CS<sub>2</sub>
  - CDCl<sub>3</sub>
  - CCl<sub>4</sub>
  - All of the above**
92. Microscopic examination of leaves of which of the following plant shows the presence of cystolithic and glandular hair?
- Cannabis sativa**
  - Papaver somniferum
  - Digitalis purpurea
  - Nicotiana tabacum
93. How much energy potential is employed on the filament in GC-MS?
- 750 eV
  - 1000 eV
  - 70 eV**
  - 500 eV
94. What does "desolvation" signify?

- a) **Removal of the liquid mobile phase**
  - b) Incorporation of liquid droplets
  - c) Add solvents in mobile phase
  - d) Remove solvents from mobile phase
95. What does "internal standard" refer to?
- a) It is not expected to be normally present in the specimen being analyzed.
  - b) It is close in chemical structure to the analyte of interest.
  - c) It must be stable.
  - d) **All of the above**
96. What does isocratic elution mean in HPLC?
- a) Mixing of desired gas with the mobile phase
  - b) Changing the composition of mobile phase during analysis
  - c) Changing the column
  - d) **The composition of mobile phase remains constant throughout the analysis**
97. Which type of chromatography commonly utilizes a guard column?
- a) High performance thin layer chromatography
  - b) Size exclusion chromatography
  - c) Gel permeation chromatography
  - d) **High performance liquid chromatography**
98. What is mean of CHALCOSIS?
- a) **Presence of copper deposits in the tissues**
  - b) Presence of calcium deposits in the tissues
  - c) Presence of lead deposits in the tissues
  - d) Presence of zinc deposits in the tissues
99. What is the term used to describe the pigmentation that may occur in the cornea and cartilages due to hydroquinone and pyrocatechol?
- a) Carbolism
  - b) **Oochronosis**
  - c) Liquefaction necrosis
  - d) None of the above
100. Which type of poisoning does act so rapid that it has been commonly referred to as "knock out drops"?
- a) **Chloral hydrates**
  - b) Barbiturates
  - c) Rock oil
  - d) OMPA

101. Which of the following is used as dehydrating agent during the extraction of poisons from toxicological samples?
- Ammonium nitrate
  - Ferrous chloride
  - Ammonium sulphate**
  - Sodium tungstate
102. Which statement is true about split injectors?
- Split injectors are used for more concentrated samples**
  - High split ratios waste low amount of carrier gas
  - Insufficient analyte may reach the column due to high split ratios
  - The total flow through the injector may be from 10 to 100 mL/min
103. Which of the following is not true for atomic absorption spectrometry?
- It is a destructive technique
  - It can be linked to hybriide-generation system to analyse elements that forms gaseous hybrids
  - It allows for the simultaneous multi-element analysis**
  - It is quantitative technique
104. Complete given reaction:
- Arsine gas + .....  $\longrightarrow$  Red colour
- Copper foil
  - Ferrous hydroxide
  - Diphenyl carbazone
  - Diethyldithiocarbamate**
105. Which statement is true regarding carbinol?
- It is known as methyl alcohol**
  - It is not more toxic than ethyl alcohol
  - During metabolism, it is converted into acetaldehyde.
  - It is colorful liquid
106. What accurate information pertains to TATP?
- It is not an improvised homemade explosive
  - It is prepared by reacting the acetone and hydrogen peroxide in the presence of an acid catalyst**
  - It is not a friction and impact-sensitive explosive
  - It has not been used by terrorist organizations in Israel and other Middle Eastern countries
107. Which device is employed to search for traces of flammable liquid residues?
- Charcoal-coated strip



- b) Streamers
  - c) **Portable vapor detector**
  - d) A and B both
108. What is the oxygenated metabolite of parathion?
- a) N-acetyl-p-benzoquinoneimine
  - b) **Paraoxon**
  - c) p-phenetidine
  - d) Phenacetin
109. What procedures are typically involved in the illicit production of cocaine?
- a) Extraction of crude coca paste from the cocaine base
  - b) **Purification of the coca paste to cocaine base**
  - c) Conversion of coca leaf to cocaine salt
  - d) All of the above
110. What are the examples of glowing combustion?
- a) Burning cigarette
  - b) Red glow of hot charcoals
  - c) Buring a gasoline
  - d) **A and B both**
111. Which statement is not true regarding LSD?
- a) Its hallucinogenic effects were first described by the Swiss chemist Albert Hofmann
  - b) It stands for lysergic acid diethylamide
  - c) It is very potent drug
  - d) **It is synthesized from lysergic acid, a substance derived from ergot, which is a type of algae that attacks certain grasses and grains**
112. What is the cutting agent included during synthesis of heroin?
- a) Sugars
  - b) Acetaminophen
  - c) Caffeine
  - d) **All of the above**
113. Which explosive is employed in the treatment of angina pectoris as a vasodilator?
- a) TNT
  - b) RDX
  - c) **PETN**
  - d) Dynamite
114. Which of the following statement is false concerning Ion chromatography?
- a) IC is considered as a type of HPLC
  - b) The stationary phase, in the form of tiny beads, is held in a column

- c) The mobile phase is an aqueous solution, commonly of either dilute acid (in the separation of cations)
- d) The mobile phase is an aqueous solution, commonly of either dilute acid (in the separation of anions)**
115. Which act was repealed by the NDPS?
- The Opium Act, 1850
  - The Opium Act, 1870
  - The Dangerous Drugs Act, 1920
  - None of the above**
116. Which antidote is specifically used for treating iron poisoning?
- Cuprimine
  - Desferrioxamine**
  - DMSA
  - DMPS
117. Which drug is referred to as oil of wintergreen?
- Acetyl salicylic acid
  - Sodium salicylate
  - Methyl salicylate**
  - Salicylate jag
118. What is the advantage of HPLC over GC?
- Derivatization is used to enhance the selectivity and sensitivity
  - HPLC applies to compound of all polarities and molecular weight**
  - HPLC exhibits higher sensitivity compared to GC when analysing the graph in SIM mode
  - HPLC exhibits higher sensitivity compared to GC when analysing the graph in EIC mode
119. What are the solid adsorbents used in clean-up method?
- Alumina and zinc silicate
  - Alumina and silver nitrate
  - Alumina and silica**
  - Alumina and sodium carbonate
120. What are the required characteristics of the detection tag?
- It should not exist in nature.
  - It should continue to release its vapor for at least 5 years, preferably 10 years.
  - It should be detectable down to ppm levels.
  - It must not change the properties of explosives.
- Choose the correct answer from the options given below:
- 1, 3, 4,
  - 3, 1, 2,

c) 3, 4, 2

d) 1, 2, 4

NESSU DC