C–0595	Sub. Code 99013

B.Sc. DEGREE EXAMINATION, NOVEMBER 2023

First Semester

Forensic Science

GENERAL FORENSIC SCIENCE

(2020 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What is a mobile FSL?

2. Brief about Locard's principle.

3. What is GEQD?

4. Brief about CCMB.

5. What is crime?

6. What are central prisons?

7. List a few preservatives of blood.

8. How to find the point o origin of blood stain?

9. Who is an expert?

10. What is testimony in court?

Part B (5 × 5 = 25)

Answer **all** the questions.

11. (a) Brief about the history of CFSLs in India?

Or

(b) Write a note on the application of microscopy in forensic science.

12. (a) Write a note on recently established NFSU.

Or

(b) Explain the role of NDTL.

13. (a) Brief about the structure of courts in India.

Or

(b) What do you mean by crime scene reconstruction?

14. (a) What are satellites in bloodstain pattern? Explain their importance.

Or

(b) What do you mean by druggist fold?

15. (a) Forensic Scientist is a court witness. Explain.

Or

(b) Brief about the format of a forensic report.

Part C (3 × 10 = 30)

Answer **all** the questions.

16. (a) Write in detail the functions of fingerprint bureau.

Or

(b) Explain in detail the principles of FS.

17. (a) You are asked to process an Indoor crime scene. How do you go about it?

Or

(b) Explain in detail the legal considerations while handling a crime scene.

18. (a) Explain the structure of state police.

Or

(b) What are the different packing methods used in evidence packing? Explain with examples.

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C–0596	Sub. Code
	99014

B.Sc. DEGREE EXAMINATION, NOVEMBER 2023

First Semester

Forensic Science

GENERAL CHEMISTRY

(2020 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** the questions.

1. What is homolytic cleavage?

2. What are nucleophilic reagents?

3. What do you mean by isomerism?

4. What are chiral compounds?

5. What are sugars?

6. What is the forensic significance of alkaloids?

7. What do you mean by multicentre bonds?

8. What are major sources of dietary calcium?

9. What are concordant values?

10. What is normality?

Part B (5 × 5 = 25)

Answer **all** the questions.

11. (a) What are free radicals? Explain.

Or

(b) Compare and contrast aliphatic and aromatic organic compounds.

12. (a) Explain fisher projection formula.

Or

(b) Explain E, Z system of nomenclature of isomers.

13. (a) Explain the general structure of carbohydrates.

Or

(b) Brief about different classification of carbohydrates.

14. (a) Brief about the structure of Methyl Lithium.

Or

(b) Brief about the role of K+ ions in body.

15. (a) Write a note on solvent extraction.

Or

(b) Compare normality and molarity.

Part C (3 × 10 = 30)

Answer **all** the questions.

16. (a) Explain the stability of aliphatic and aromatic compounds. Write a note on delocalisation of electrons.

Or

(b) Explain in detail the Cahn-Ingold-Prelog sequence rules.

17. (a) Write in detail the structure of maltose, lactose and sucrose.

Or

(b) Write a detailed note on the various biological functions of Calcium in plants and animals.

18. (a) Explain batch extraction, continuous extraction and concurrent extraction.

Or

(b) Write a note on the following :

(i) Oxidation

(ii) Significant figures

(iii) Molarity.

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C–0597	Sub. Code
	99015

B.Sc. DEGREE EXAMINATION, NOVEMBER 2023

First Semester

Forensic Science

GENERAL BIOLOGY

(2020 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What is diffusion?

2. What are ribosomes?

3. What are proteins?

4. How glucose and starch are different?

5. What are viruses?

6. What is sterilisation in biology?

7. What are antigens?

8. What is immunochemistry?

9. What do you mean by asexual reproduction.

10. What is the biological significance of sweating in our body?

Part B (5 × 5 = 25)

Answer **all** the questions.

11. (a) Explain the working and functions of mitochondria.

Or

(b) Explain material transport via diffusion in body.

12. (a) Proteins are the building blacks of human body Explain.

Or

(b) Explain the biological significance of polysaccharides.

13. (a) State Koch postulates.

Or

(b) Brief about the significance of staining in identification of microbes.

14. (a) What is the significance of agarose medium in microbial culture?

Or

(b) Explain agglutination reaction.

15. (a) Brief about ELISA test.

Or

(b) What are the major roles of endocrine systems in body?

Part C

$(3 \times 10 = 30)$

Answer **all** the questions.

16. (a) Sketch and label animal cell with brief explanation about each organelle.

Or

(b) Explain in detail the chemical composition of cells.

17. (a) Write a detailed note on the structure and biological functions of glucose and fructose.

Or

(b) Explain in detail the process of protein synthesis in body.

18. (a) Write a detailed note on the culturing procedure of microorganisms.

Or

(b) Explain in detail various antigen antibody reactions.

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C–0598	Sub. Code
	99032

B.Sc. DEGREE EXAMINATION, NOVEMBER 2023

Third Semester

Forensic Science

FORENSIC PHYSICS

(2020 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** the questions.

1. Glass is not solid. Explain.

2. Explain the process of weathering.

3. What is a comparison microscope?

4. How to perform an ignition test for soil?

5. Write the chemical composition of paint. Explain the composition of concrete.

6. What are the various layers in automobile paints?

7. What is the basic principle of AAS?

8. Explain the term chemical etching.

9. What is the chemical composition of etching solution for iron?

10. What is the refractive index?

Part B (5 × 5 = 25)

Answer **all** the questions.

11. (a) Explain the procedure for the analysis of density of glass.

Or

(b) How to find out the refractive index of a glass piece?

12. (a) Explain differential thermal analysis technique.

Or

(b) What is the turbidity test of soil?

13. (a) How is the quality of bitumen analysed?

Or

(b) Explain the working of a comparison microscope.

14. (a) Write a note on automobile paint.

Or

(b) Explain the solubility test for paint.

15. (a) What are different types of Paints? Explain their differences.

Or

(b) What is the chemical composition of cement? What are its features?

Part C (3 × 10 = 30)

Answer **all** the questions.

16. (a) Explain the principle and procedure of TLC examination. Explain the TLC analysis of paint.

Or

(b) Explain all the microscopic tests for paint.

17. (a) Explain differential thermal analysis technique.

Or

(b) What is the turbidity test of soil?

18. (a) What is the refractive index? Explain the different methods to determine the RI of a glass piece.

Or

(b) Explain the different tests on glass to chemically identify it.

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C–0599	Sub. Code 99033

B.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

Third Semester

Forensic Science

QUESTIONED DOCUMENT EXAMINATION

(2020 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Define document.

2. What are questioned documents?

3. What are signatures in documents?

4. What do you mean by impersonation?

5. Currency note is riot paper. Why?

6. What do you mean by digital signatures?

7. What are charred documents?

8. List any two class characteristics of seals.

9. How type writers work?

10. What are facsimile machines?

Part B (5 × 5 = 25)

Answer **all** the questions.

11. (a) Write a note on the classification of questioned documents.

Or

(b) Brief about the history of GEQD.

12. (a) Brief about various hand movements involved in handwriting formation.

Or

(b) Explain free hand forgery.

13. (a) Explain the various types of alterations that are generally made to a document.

Or

(b) What is intaglio printing? How it is applied in security documents?

14. (a) What is wet offset process?

Or

(b) Write a note on the examination of intended writing.

15. (a) Which is the chemical that is commonly used to read charred documents? Explain the procedure.

Or

(b) What are alignment defects in type writers?

Part C

$(3 \times 10 = 30)$

Answer **all** questions.

16. (a) Write a note on the history and working of various types of pens.

Or

(b) Explain document dating. What are the methods used for the same?

17. (a) Explain the contribution of Francis Damelle and Albert Osborn to the field of questioned document examination.

Or

(b) Explain in detail the class characteristics of paper.

18. (a) Explain the importance of the following in handwriting :

(i) Pen held in low angle

(ii) Heavy pen pressure

(iii) Speed of writing.

Or

(b) Explain the various chemical methods of secret writing on paper.

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C–0600	Sub. Code 99034

B.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

Third Semester

Forensic Science

AUDIO AND VIDEO ANALYSIS

(2020 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** the questions.

1. Explain the term noise.

2. What is digital image processing?

3. What do you mean by fps in video?

4. Write a note on handling digital evidence.

5. Mention any four softwares used for audio-video analysis.

6. What is cloning of a disk?

7. What is forensic phonetics?

8. Explain the vocal code activity in humans.

9. Explain the term likelihood ratio.

10. What do you mean by voice print identification?

Part B (5 × 5 = 25)

Answer **all** the questions.

11. (a) Explain the working of high pass filters.

Or

(b) Write a note on various video formats.

12. (a) Explain the procedure of watermarking. Explain its role.

Or

(b) What is digital watermarking? Explain the procedure.

13. (a) Explain the procedure of' authentication of a video file.

Or

(b) List a few video analysis softwares.

14. (a) How does the human vocal cord produce sound?

Or

(b) What are Segmental and Suprasegmental phonemes?

15. (a) What are the different types of possible errors in speaker identification analysis?

Or

(b) Explain vector quantisation.

Part C

$(3 \times 10 = 30)$

Answer **all** the questions.

16. (a) Explain with diagrams the working of LCR circuits.

Or

(b) What do you mean by the term 'format'? Explain various formats of audio and video files.

17. (a) What is video production technology? How are videos produced?

Or

(b) Explain in detail the forensic examination of a video file for identifying its genuinity.

18. (a) How to identify a disguised voice from the original voice? Explain the basic principle of automatic audio detection.

Or

(b) Explain :

(i) Long term averaging

(ii) Neural Network.

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C–0601	Sub. Code
	99051

B.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

Fifth Semester

Forensic Science

FORENSIC BALLISTICS AND TOOL MARKS

(2020 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions.

1. Define bore and calibre.
2. Explain the classification of firearms based on action mechanism.
3. What is the chemical composition of black powder?
4. Define recoil and explain its theory.
5. Discuss the physics of shock waves in terminal ballistics.
6. How does air resistance affect the trajectory of projectiles in external ballistics?
7. What are the different types of evidentiary clues in forensic ballistics?
8. Explain the concept of matching crime and test bullets and cartridge cases
9. Describe the types of tool marks found in forensic investigations.
10. Explain the application of a comparison microscope in tool mark analysis.

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) Describe the lock mechanism of firearms and its historical significance.

Or

(b) Explain the concept of caliber and its importance in forensic ballistics.

12. (a) Discuss the progressive and degressive burning of propellants.

Or

(b) Explain the effects of gas flow near the muzzle in intermediate ballistics.

13. (a) Calculate the vacuum trajectory of a projectile and explain its significance.

Or

(b) Describe the behaviour of different bullet types upon hitting a target in terminal ballistics.

14. (a) Explain the principle and procedure of modifies walker's test.

Or

(b) Write a note on the chemical composition of GSR.

15. (a) Explain the procedure of lifting of tool marks using clay.

Or

(b) Brief about the standards of comparison of tool marks.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) Explain the collection and packing of evidentiary clues in forensic ballistics.

Or

(b) Discuss the chemical and instrumental methods of analyzing Gun Shot Residues (GSR).

17. (a) Describe the types of tool marks and their characteristics.

Or

(b) Explain the forensic examination and comparison of tool marks using a comparison microscope.

18. (a) Explain the process of determining the range of firing for shotguns based on burning, scorching, blackening and tattooing effects. Discuss the significance of these characteristics in forensic ballistics investigations.

Or

(b) Discuss the collection, preservation and packaging of evidentiary clues in forensic ballistics. Explain the types and occurrence of evidentiary clues and their importance in linking firearms to a crime.

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C–0602	Sub. Code 99052

B.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

Fifth Semester

Forensic Science

RESEARCH METHODOLOGY AND STATISTICS

(2020 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define research and explain its characteristics.

2. Differentiate between qualitative and quantitative research.

3. Explain the process of formulating a research problem.

4. Define hypothesis and discuss the types of hypotheses.

5. Describe the types of primary data collection methods.

6. Explain the criteria for selecting a sampling design in research.

7. Define variables and explain the different scales of measurement.

8. Discuss the graphical representation of data and its significance in forensic science.

9. Explain the measures of central tendency, including mean, median, and mode.

10. Discuss the measures of dispersion and the concept of symmetry in statistical analysis.

Part B $(5 \times 5 = 25)$

Answer **all** questions.

11. (a) Discuss the characteristics of research and its importance in the field of criminal justice.

Or

(b) Explain the significance of ethics in criminal justice research.

12. (a) Discuss the stages involved in the research process, from hypothesis formation to analysis and report writing.

Or

(b) Explain the importance of research design in conducting a successful research study.

13. (a) Describe the types of primary data collection methods and their advantages and disadvantages.

Or

(b) Explain the principles and procedures of probability sampling techniques in research.

14. (a) Discuss the significance of statistics in forensic science and its applications in criminal justice research.

Or

(b) Explain the concepts of class interval, class width, and continuous versus discontinuous data.

15. (a) Compare and contrast the measures of central tendency, including mean, median, and mode.

Or

(b) Discuss the measures of dispersion, such as range, quartile deviation, and standard deviation, and their relevance in data analysis.

Part C $(3 \times 10 = 30)$

Answer **all** questions.

16. (a) Discuss the concepts of epistemology (methodology) of research and their significance in criminal Justice research.

Or

(b) Explain the difference between applied and fundamental research and provide examples.

17. (a) Explain the process of formulating a research problem and the role of literature review in identifying research gaps.

Or

(b) Discuss the importance of hypothesis testing in research and its relationship to research objectives.

18. (a) Describe the steps involved in designing a research questionnaire, including question formulation and scaling techniques.

Or

(b) Explain various sampling methods and their applications in different researches.

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C–0603	Sub. Code 99053

B.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

Fifth Semester

Forensic Science

FORENSIC BIOLOGY AND MEDICINE

(2020 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What are the legal requirements to conduct an autopsy?

2. What are the immediate signs of death?

3. What are the different types of injuries?

4. What are the medicolegal aspects of vehicular injuries?

5. What are the different types of burns?

6. What are the medicolegal aspects of sexual offenses?

7. What are the different types of hair?

8. What are the different types of fibers?

9. What are the laws related to wildlife protection?

10. What are the different types of pug marks?

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) Discuss the scope of forensic medicine.

Or

(b) Explain the importance of medical records in forensic medicine.

12. (a) Describe the different modes of death.

Or

(b) Explain the process of determining time since death.

13. (a) Discuss the medicolegal aspects of injuries.

Or

(b) Explain the different types of sexual offenses.

14. (a) Describe the structure of human hair.

Or

(b) Explain the classification of fibers.

15. (a) Discuss the importance of wildlife forensics.

Or

(b) Explain the methods for collecting and analyzing pug marks.

Part C

$(3 \times 10 = 30)$

Answer **all** questions.

16. (a) Discuss the legal and ethical aspects of conducting an autopsy.

Or

(b) Describe the different stages of death and the medicolegal significance of each.

17. (a) Discuss the medicolegal aspects of burns and scalds.

Or

(b) Describe the structure of human hair and its forensic significance.

18. (a) Discuss the importance of wildlife forensics in the conservation of wildlife.

Or

(b) A body is found inside a room in a hanging position. Explain the step-by-step medical examination to the body.

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C–0604	Sub. Code 99054

B.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

Fifth Semester

Forensic Science

FORENSIC ANTHROPOLOGY AND ODONTOLOGY

(2020 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions.

1. Define Forensic Anthropology and its significance in forensic investigations.

2. Explain the classification of bones and their importance in forensic age estimation.

3. Describe the process of ossification and its role in gender identification using human skeletal points.

4. Explain the anatomy of the clavicle and its significance in forensic investigations.

5. Discuss the biochemical aspects of bones and ligaments.

6. How is demography estimated from skeletal remains? Explain the process.

7. Describe facial reconstruction methods and their forensic applications.

8. Explain how facial superimposition is performed using ante-mortem photographs.

9. Define Forensic Odontology and its role in personal identification.

10. How are teeth evidence used in mass disaster investigations?

Part B $(5 \times 5 = 25)$

Answer **all** questions.

11. (a) Elaborate on the history and scope of Forensic Anthropology.

Or

(b) Discuss the functions and characteristics of bones in the human skeletal system.

12. (a) Compare the rate of ossification in the human skeletal system with nonhuman ossification points for gender identification.

Or

(b) Describe the anatomy of the scapula and its forensic significance.

13. (a) Explain the collection, preservation, and packaging of osteological evidence.

Or

(b) Discuss how sex and age estimation are carried out using skeletal remains.

14. (a) Compare two and three-dimensional methods of facial reconstruction in forensic anthropology.

Or

(b) Analyze the process of facial superimposition using photographic and computerized methods.

15. (a) Provide an overview of the history and scope of Forensic Odontology.

Or

(b) Discuss the recovery of forensic evidence from graves and the role of skeletal variation in identification.

Part C $(3 \times 10 = 30)$

Answer **all** questions.

16. (a) Explain in detail the ossification of sutures of skull and age determination using it.

Or

(b) Write a detailed note on the chemistry and process of formation of bones.

17. (a) Explain in detail the sex determination process using bones.

Or

(b) Write a detailed note on the use of dental records in identification of individuals.

18. (a) Sketch and label the diagram of human teeth. Also write a note on human dentition.

Or

(b) How race is determined using bones. Explain.

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C–0605	Sub. Code
	99055

B.Sc. DEGREE EXAMINATION, NOVEMBER 2023

Fifth Semester

Forensic Science

STATISTICS FOR FORENSIC SCIENCE

(2020 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define uncertainty in forensic science.

2. Explain the concept of probability.

3. Discuss the different types of events.

4. Explain the concept of subjective probability.

5. Discuss the law of total probabilities.

6. What is likelihood ratio?

7. Define populations, samples, and estimate.

8. Name the different types of distributions in statistics.

9. Brief the concept of value of evidence.

10. Discuss the direction of transfer in forensic science.

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) Elaborate on the concept of complementary events.

Or

(b) State and explain Bayes' theorem.

12. (a) Explain the different types of errors in interpretation with special reference to forensic science.

Or

(b) How value of evidence is been calculated? Explain.

13. (a) When a coin is tossed for 5 times, what is the probability of getting 3 Tails?

Or

(b) Discuss the concept of transposed conditional and defence fallacies.

14. (a) Explain the concept of probability of guilt. How is helps in forensic science.

Or

(b) Brief about the importance of calibration of devices.

15. (a) Explain t test.

Or

(b) What is bell curve? Explain.

Part C

$(3 \times 10 = 30)$

Answer **all** questions.

16. (a) Explain the concept of probability. What is the probability of drawing 3 red cards consecutively from a deck of cards.

Or

(b) Explain the importance of evaluating evidences and discuss the limitations of probability in forensic science.

17. (a) Explain the significance tests for correlation coefficient.

Or

(b) Explain the concept of mean, median, mode and standard deviation. Give the mathematical expression standard deviation.

18. (a) A garden contains 39 plants. The following plants were chosen at random, and their heights were recorded in cm: 38, 51, 46, 79, and 57. Calculate their heights' standard deviation.

Or

(b) Explain prosecutor fallacy in detail.

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