

FORENSIC SCIENCE
IV SEMESTER
UNIT- IV
WRITING INSTRUMENTS & THEIR CHARACTERISTICS

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INTRODUCTION TO WRITING INSTRUMENTS

The writing instrument is one of the important aspects of writing because a person used to write with an ink pen may write with a slight difference from a ball pen which cannot be recognized at once. There are many writing instruments but it can be classified as further:-

- Writing surface such as paper, leaves, metals, etc;
- Instrument of writing (Pen, Pencil etc.);
- Ink blood, plant juices, chemicals etc.

WRITING SURFACE: PAPER

The majority of documents are written, typed or printed on paper. Paper is a versatile material formed pressing together the moist fibers typically called pulp which is being obtained from wood, grass, reed and drying them into a flexible sheets. The name 'paper' is derived from the Greek word 'Papyrus', this was a plant *Cyperus papyrus*. The Papyrus is the thick paper like material produced from the pith of the *Cyperus* plant, which was famously used in ancient Egypt civilization.

Modern paper developed by Chinese in 2AD. Paper was invented in China more than two thousand years ago, but knowledge of its manufacture was slow to spread into Europe. The exact date when paper was first made in Europe is not known; it was certainly first made in France in the 12th century and knowledge of the paper making process had spread to England by A.D. 1600.

The paper spread from Chinese to middle-east and Europe. In 19th century came at the level of economical level. In 1844 the Canadian inventor Charles Fenerty and German inventor F.G. Keller, they developed the modern technique for development of paper from pulp.

Paper is made up by the processing of wood and fibers. Logs of the woods are cut into the logs from which pulp is formed. Pulp is formed by chopping of the wood into very small piece and boiled with water with few chemicals until they turn into slushy pulp. After pulp formation, it is processed either in chemical or mechanical process to form a paper.

Chemical process- It is done by dissolving the finely chopped wood in cooking boiling liquor. It separates lignin(acidic nature) from wood. Paper formed is called refined paper because it contains only cellulose. Paper also called wood free paper in regarding of the absence of the lignin. The quality produce is good but quantity is less.

Thermo-mechanical process- Wood is chopped and fed into the steam heated refineries when the chips are squashed and made into fibers pressing between two steel discs.

Ground wood mechanical process- Wood is ground in the form of the powder. Barks/logs are fed into grinders ad then they are heated with water and finally fed into rotating rollers and obtained as the large paper sheets.

Additives (e.g. Alum) or fillers are added as it helps in sizing in reference to paper. Usually size varies from 0.07-0.18mm in thickness. China clay, chalk, CaCO₂, etc helps in the sizing or making of the special paper.

Loading agents are also used in the manufacturing of paper for providing proper weight to the paper according to the requirement such as Aluminium silicate like kaolin, Magnesium silicate like talcum, Calcium sulphate (Gypsum), Calcium carbonate.

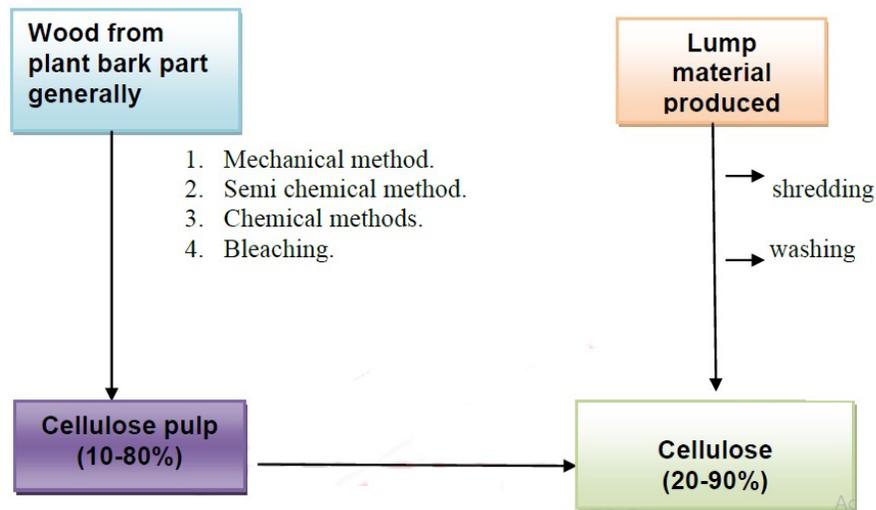


Figure: Manufacturing process of paper

WRITING INSTRUMENT

The use of the graphite and coal was in action before the development of the instruments used for writing like pen, pencil etc. The choice of writing instrument determines the type of work to be done at that particular surface with a specific instrument of writing and all these specificities which vary from instrument to instrument can be of utmost importance for the examiner to determine the exact source of writing instrument used and any other significance of using that specific writing instrument. The use of writing instrument is also dependent on the habit of a person. Some person like to write with gel point pen on a neat and smooth surface of writing while some others use ball point pen and write on a comparatively rougher surface.

DIFFERENT TYPES OF WRITING INSTRUMENT & THEIR CHARACTERISTICS

Writing instruments are identified on the basis of the class characteristics. For the analysis or examination of these characters stereo microscope is used.

Ball pen were invented in late 1800s, it wasn't until 1945 that they came into mass production. The ball pen consists of a small rotating ball fitted into a socket like device at the end of a tube which acts as the ink reservoir. The ink is fed through ball housing by the gravity and when ball rotates with the motion of pen, a thin film of ink in the form of the inked transforms on to the writing surface. The ink used in ball pen is a viscous past like material unlike usual fluid ink used in the fountain pen. Ball pen produces rounded or solitary line. In ball pen during writing sometimes the ink does not pass through the rolling ball and thus the production of strokes lacks ink in the strokes and produces an un-inked stroke, which is called as **skipping**. Similarly there is another term known as **gooping** which is known for the dark deposits of ink.

Fountain pens are used from the ancient time and are considered very classic, very few people are used to its use and thus this is in itself a peculiar feature of its use. It generally has two flexible nibs which help in the production of lines of varying width depending mainly on the flexibility of points and pressure applied during writing. Most of the fountain pens of modern scenario have comparatively stiff nib point which restrict shading and produce strokes comparable to the uniform strokes of porous tip pens. One of the most important features is that they use liquid ink which has a tendency to penetrate deep into the paper fibers. The fountain pen which consists of broader nib point gives rise to comparatively more shaded strokes and the nature of shading depends on angle of pens.

The **pencil** is one of the most ancient writing instruments and the best factor about this writing instrument is that it has maintained its place as an important writing instrument. This instrument has a non-flexible writing tip which is continuously rubbed off while depositing solid matter in the form of written line on the surface of paper. Depending upon the degree of hardness, writing pressure and nature of the writing surfaces, the pencil strokes vary in their nature and intensity. When one writes with a weak pressure the wear graphite is lesser and the

deposits on the surface of paper is weak, producing lighter strokes and when one writes with heavy pressure the wear of graphite is more and the deposits on the surface of paper is greater producing darker strokes. Due to smooth and rounded point, the pencil, like a ball pen enables the writer to write faster than he would write with fountain pen. This can be of little benefit to all the forgers if the bank allows the signature on the withdrawal form to be done by pencil, because this instrument of writing reveals less about the pen lifts, pen pause etc. as in the case of pens.