

FORENSIC EXAMINATION OF QUESTIONED DOCUMENTS: DETECTION, ANALYSIS, AND LEGAL ADMISSIBILITY

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BEST CITATION – BELSY J & SUGITH KUMAR R G, FORENSIC EXAMINATION OF QUESTIONED DOCUMENTS: DETECTION, ANALYSIS, AND LEGAL ADMISSIBILITY, INDIAN JOURNAL OF LEGAL REVIEW (IJLR), 6 (1) OF 2026, PG.1088-1098, APIS – 3920 – 0001 & ISSN – 2583-2344

ABSTRACT:

Questioned document examination, commonly referred to as forensic document examination, is regarded as a highly intricate and vital branch of forensic science. It plays a crucial role in supporting the legal system through the application of sophisticated analytical methods and scientific principles required for verifying the authenticity, origin, and integrity of both physical and digital documents. This discipline is extensively utilized in various contexts, including criminal investigations, civil litigation, financial fraud detection, and historical research.

Documents such as wills, checks, passports, and contracts are essential not only for everyday transactions but also within the legal arena. Many criminal activities frequently involve disputed or questionable documentation. With technological advancements, instances of forgery and crimes such as counterfeit currency and falsified documents have risen significantly. Therefore, forensic expertise is essential for identifying, evaluating, and determining the legal admissibility of these documents.

When there are doubts regarding the authenticity or legitimacy of a document, it is classified as a questioned document; however, it is important to note that not all questioned documents are fraudulent. The analysis process includes comparing handwriting samples, assessing paper and ink quality, examining printing techniques, identifying inconsistencies such as erasures or variations in stroke patterns among others.

Albert S. Osborn established fundamental standards that have been adopted by courts, forming the basis for the scientific investigation of disputed documents. This paper discusses the importance of examining questioned documents along with their classifications; outlines collection and handling procedures; examines tools and techniques used in analysis; describes methods for age determination; addresses issues related to legal admissibility; highlights associated challenges; and emphasizes the need for reforms aimed at enhancing the field of questioned document examination.

Keywords: Questioned Documents, Handwriting, Handwriting Identification, Forgery, Ink Examination.

Introduction:

Questioned Document Examination (QDE) (also known as forensic examination of questioned documents) is a field of forensic science specialized in analyzing contested writings and documents to determine their authenticity, origin, or change. Questioned document examination examines documents that raise concerns in legal procedures. Handwriting analysis is a major component of this subject that compares handwritten samples using recognition principles.

Documentary proof is an indispensable requirement in criminal or civil matters related to forgery, fraud, impersonation, counterfeiting, and contract disputes. Courts want fair, objective, and reliable results using actual scientific measures rather than just eye examination. So, they rely on tried and tested scientific methodologies. Pioneers such as Edmond Locard, who developed the exchange principle emphasizing the evidentiary significance of trace elements in document examination, were influential in the development of the discipline. A variety of techniques are employed in investigations of modern forensic documents, such as handwriting comparison with signatures, ink and paper analysis, identification of printing methods, detection of modifications and obliterations, and examination of indented writing. Chemical compositions, secret writings, erasures, and digitally created modifications are all detectable with stereomicroscopes, Video Spectral Comparators (VSC), Electrostatic Detection Apparatus (ESDA), chromatography, spectroscopy, and specialized light sources. In an era of technologically advanced forgery, these scientific methods allow specialists to more accurately identify falsification and establish authorship. The usefulness of such evidence in court is largely dependent on its legal admissibility.

In India, Section 45 of the Indian Evidence Act, 1872, permits courts to rely on expert scientific testimony thus recognizing forensic expert

opinion. However, admissibility is dependent on various factors such as the validity of procedures, appropriate collection and handling of evidence and compliance with procedural protections. Modern forensic methods also need to adapt as document production technologies improve in order to ensure the reliability and integrity of documented evidence in the legal system.

Document and Questioned Document – Meaning and Definition:

Document – Meaning:

A document refers to any medium through which a message is communicated in some form. While in most cases documents are typically linked to paper, it is important to acknowledge that documents can exist in formats other than paper. For instance, one study examined writing found inscribed on the body of a deceased woman; thus, the body itself qualifies as a "document."

A writing instrument is defined as an object that transfers a handwritten message onto a document. Pens and pencils are the most commonly recognized types of writing instruments. Nevertheless, items such as knives, eyeliner pencils, lipstick, crayons, and paintbrushes can also serve as writing tools.

Section 3 of the Indian evidence act of 1872 defines a document:²⁴¹⁹–

Document means any matter expressed or described upon any substance by means of letter, figures, or marks by more than one of those means, intended to be used, which may be used for purpose of recording that matter.

Section 29 Indian Penal Code²⁴²⁰

The word "document" denotes any matter expressed or described upon any substance by means of letters, figures, or marks, or by more than one of those means, intended to be used, or which may be used, as evidence of that matter.

²⁴¹⁹ Section 3 of Indian Evidence Act, 1872

²⁴²⁰ Section 29 of Indian Penal Code, 1860

Questioned Document – Meaning and Definitions:

A document is referred to as a **Questioned Document**, also known as a "disputed" or "contested" document, when there are doubts concerning its authenticity or specific parts of it.

The legitimacy of such a document can be called into question for various reasons, with most disputes arising over the validity of signatures, thumb impressions of the executors or witnesses, or both. In short, a questioned document is any document that is potentially disputed in the court of law.

In many cases, an executor may choose not to confirm or deny a thumb impression or signature on a contested document due to concerns that their acknowledgment might validate the contents of the document, potentially harming their interests. In some situations, an executor may even assert illiteracy or lack of understanding regarding the script used for the disputed signatures. However, there are instances where documents are intentionally fabricated using forged signatures to deceive others for personal gain.

Instances of Questioned Documents:-

Proficient forgers often manage to obtain genuine signatures on blank sheets through deceitful means or exploit spaces above real signatures on other documents by removing sections with previous writing. This practice leads to numerous documents becoming subjects of legal contention. There are also cases where original writings have been chemically or physically eradicated, after which the document is retyped or recreated on what was once the removed surface; alternatively, signatures from different documents may be affixed. Conversely, some executors challenge authentic documents by claiming that text was added subsequently while arguing that the signatures themselves remain valid.

Another category includes documents allegedly modified by adding or removing lines, words, or strokes in blank areas. This involves altering text

by either inserting new letters or strokes or substituting erased words with replacements. Furthermore, disputes can arise based on the order of entries over time, identification of ink and pen used, changes in quantity and obliterations, as well as typewriting sequences relative to paper folds.

Sometimes photocopies and carbon copies face challenges because they do not precisely mirror their originals or contain alterations made during reproduction processes—such as adding or omitting text.

Documents whose ages or chronological sequences are ambiguous also fall into this category. A frequent concern is whether a document is genuinely as old as its stated date or if it has been backdated; backdating is a prevalent issue. Documents dated prior to when the paper, instrument, ink/typewriter was produced can raise questions regarding their reliability. Variations in writing stroke sequences and irregularities in revenue stamps have led to certain documents being labeled as fraudulent.

Father of Questioned Document Examination (1858-1946):

Albert S. Osborn is widely regarded as the pioneer of contemporary questioned document analysis. He released his most notable work, "Questioned Documents", in 1910, where he detailed techniques that continue to be employed today. Osborn, along with other prominent experts in questioned document examination from various regions, provided testimony during the trial of Bruno Richard Hauptmann, who was accused of abducting the young son of aviator Charles Lindbergh.

Principles and Guidelines for the Questioned Documents:-

A fundamental aspect of document examination is the analysis of handwriting. The forensic evaluation and comparison of handwriting, which encompasses both hand printing and signatures, relies on three primary principles:

1. With a sufficient sample of handwriting, no two proficient writers will display identical features in their writing.
2. Each individual has a degree of natural variation in their writing style.
3. No writer can surpass their own level of skill; for instance, it would be unrealistic to expect a person with only basic literacy skills to produce flawless, advanced cursive writing.

Forensic Document Examiner (FDE):

For several decades, forensic document examiners (FDEs) have concentrated on investigating and analyzing documents to determine their origin and history. Those involved in this field are often termed handwriting examiners or specialists, due to the frequent inquiries regarding handwriting aspects. However, this designation does not fully encompass the broad scope of expertise possessed by these professionals. These specialists are required to recognize both handwriting and printed texts, detect forgeries, analyze various inks and papers, identify alterations and additions, and restore or interpret text that has been erased or obscured. The examination process must be thorough, precise, and entirely objective. The responsibilities of an FDE extend beyond merely identifying key details; they must carefully evaluate these findings and logically deduce appropriate conclusions related to the case at hand. Once an opinion is established, a comprehensive report should be prepared so that it can be readily understood by non-experts such as judges, juries, or other stakeholders interested in the matter.

Why Is Document Examination Performed?

The purpose of conducting a document examination is to ascertain several key aspects:

Origin: Identifying the source of the document.

Production Source: Determining which individual or machine created it.

Production Process: Understanding how the document was produced.

Inscription: Investigating any faded or erased content.

Chastity: Assessing whether any alterations have been made to the document.

Integrity: Establishing its authenticity as genuine or forged.

Legitimacy: Clarifying whether it is an original document or a reproduction, and if so, what generation it belongs to.

This analysis employs technical methods aimed at uncovering historical details regarding the document's circumstances prior to its presentation in court. Such insights enable the court to validate any assumptions that might arise otherwise.

Types of Questioned Documents:

Documents can be categorized into various types, including:

1. Financial Documents: This category encompasses money receipts, money orders, checks, promissory notes, account books, bills, and tenders.
2. Administrative Documents: Examples include orders related to appointments, transfers, training, promotions, as well as records of sales or purchases.
3. Educational Documents: This includes degrees and diplomas, along with answer sheets.
4. Historical Documents: Such documents may consist of forged letters, official orders, and autographs from notable individuals.
5. Letters: This category covers various types of correspondence such as ransom notes and suicide letters.
6. Wills: Specifically focusing on holographic wills.
7. Tickets: This includes excise stamps, betting tickets for horse races, and lottery tickets.

8. Posters: These may incite communal hatred or defame individuals.

9. Books: This group comprises pornographic materials or pirated editions of texts.

10. Burnt or Damaged Documents: Referring to any documents that have been partially or completely destroyed.

Collection Of Documents:

Document can be collected with two methods: Requested method and Collected method

Requested method:

As it stands, the person doing the writing should be able to work at a desk or table in a comfortable, distraction-free environment. The documentation in question should be visible to invoke suspicion. The person examined should be provided with a pen and paper similar to the documents under inquiry. The questioned document should be aligned with the text of the dictating document and the arrangement of letters and words should be the same. No instructions should be given to the suspect about using uppercase or lowercase letters. If there is an intention on the part of the writer to conceal their handwriting, the text should be dictated no fewer than three times. Prior to collecting desired samples from the suspect, it is crucial for a document examiner to be consulted and presented with the questioned specimen.

Collected method:

Documents that the suspect has previously authored in his day-to-day activities are referred to as collected methods. Every individual writes for their own lifetime, and since these manuscripts are prohibited from being used for any other unlawful reasons, they contain all of the characteristics that make a person's handwriting distinctive. The best handwriting to compare from this perspective is collected handwriting. Diary, notes, application letters, checks, etc. are a few examples.

Care, Handling and Preservation of Questioned Documents:-

To preserve the integrity of the evidence, it is crucial that the questioned document is collected and handled with care. Any modifications, creases, signatures, or damage incurred during its collection or handling may jeopardize the outcomes of various tests and assessments, as well as influence expert opinions. Evidence should be gathered using gloved hands to prevent contamination.

When collecting any questioned document, consider the following guidelines:

- The document must be handled by a qualified expert.
- Upon receipt, both the front and back sides of the document should be thoroughly examined for any extraneous markings before being opened.
- Bare hands must not touch the document; gloves are essential.
- If the document remains unfolded, do not create any new folds.
- As soon as it is received by the document expert, mark the document and assign a unique identification number.
- Store the document in a static-free bag, cellophane bag, or envelope while maintaining its original condition.
- Avoid unnecessary handling of the document.
- Protect it from intense light, chemicals, moisture, and pests.
- Each time a document is processed, prepare a detailed descriptive note that includes information about its date, location, and source.
- Take enlarged and detailed photographs of the document to ensure proper chain of custody is maintained.
- Never use a pen, pencil, or any sharp tool to examine the document to prevent making any marks or causing damage.
- Chemical treatments on documents should only be employed if absolutely

necessary; if so required, take a small piece or scrape after photographing it.

Preliminary Examination of Question Document:

To assess if a disputed document case warrants an in-depth review, a preliminary examination is performed. This process involves more than merely comparing signatures or handwriting; it encompasses a scientific investigation of various elements such as ink, typed and printed materials, watermarks, and other aspects that contribute to the creation of a document. A comprehensive inspection can only be deemed complete when all components have been thoroughly analyzed.

The following factors are typically taken into account during the preliminary examination:

1. Is the paper of an unusual size, and has it been hand-cut or trimmed at any edge?
2. How many times has the paper been folded, and what is the order of those folds?
3. Are there signs of artificial aging on the paper? Has it been torn, wet, or damaged in any way? If so, what might be the reasons for this?
4. Are there indentation marks present on the front side or embossed impressions on the back?
5. Does the paper exhibit any signs of physical or chemical erasure, obliteration, substitution, or alteration?
6. Was the document written or typed before or after folding occurred?
7. Were different types of ink or pens utilized for writing within the document?
8. Does the document display any irregular spacing between lines of text?
9. Is the main body of writing continuous and produced by a single writer?
10. Are there any other unusual characteristics?

This initial evaluation therefore determines the adequacy, genuineness, and reliability of the materials being examined, while also offering

essential information for subsequent in-depth analysis and assessment.

Determining Age of Documents/Dating of Documents:

Why is Determining the Age of Documents Important?

Establishing when a specific document or record was created can raise numerous inquiries. One of the more challenging aspects of examining questioned documents is dating them accurately. Assessing the age of a document becomes essential, particularly if it holds historical value or if there is a dispute regarding its date. Document dating can be achieved by focusing on various features, such as handwriting, ink types, paper quality, and patterns of intersecting lines. A manuscript claimed to have been written centuries or decades ago may not be authentic.

A medical or legal record might contain information that has been significantly altered months or years after the dates indicated within it. There could be instances where an entry in a diary or appointment note was made only days or weeks after the recorded date.

In these circumstances, various backdating techniques have been utilized. Several approaches can be employed to address these issues:

- Comparing the disputed document with other similar documents from the same era.
- Conducting intra-comparisons among different entries within a file or multi-page document to check for consistency.
- Referring to manufacturers' data and technical details about materials used, including inks, papers, computer printers, fax machines, etc.
- Investigating accidental markings and indented impressions.

The age of the paper serves as a general indicator for determining the document's age; paper cannot precede its corresponding

document. Factors like manufacturing processes, watermarks, fiber composition, dimensions, and additives provide insights into how old the paper might be. Some manufacturers keep records of watermarks that signify specific years.

The relationship between ink age and that of writing tools also plays a role in establishing age. For example, documents purportedly created before 1950 using ballpoint pens cannot be validated since this type of pen was first introduced in India in that year.

Revenue stamps often include markings indicating their production period and thus help ascertain age. Offices periodically replace seals which may degrade over time; comparing these seals can yield valuable information.

Certain documents may exhibit signs of artificial aging through methods such as:

- Placing them over chimneys to collect dust and dirt.
- Exposure to sunlight or UV rays.
- Utilizing iodine fuming for artificial aging effects.
- Applying solutions like sulfur dioxide permanganate to facilitate artificial aging processes.

Tampered Documents:

Tampering is a type of forgery that people make for all sorts of reasons, be it for money, property, or envy. Documents are one of the most critical pieces of evidence in any investigation; but they may also be altered by someone else. This change may occur in more than one manner, such as through adding, deleting, hidden writing, burning, erasures, or complete obliteration. According to law tampered documents include illegal alterations, interference, intrusion, or manipulation of records or evidence. This could also be in an attempt to influence witnesses. Specialists will often deal with changes such as additions, erasures, secret writing and charred materials. The analysis of these modified documents is a demanding responsibility because of the

various inks and types of paper/plate work involved. And if there is any suspicion around changes to letters, numbers, signatures and the like, then it is of special importance to validate their authenticity and to spot any potential forgery. The purpose of the forensic document examiner is to ascertain whether the changes made by a person are legitimate or fraudulent.

Alteration: Alteration pertains to any change or modification made to a document. This can involve actions such as erasing, adding, deleting, cancelling, interlining, or substituting writing materials or figures that may affect the identity, rights, or obligations of the parties referenced in the document. Modifications can be made at any stage within the document. Any direct changes made to a document are likely to be easily identified under magnification. Utilizing a stereoscopic binocular magnifying lens at low magnification can effectively reveal the modified area. Typical alterations include overwriting or adjustments in numerical values, like changing 0 to 1, 0 to 9, or other similar conversions.

Erasures: Erasures refer to the act of removing writing, typewriting, or printing from a document using either chemical or abrasive techniques. This practice is a common approach for modifying texts. Erasures can be performed through mechanical means or chemical processes. Tools such as erasers, sandpaper, razors, and blades can effectively scrape away ink or print, impacting the document's surface. Mechanical methods may disturb the upper fibers of the paper and leave behind visible rubber residue. To identify such alterations, microscopic analysis is frequently employed. Chemical erasures can also be detected and potentially reversed by applying certain chemicals like ammonium sulfide vapor, alcohol, or iodine vapor.²⁴²¹

²⁴²¹ Futuristic Trends in Social Sciences, Volume 3, Book 19, Part 2, Chapter 13, FORENSIC EXAMINATION OF QUESTIONED DOCUMENTS, e-ISBN: 978-93-5747-397-2 IIP Series.

Paper Analysis:

Information regarding the original production date of paper can be inferred from its constituent materials. This encompasses the earliest usage dates for the fiber content, along with other components such as coatings, fillers, or brightening agents. To establish a pivotal date through a formulation-based examination of paper, two essential factors must be addressed. First, it is important to determine who manufactured the paper. Second, the manufacturer must maintain records that indicate when specific combinations of materials were introduced. While this information can sometimes be generated and proves beneficial, it often falls short due to difficulties in identifying the manufacturer or inadequate record-keeping.

A widely used approach for tracing the origin of paper and estimating its manufacturing date involves examining watermarks found in high-quality writing and typing papers. However, only a small fraction of these watermarks currently feature a dating code that specifies the year of production. Although many brands have been available for several years, documentation regarding each brand's initial release date as reflected in its watermark is generally accessible. Changes in watermark design or imperfections that arise over time within the watermark dandy roll have been employed to date documents or question their authenticity.

Writing Inks:

For a variety of writing instruments currently available, including ballpoint, rollerball, porous tip, and gel pens, new types of ink have been formulated. These inks can be differentiated based on their chemical composition or the style of writing they produce. The appearance of ink on a document from a given date may not correspond with the earliest availability of that particular pen or ink.

Ink a crucial component in many manuscripts primarily consists of colorants, resins, solvents, and various additives. Over time, these

components experience chemical changes such as resin polymerization, evaporation of solvents, and demethylation of dyes. The aging process begins the moment the ink is applied to paper; these transformations can be detected and analyzed through advanced scientific methods. Such techniques lay the groundwork for estimating both the age of the ink and that of the corresponding document. Exposure to light induces demethylation in certain dyes like crystal violet.

Relevant Cases:-

Results from forgery detection must be presented in an understandable manner and backed up by logic from science. Courts look at the expert's adherence to established protocols and the logical conclusions' derived from the observable traits. The quality of the examination, documentation, and expert testimony determines how much weight is given to such evidence.

Ransom Note Nabs Kidnapper:

Forensic document examination can significantly contribute to investigations, as illustrated by a kidnapping case from Long Island, New York, in 1956. In this case, a ransom note allegedly left by the child's babysitter was found in the infant's carriage following the abduction of a one-month-old from his home. Among the notable characteristics that investigators identified in the handwritten letters was a lowercase "m" that bore resemblance to an inverted "z." After meticulously reviewing nearly two million documents for similar handwriting, a probation officer uncovered paperwork authored by a 31-year-old auto mechanic containing the same unusual "m." The ability of document examiners to accurately link the suspect's handwriting to the ransom note played a pivotal role in securing a conviction.

Fraudulent Cheques:

Cheques, especially those related to legal documentation, frequently present challenges for forensic document examiners. By analyzing how inks from different writing instruments

react to infrared radiation, examiners can determine if a cheque has been altered to increase its amount. For instance, a cheque originally made out for \$1,000 to "Cash" may have been modified by adding a name and changing the "1" to a "9." Although the black inks appear identical under visible light, they behave differently when subjected to specific infrared wavelengths, thereby revealing the tampering.

Examiners are also capable of identifying the materials and inks used, along with the types of writing tools or office supplies employed in creating the document. This information is particularly valuable in investigations of fraud as it can indicate the era during which a document was produced. For example, if an examination of a paper reveals substances that were not used in paper-making during that time period, it would indicate that a document, artwork, or historical record is likely fraudulent.

History-Case Study:

In the 1868 trial concerning the alleged forgery of Sylvia Ann Howland's will²⁴²², a businesswoman was the accused. The will was challenged by Henrietta "Hetty" Howland Robinson. The stipulations of Howland's will indicated that upon Howland's death in 1865 half of her estate, valued at around \$2 million was to be distributed among various organizations and charities, while the remainder amount was intended to be held in trust for her niece, Robinson and upon Robinson's passing, the remaining principal was to be distributed among multiple beneficiaries. To dispute the legitimacy of this will, Robinson submitted an earlier will that bequeathed her the entire estate and included a separate page seemingly aimed at invalidating any later wills.

Robinson initiated legal action after Thomas Mandell, Howland's executor, rejected her claim and asserted that this additional page was fraudulent. Ultimately, when it was found that Sylvia's signature on the section declaring future wills void was indeed forged, the court

ruled against Robinson. Due to her status as a beneficiary with a clear conflict of interest regarding the will's validity, her testimony affirming Howland's signature was deemed inadmissible by the court. This case is part of broader efforts to integrate mathematical reasoning within legal proceedings.

Legal Admissibility of Questioned Documents In India:-

1. Questioned Documents and Indian Penal Code:

The Indian Penal Code (IPC) addresses forgery and related offenses through various sections that define terms, outline penalties, and detail specific scenarios involving documents and currency. Sections 463 and 464 provide definitions for forgery and the fraudulent creation of false documents with an objective to bolster a claim, title, or contract resulting in legal repercussions and instances where a document's content or execution is falsely portrayed, modified, or manipulated without lawful authorization. Section 465 stipulates punishments of up to two years of imprisonment or fines depending on the gravity of the offence.

More severe offenses, including the forgery of documents that resemble court records, public registers, certificates or other official documents²⁴²³ (imprisonment for up to seven years and potential fines) or valuable securities and wills²⁴²⁴ (life imprisonment or incarceration for up to ten years along with fines), result in harsher penalties that can include life imprisonment. Sections 468 and 469 pertain to forgery aimed at deception²⁴²⁵ or damaging someone's reputation²⁴²⁶, with potential prison sentences ranging seven and three years respectively. Sections 470 and 471 clarify what constitutes forged documents²⁴²⁷ and impose penalties for knowingly using these as if they

²⁴²³ Section 466, Indian Penal Code, 1860

²⁴²⁴ Section 467, Indian Penal Code, 1860

²⁴²⁵ Section 468, Indian Penal Code, 1860

²⁴²⁶ Section 469, Indian Penal Code, 1860

²⁴²⁷ Section 470, Indian Penal Code, 1860

²⁴²² Robinson v. Mandell, 20 F. Cas. 1027

were genuine²⁴²⁸. The IPC also comprehensively addresses currency-related offences within Sections 489A to 489E, where actions such as counterfeiting²⁴²⁹, utilizing²⁴³⁰, possessing²⁴³¹, or creating tools for forging currency notes²⁴³² attract severe consequences including life sentences and substantial fines. Additionally, Section 489E focuses on the fabrication or use of documents that mimic currency, imposing relatively minor fines along with measures for identifying those responsible²⁴³³. In summary, the IPC implements strict regulations against forgery and counterfeiting to uphold both legal and financial integrity.

Indian Evidence Act and Questioned Documents:

The court recognizes the opinions of experts in fields such as foreign law, science, art, handwriting, and finger impressions as relevant facts when forming judgments in those areas.²⁴³⁴ Facts that support or contradict expert opinions also become relevant when those opinions are relevant.²⁴³⁵

Specifically, opinions on the authorship of documents by individuals familiar with the handwriting of the supposed author are treated as relevant and the person's opinion on whether the document was written or signed by that author is treated as a relevant fact²⁴³⁶ and opinions from the Certifying Authority about the authenticity of digital signatures are likewise deemed relevant²⁴³⁷. Direct Oral evidence can prove all facts except the contents of documents, which require either primary or secondary evidence²⁴³⁸. Primary evidence is the original document itself presented for court

inspection²⁴³⁹ while secondary evidence includes certified or mechanically produced copies, copies made from originals, counterparts against non-signing parties, and oral descriptions by witnesses familiar with the document²⁴⁴⁰. Documents generally must be proven by primary evidence unless otherwise allowed²⁴⁴¹, but secondary evidence may be used to establish a document's existence, condition, or contents in certain cases²⁴⁴². To verify the authenticity of signatures, writings, or seals, the court may compare them with known samples, even if those samples were not originally produced for that purpose, and may require individuals present to produce writing for comparison.²⁴⁴³ Finally, documents over thirty years old that come from proper custody are presumed authentic as to handwriting and proper execution and attestation.²⁴⁴⁴

Legal Admissibility and Challenges in the Forensic Examination of Questioned Documents:

The analysis of disputed documents is crucial in both criminal and civil court cases, especially those related to forgery, fraud, contested signatures, modified contracts and wills, counterfeit money, and anonymous messages. The effectiveness of this type of evidence relies not just on its scientific validity but also on its acceptance within the legal framework. Courts mandate that expert testimony must be dependable, pertinent, and aligned with recognized standards of evidence.

Legal Admissibility of Questioned Document Evidence:

1. Expert Opinion as Evidence:

Section 45 of the Indian Evidence Act, 1872, outlines the criteria for admissibility of expert opinions in India concerning handwriting and document examination. This provision allows courts to rely on the opinions of individuals with

²⁴²⁸ Section 471, Indian Penal Code, 1860

²⁴²⁹ Section 489A, Indian Penal Code, 1860

²⁴³⁰ Section 489B, Indian Penal Code, 1860

²⁴³¹ Section 489C, Indian Penal Code 1860

²⁴³² Section 489D, Indian Penal Code, 1860

²⁴³³ For persons who creates or uses a document resembling currency notes with deceptive intent - fine not exceeding one hundred rupees; individual whose name appears on an offence-related document but refuses to disclose their identity and address when requested by law enforcement officers may be fined no more than two hundred rupees.

²⁴³⁴ Section 45, Indian Evidence Act, 1872

²⁴³⁵ Section 46, Indian Evidence Act, 1872

²⁴³⁶ Section 47, Indian Evidence Act, 1872

²⁴³⁷ Section 47A, Indian Evidence Act, 1872

²⁴³⁸ Sections 59-61, Indian Evidence Act, 1872

²⁴³⁹ Section 62, Indian Evidence Act, 1872

²⁴⁴⁰ Section 63, Indian Evidence Act, 1872

²⁴⁴¹ Section 64, Indian Evidence Act, 1872

²⁴⁴² Section 65, Indian Evidence Act, 1872

²⁴⁴³ Section 73, Indian Evidence Act, 1872

²⁴⁴⁴ Section 90, Indian Evidence Act, 1872

specialized expertise in fields such as science, art, handwriting analysis, or fingerprint examination. Nevertheless, expert opinions are considered supportive rather than conclusive. Courts usually seek corroborating evidence before arriving at a verdict solely based on handwriting or document scrutiny. Legal precedents emphasize the importance of having expert testimony meticulously analyzed and substantiated by logical reasoning.

2. Requirements for Admissibility:

For questioned document evidence to be accepted in court, several critical criteria need to be fulfilled:

- **Relevance:** The document and the expert's conclusions must have a direct connection to the issues at hand.
- **Expert Competence:** The examiner should have appropriate qualifications, training, and experience.
- **Scientific Reliability:** The methods employed must rely on established scientific principles and validated procedures.
- **Proper Chain of Custody:** The document should be correctly preserved, managed, and documented to avoid any tampering or contamination.
- **Clear and Reasoned Opinion:** The expert is required to articulate the basis for their conclusions in a comprehensible manner, supported by demonstrative evidence such as charts, enlargements, or laboratory reports.

In jurisdictions like the United States, expert testimony needs to be scientifically valid, testable, peer-reviewed, and widely accepted within the relevant scientific community for courts to apply standards set forth in cases such as *Daubert v. Merrell Dow Pharmaceuticals, Inc.*²⁴⁴⁵ Although India does not officially follow the *Daubert* standard, its courts are progressively examining the reliability and scientific foundation of forensic methodologies.

²⁴⁴⁵ 509 U.S. 579 (1993).

Challenges in Legal Admissibility of Questioned Document:-

Despite technological progress, several issues still influence the admissibility and credibility of questioned document evidence.

1. Subjectivity in Handwriting Analysis:

Unlike DNA profiling or fingerprint analysis, handwriting comparison does not require a uniformly quantified statistical database. Expert judgment is often necessary for interpreting similarities and discrepancies. Defense attorneys frequently challenge conclusions, arguing that they are subjective rather than objectively measurable.

2. Lack of Standardization:

Although guidelines exist, variations in reporting styles and laboratory techniques can affect consistency. The absence of uniform national or international standards raises questions about the reliability of results.

3. Technological Advancements in Forgery:

Modern forgery methods utilizing high-resolution printers, scanners, and digital editing software have made document fraud more sophisticated. Identifying digitally altered documents requires specialized knowledge; if contemporary techniques are not employed, the evidential value may be compromised.

4. Ink Dating Limitations:

While chemical analysis can differentiate inks, accurately determining their age remains a difficult scientific endeavor. Courts tend to be cautious when specialists provide precise dating without sufficient supporting evidence.

5. Chain of Custody Issues:

Improper handling, storage, or transportation of documents can lead to allegations of tampering. Minor procedural errors may affect admissibility or lessen the weight of the evidence presented.

6. Courtroom Presentation

Difficulties:

It is essential that scientific findings are communicated in clear and understandable terms. If juries or judges encounter confusion due to technical jargon or overly complex explanations, the persuasiveness of the evidence may suffer.

7. Cross-Examination and

Contradictory Opinions:

Opposing parties often present their own experts whose testimonies may conflict with one another, creating doubt about forensic findings. Consequently, the court must evaluate the reasoning, methodology, and credibility behind each expert's opinion.

Need for Reform and Strengthening:

To tackle these issues, it is crucial to implement the following actions:

- Accreditation of forensic labs
- Implementation of standardized procedures and peer-reviewed methods
- Ongoing training and certification for examiners
- Incorporation of digital forensic knowledge
- Clear reporting that includes explanations of limitations
- Increased research into statistical approaches for handwriting analysis

Enhancing scientific rigor improves the trust in the judicial system and minimizes the chances of wrongful convictions or acquittals stemming from unreliable expert testimony.

Conclusion:

A specialized and scientifically grounded area essential for the justice system is the forensic examination of questioned documents. Forensic specialists utilize advanced methods, such as handwriting comparisons, microscopic inspections, spectral analysis, ink and paper assessments, electrostatic detection of indented writing, and digital document evaluations, to identify forgeries, recognize

alterations, and determine authenticity with increasing accuracy. These scientific approaches have significantly improved the reliability of documentary evidence in both criminal and civil cases. The integration of chemistry, physics, and digital technology into document analysis has enhanced the ability to uncover concealed entries, differentiate between various inks, scrutinize printing techniques, and expose sophisticated forgeries. However, the field continues to grapple with challenges related to subjectivity in handwriting assessments, constraints in ink dating practices, a lack of universal standards, and evolving digital manipulation methods despite advancements in technology. Consequently, courts approach such evidence with caution, emphasizing the importance of expert qualifications, validated methodologies, and proper chain of custody.

Ultimately, while scientific precision plays a crucial role in determining legal admissibility, other considerations—such as transparency, procedural soundness, and the expert's ability to effectively convey findings in court—are equally significant. When executed and presented appropriately, forensic analysis of disputed documents serves as a powerful tool against fraud, facilitates conflict resolution, and ensures that justice is based on reliable and impartial evidence.