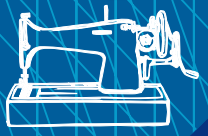
Unit 1



Introduction to Sewing Machine

17915CH01

Introduction

A sewing machine is used to stitch the fabric and other pliable materials together with threads. Sewing machines were invented during the first Industrial Revolution to decrease the quantum of manual sewing done in garment industries. Since its invention, it has greatly improved the efficiency and productivity of the fabric, garment and needle industries.

The different parts of a sewing machine and its functions help the Operator to know the functioning of a sewing machine. There are different types of sewing machine used in the manufacturing of garments and other articles, but here in this Unit, we will study only single needle lock stitch machine.

A sewing machine controls the fabric with feeding devices and forms a perfect stitch to join the fabrics. It has various parts and attachments, each of which have their own importance and use. There are mainly two categories of sewing machines that is, domestic sewing machine and industrial sewing machine.

A Sewing Machine Operator should have the knowledge and skills to operate the different types of sewing machine. The Operator should know about the various operations of the sewing machine, its parts,

their functions, its attachments and the terms related to stitching. Some of the common and important terms are explained in this Unit.

SESSION 1: SEWING MACHINE AND ITS TYPES

Introduction to sewing machine

Before the invention of a useable machine for sewing, everything was sewn by hand. Many early efforts tried to replicate this hand sewing method but were mostly a failure. It looked to embroidery, where a needle was used to produce decorative stitches but not for joining the fabrics.

The final look of any garment or article depends on how the different components are attached together by sewing. Any variation in sewing leads to a defective material. Thus, sewing must be done with caution.

Sewing can be broadly classified in two categories—hand sewing and machine sewing. Hand sewing may be used for temporary purposes or sometimes, it may be used for some special purposes like hemming, buttonhole making, blanket stitch, etc. Here in this session, our main focus is on the sewing machine. The basic thought behind sewing machines is to mechanically stitch two or more pieces of material—mainly fabric, together using thread and a needle. Sewing machines reduce the amount of manual sewing in preparing a garment or any other article. Sewing machines help the operator in getting the work done quicker, with greater accuracy and much more consistently.

Evolution of the sewing machine

The sewing machine device was invented in 1790 by English inventor, Thomas Saint, but he could not advertise his invention. He designed a wooden awl to make holes in leather and canvas, thus allowing a needle and single piece of thread through to hook underneath, and forming locked chain stitches. Josef Madersperger began developing the sewing machine in 1807 and he presented the working machine in 1814.

John Greenough patented the first sewing machine in the United States in 1842. Elias Howe created a sewing machine in 1845.

The sewing machine's recognition quickly spread like wildfire, initially selling to clothing manufacturers so that they could construct standardised clothing sizes on a larger scale. In 1860s, there was a quick popularity of these machines in the middle class section. Later in 1889, the machines run by electricity were designed with motors fixed in them. At first, these were standard machines with a motor strapped on the side. As with the expansion of the power in houses, these became more popular and the motor was gradually introduced into the casing. Later innovations include the ability to make more sophisticated stitching patterns. In the twenty-first century, sewing machine companies have manufactured several type of machines used for different sewing techniques and there are also computerised machines, embroidery machines and special purpose machines manufactured. The latest machines have LCD screens, microprocessors, and pre-programmed fonts.

Categories of sewing machine

The following are the main categories of sewing machine.

Domestic sewing machines

These are designed mainly for one person to sew individual dresses while using a single stitch type. Modern sewing machines are designed in such a way that the fabric easily glides in and out of the sewing machine, speeding the stitching process and saving time and energy. Some key points for domestic sewing machines are as follows.

1. Domestic sewing machines are usually used in homes by people simply interested in sewing.
2. These are commonly used by people in a variety of projects for dressmaking, and for stitching simple home furnishing items.
3. With little changes, these machines can perform a variety of stitch types.

4. Domestic sewing machines usually work on lightweight fabrics or work pieces.
5. These machines run on significantly smaller motors compared to that of the industrial sewing machines.

Industrial sewing machines

1. Industrial sewing machines are a heavy-duty version of a standard basic sewing machine, and it is used in garment and other related industries.
2. Industrial sewing machines are used for mass production.

Fig.1.1: Operators working on industrial machines

3. These are heavy-duty machines that work thousands of stitches per minute.
4. An industrial machine is well equipped with a clutch and large servo motor.
5. Industrial machines are mainly designed to perform one single specific function in assembly-line based factories.
6. Some industrial machines are designed to operate heavier than normal material.
7. Mainly, mass production requires an industrial sewing machine, which is designed to sew heavy material speedily, such as leather, canvas, and vinyl, at one time.

8. The industrial machines are named based on the function that they serve. Typical names for industrial machine class include pocket setter, buttonhole, and programmable pattern sewers, etc. For instance, a pocket industrial machine can sew 2,000 pockets in an eight-hour production cycle.
9. Programmable machines can store 10–30 or more patterns in the memory.
10. Special purpose industrial machines can give better output in production, for example, buttonhole machines, pocket setter, pattern sewer.

Industrial sewing machines are larger, faster, more complex, and more varied in their size, price and task.

The following are the comparison between domestic and industrial sewing machines:

1. The industrial machine is faster, stitching from 3000–6000 stitches per minute, while the fastest domestic sewing machine stitches not more than 1500 stitches per minute.
2. The presser foot (See Session 3) on a power machine is raised and lowered with a knee lift to a special foot pedal. On domestic machines, it is generally operated manually using a lever at the back of the needle bar.
3. Lubrication is done automatically in industrial sewing machines whereas it is done manually in domestic sewing machines.

Types of sewing machine

Though there are different types of sewing machine but mainly, three types are considered for sewing, as given below.

1. Mechanical sewing machines
2. Electronic sewing machines
3. Computerised sewing machines

1. Mechanical sewing machines

These machines are less expensive and are the simplest type of sewing machines in terms of build. They are the hand-operated sewing machine and treadle sewing machine.

Fig.1.2: A hand-operated sewing machine

Fig.1.3: Treadle sewing machine

Hand-operated sewing machine

(i) This is the simplest form of domestic sewing machine which is operated by hand.

(ii) A handle is attached to the flywheel (See Session 3) which is detachable and is used to operate the machine.

(iii) A hand-operated sewing machine is generally used for domestic purpose for simple projects as it does not work very speedily.

(iv) This machine is suitable where there is no electricity supply.

Treadle sewing machine

(i) This machine is the same as a hand-operated sewing machine but it is operated by feet, with an additional stand attached to the machine.

(ii) A belt is attached to the lower stand passing through the balance wheel and driven by feet.

(iii) These machines run faster than the hand-operated sewing machine.

(iv) This machine is also suitable for the places where there is no electric supply.

(v) When handling the treadle sewing machine, both the hands of the Operator are free to handle the fabric. Hence, this speeds up the work of sewing.

2. Electronic sewing machine

These machines became popular during the 1970s. There are many more features in an electronic sewing machine than in a mechanical sewing machine.

(i) These sewing machines run faster than manually operated machines.
(ii) In the electronic machines, balance wheel comes to motion by a belt, which is attached to an electric motor.
(iii) A single motor is attached to the electronic sewing machines and this motor supplies power to the needle.
(iv) It is essential to control the speed of this machine by putting pressure on an electronic foot pedal.
(v) Practice is essential to handle an electric sewing machine.

3. Computerised sewing machines

(i) These sewing machines are very fast and specific to use.
(ii) These machines are similar to the electronic sewing machines. However, a computerised sewing machine works with the help of various softwares.
(iii) Computerised sewing machines allow the Operator to tailor the functions according to the sewing needs. A computerised sewing machine functions very appropriately in designing and stitching various components of the garment like sleeves, yokes, pockets, etc. These advanced computerised machines have an LED display or LCD display or touch screen. They are multi function machines and are expensive.

The following are some other types of sewing machines according to their specific applications.

(i) Lock stitch machine
(ii) Chain stitch machine
(iii) Double chain stitch machine
(iv) Buttonhole machine
(v) Button stitch machine
(vi) Bar-tack machine
(vii) Feed off arm machine
(viii) Over-lock machine
(ix) Blind stitch machine
(x) Over-edge machine

Fig. 1.4: Lock stitch machine

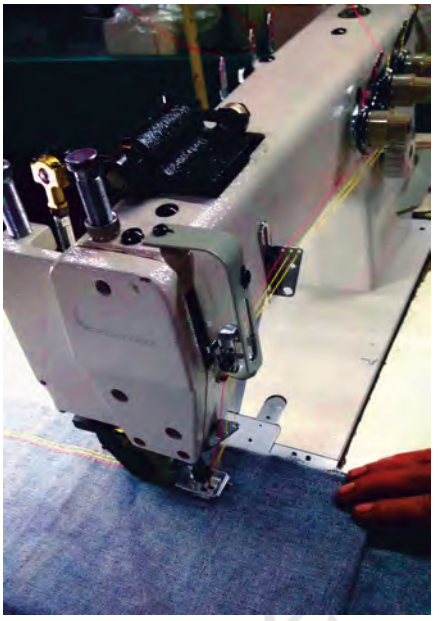


Fig. 1.5: Chain stitch machine

Fig. 1.6: Double chain stitch machine

Fig. 1.7: Buttonhole machine

Fig. 1.8: Button stitch machine

Fig.1.9: Bar-tack machine

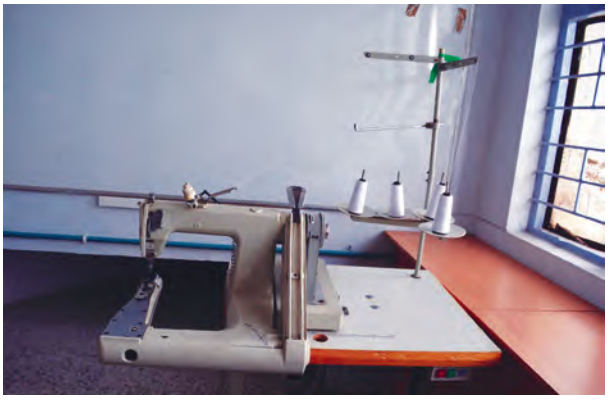


Fig. 1.10: Feed off arm machine

Fig. 1.11: Over-lock machine

Fig. 1.12: Blind stitch machine

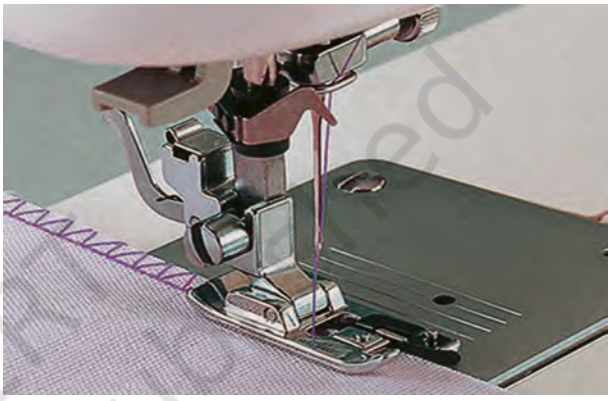


Fig. 1.13: Over-edge machine

Practical Exercises

Activity 1

Prepare a chart of the different type of sewing machines.

Material Required

1. Chart sheet
2. Pictures of sewing machines
3. Adhesive/glue
4. Scissors
5. Coloured pens/pencils

Procedure

1. Search and collect the pictures of different type of sewing machines.
2. Cut the pictures very neatly with scissors.
3. Paste them on a chart sheet.
4. Label them.
5. Place the chart in the classroom/practical lab.

Activity 2

Visit the garment manufacturing industry/local distributors of sewing machines/boutiques/workshops/units of garment making and designing.

Materials Required

1. Notebook
2. Pen
3. Camera (if available/mobile phone with camera)
4. Vehicle (bus) for field visit

Procedure

1. Visit a garment manufacturing industry/local distributors of sewing machines/boutiques/workshops/units of garment making and designing with your teacher.
2. Observe the different parts and attachments of a sewing machine and its functions.
3. List the type of sewing machines used and write about their functions.
4. Prepare a report of the field visit.

Check Your Progress

A. Fill in the blanks

1. _____ sewing machines are those usually used in homes by people simply interested in sewing.
2. A _____ sewing machine works with the help of various softwares.
3. _____ sewing machines use a single motor that supplies power to the needle.

B. Short answer questions

1. Enlist the different type of sewing machines.
2. Write short notes on:
   (a) Electronic sewing machines
   (b) Computerised sewing machines
3. Write the difference between a domestic and industrial sewing machine.

C. Long answer questions

1. Write down the different categories of sewing machine.
2. Explain mechanical sewing machines in detail.

Session 2: Terminology Related to Sewing and Garments

There are some special terms related to sewing and garments which a Sewing Machine Operator should know to facilitate the task.

A

Anchoring stitches

Machine stitches sewn with zero stitch length to keep from pulling out the stitch/thread, or the end of seam where one stitch backwards for some stitches to anchor the stitch

Apex

The highest point on the bust for ladies' garment

Armhole

It is a hole for the arm where bodice joins the sleeve. It is important to have the depth and width of the armhole to be perfect for an individual, especially when clothes are closely fitting.

Armhole scye

It is used to describe the scooped out curve of the armhole on a block or pattern.

B

Balance

It refers to the hang and proportion of the garment. Fashion does determine balance to a certain extent, for example it is appropriate to wear long tops over short skirts. Where the flat pattern cutting is concerned, it is often difficult to judge correct balance until the garment is test-fitted.

Balance point

It is a mark made on the various pieces of the garment to maintain a balance while stitching.

Baste

To stitch the pieces of a fabric together temporarily (long running stitches) created by hand or by machine.

Basting

Long, loose stitches employed to hold two pieces of fabric together until they can be sewn firmly by hand or by machine.

Bell sleeve

A style of sleeve that is full and flared at the elbow or wrist level.

Bias

It is a diagonal line across the grain of the fabric. When used to substitute crosswise or lengthwise grain in pattern placement, a bias cut will cling to the figure following body curves closely.

Bias cut

Any diagonal cut that is not on the lengthwise or crosswise grain is a bias cut.

Binding

It is a strip of fabric used to cover a seam edge or enclose raw edges. It can be straight or bias.

Blind hemming (stitch)

It is a hemming (stitch) that is not visible on the face of a fabric or garment.

Bobbin winder tension angle

It is a device situated near the bobbin winder which helps to wind the bobbin evenly.

Bodkin

Long, flat, needle-like tool used to thread elastic through a loop

Brocade

In textiles, woven fabric having a raised floral or figured design that is introduced during the weaving process. The design, appearing only on the fabric face, is usually made in a satin or twill weave. The rich, fairly heavy fabric is frequently used for evening dresses, draperies, and upholstery.

Button

It is usually round in shape and is used to close an opening in the garments or any other article. It is used for decoration purpose also. Buttons are available in the market in different size, shape, material and colours.

C

Cambric

It is a soft, plain weave cotton or linen fabric closely woven, usually given a slight stiffening.

Canvas

It is a general classification of strong, firm, closely woven fabrics usually made with cotton, originally made of hemp. Produced in many grades and qualities, it may be softly finished or highly sized.

Carding

It is a mechanical process that disentangles, cleans and intermixes fibres to produce a continuous web or sliver suitable for subsequent processing.

Centre point

The point that is equally distant from every point on the circumference of a circle or sphere or place in the middle.

Chain stitch

It is a stitch formed by making connected loops that form a chain.

Cheesecloth

It is a plain weave, thin cotton fabric, loosely woven. It has a slight crepe texture

Chiffon

It is a very lightweight, sheer silk or manufactured filament fabric made in a plain weave with fine, hard spun yarn of approximately the same size in warp and filling and the same number of ends and picks per inch. The finish is dull and soft, or sometimes stiff. The fabric is delicate but relatively strong.

Clip

It is a small snip or cut made in the edge of fabric. All curved edges must be clipped so that the fabric lies flat when final pressing is done.

Combing

It is a technique whereby fibres are passed through a series of straight, metal teeth in order to lay the fibres parallel to one another.

Cords

It is thin, flexible string or rope made from several twisted strands.

Corduroy

It is a strong durable fabric with a rounded cord, rib, or wale surface formed by cut pile yarn. The back of the goods has a plain or a twill weave.

Couching

A method of embroidering in which a design is made by various threads or cords laid upon the surface of a material and secured by fine stitches drawn through the material and across the cord. Couching is either raised or flat.

Crêpe

It is a general classification of fabrics that may be made of silk, rayon, acetate, cotton, wool, manufactured fibres, or blends, characterised by a broad range of crinkled or grained surface effects.

Cross grain

It refers to the yarn direction that is perpendicular to selvedge.

Crotch point

This is where the inside leg seams meet the crotch seams in a trouser. The exact position depends on the figure but the crotch point should be towards the front of the body.

Cutting board

It is a specially constructed, folded, corrugated board which opens out to cover a table or bed to provide a surface on which the pattern is cut out or made.

D

Dart

It is a wedge or diamond-shaped section removed from the surface area of a garment part by stitching.

Dart intake

The intake is the extra quantity of fabric taken while making the dart.

Denim

A well-known basic cotton or blended fabric usually woven in a 2/1 or 3/1 warp- faced right hand twill. Generally, the warp is dyed blue or sometimes brown with a white filling

Dobby weave

It is a style of patterned weave consisting of small frequently repeated geometric designs.

Double-fold hem

It is a hem that is folded once for the hem allowance and a second time to enclose the raw edge.

Double needle

Two machine needles attached to a single shaft that sews two parallel rows of stitches at once with two spools of thread and one bobbin. Sometimes it is known as twin needle.

Drafting

It is a step/system for pattern making that depends on the measurements taken from a dress form or model, or the actual measurements, to create basic/foundation or design patterns of the garment or article.

E

Ease

It is the amount of space added to the measurements in order to ensure that there is space to move while wearing the garment. The amount varies according to the current fashion.

Easing

This is needed when joining two edges that are of different lengths and shape. The longer edge makes a slight bubble of fabric as it is seamed, which provides a slight ease for movement. Examples of easing include sleeve heads into armhole, back shoulder on to front shoulder, back edge of sleeve seam on to front edge at elbow level.

Edge stitch

It is a kind of straight stitching very close to the edge of a seam, trim, or outer edge. It secures seam allowances, prevents the edge from stretching, and supports the fabric.

Eye

It is the part on the needle that carries the thread to keep forming stitches.

Eyelets

It is a small hole, usually round and finished along the edge, as in cloth or leather for the passage of a lace or cord.

F

Fabric weight

The weight of a fabric depends on the thickness of the threads it is made of, of the density of the weave or knit, as well as its composition. The dyeing or printing process can also affect the weight. The weight will be measured in grams per square metre (g/m^2 or gsm) or in ounce per square yard (oz/y^2, often abbreviated to oz.)

Very light: upto 4 oz. (135 g/m^2)
Light: 4 to 6 oz. (135 g/m^2 to 200 g/m^2)
Medium: 6 to 8 oz. (200 g/m^2 to 270 g/m^2)
Medium-heavy: 8 to 10 oz. (270 g/m^2 to 340 g/m^2)
Heavy: 10 to 12 oz. (340 g/m^2 to 400 g/m^2)
Very heavy: above 12 oz. (400 g/m^2)

Fabric width

It is the fabric cut from one selvedge edge to the other selvedge.

Feeding devices

These are the parts of a sewing machine which are used to advance and raise the fabric while stitching.

Felt

It is a non-woven sheet of matted material made from wool, hair, fur, or certain manufactured fibres. It is an entanglement of a mass of fibres that takes place by a combination of heat, moisture, and pressure; no bonding adhesive (sticking material) is used.

Filament

It is a fibre of indefinite or extreme length. This length permits the use of filament in yarn without twist or with very low twist.

Flare

It is a shaped fullness added to the different parts of a garment. While cutting a pattern, flare is added by cutting from the top to the bottom of the basic shape of the garment and spreading the pieces at one edge only.

Floss

It is a soft thread of silk or mercerised cotton for use to clean between tension discs, feed dog, etc. It may be used to clean the area between two narrow parts.

Flounce

It is a full circular edging for the neckline, sleeves and hems.

Forearm seam

It is the seam nearest to the front of a two piece sleeve.

Frill

It is a strip of fabric of any width gathered and attached to a garment as an edging.

Fringe

It is a decorative edge made of hanging strings of thread or fabric. It is an edging or border of loose threads, tassels, or loops. These may be produced by the constituent threads or by threads added to a fabric after weaving or knitting. The threads forming the fringe are

sometimes bunched or knotted together to increase the decorative effect.

Fullness

It is an extension on one of two sections of a garment joined by a seam, used to create volume or shape in the garment.

Fusible

It is a type of fabric or material that has heat-sensitive adhesive on one side that enables it to bind to another fabric.

Fusible interfacing tape

It is available in a variety of narrow widths. On heating, this tape fuses to fabric to stabilise a seam or edge.

Fuzz

It refers to the fibre ends that protrude from a yarn or fabric.

G

Gather

It means becoming contracted into wrinkles/small folds, creases, etc., as cloth/fabric. Gathers are made by sewing parallel rows of running stitch near the garment edge and then pulling or drawing the stitching thread so that small folds are formed.

Gathering

It allows for making a long piece of fabric to fit with a shorter piece of fabric and also is a method of easing a seam to allow insertion of sleeves and another rounded pattern pieces.

Gingham

It is a medium weight cotton fabric, plain weave and yarn died; made with carded or combed yarns. Gingham varies in quality, depending upon the type of yarn, fastness of colour, construction and weight.

Godet

It is a flared or triangular insert in the hemline of any garment.

Grain

It is the direction of yarns in a woven fabric along the length to across the width. It is important for a good fit and the garment should be cut on the right grain or in other words on grain. An on grain garment hangs evenly and appears symmetrical. If the garment is off-grain, it will not hang straight.

Grain line

It is a line drawn from end to end on the pattern piece to show how the pattern should align with the lengthwise grain of the fabric. The pattern pieces will always be placed parallel to the selvedge on the fabric in the direction in which the grain line is drawn on each pattern.

Gusset

It is a small piece of fabric inserted in the seam to allow room for movement. Gussets are mostly required in *kalidar* kurta sleeves to allow arm movement.

H

Halter

It is a style of neckline that has a strap or an extension of fabric running from the front armhole to around the back of the neck edge.

Ham

A tailor's ham or dressmaker's ham is a tightly stuffed small pillow used as a curved mould when pressing curved areas of clothing, such as sleeves, darts, waistlines collars, or cuffs.

Hand overcast

A hand stitch that wraps around an edge like a spiral

Handle

It is attached to the handle attachment of the machine and helps to drive it with hand.

Hem

It is an edge finish used to finish the bottom edge of a garment or any other article.

Hem allowance

It is the distance between the cutting line and the hemline

Hemline

It is the lowest edge of the garment once the hem is sewn.

Hemp

It is a fine, light-coloured, lustrous, and strong bast fibre, obtained from the hemp plant. The term hemp is often incorrectly used in a generic sense for fibres from different plants.

Hook

A piece of metal or other hard material curved or bent back at an angle, for catching hold of or hanging.

I

Interfacing

It refers to a sew-in or fusible fabric used to stabilise the fashion fabrics. It can also add body, reinforce, or shape.

Interlacing

During stitching, when one thread passes over or around another thread or loop of another thread, it is called interlacing.

Interlooping

It is the passing of a loop of thread through another loop formed by a different thread.

Intralooping

When a loop of one thread passes through the loop of the same thread during sewing

J

Jacquard weave

It is a decorative weave which is manufactured on a jacquard loom. In this weave, detailed and intricate designs are made. Manufacturing of the jacquard designs involves at least two basic weaves in various

arrangements to form the pattern. Brocade is a common example of the jacquard weave.

L

Lawn

A fine, plain weave, relatively sheer cotton fabric made in close constructions

Linen

This fibre is obtained from the stem of the flax plant. Linen is a strong and durable fabric.

Lining

A fabric (usually lightweight) which helps to cover the stitching details on the inside of the garment

Loop stitches

These are stitches formed by the loop section of a serge or over locker.

M

Marking chalk

These are made of coloured powder that is used to transfer markings on to the fabric.

Mending

It is a finishing process in fabric manufacture in which irregularities such as weaving imperfections, tears, and broken yarns are repaired after the cloth is taken from the loom. It is primarily done on woollen and worsted woven fabrics to prepare them for further finishing.

Mercerised thread

It is a boil-fast (that is, damage resistant at the boiling temperature), plied, corded cotton thread which has been treated with caustic soda, to give it more strength, lustre and affinity for dyes.

Mercerising

It is a treatment of cotton yarn or fabric by swelling in strong alkali. The process causes a permanent swelling of the fibre, increasing its lustre, strength, and affinity for dyes.

Muslin

It is basically an unbleached plain woven cotton fabric used for making test fits. It is available in light, medium and heavy weight. Medium quality is used for test fitting and draping. It is used by the designers to check the fit and look of the design before the construction of a garment.

N

Nap

It is a layer of fibre ends raised from the ground weave of the fabric by a mechanical brushing action. In napped fabrics, a fuzzy, fur-like feel is created when the fibre ends extend from the basic fabric structure to the fabric surface. The fabric can be napped on either one or both sides. In napped fabrics, the texture runs in a particular direction and requires all pattern pieces to be cut facing the same direction.

Needle clamp

It is a screw that is tightened to hold the needle in position.

Notch

It is a small cut that is shaped like a V and that is made on an edge or a surface.

O

Organza

It is a lightweight, transparent fabric in plain weave with a crisp hand that usually is made of very fine filament yarns. The most commonly used fibres are silk, nylon, polyester, or rayon.

Overcast stitch

It is a slanting stitch used around cut edges or open parts to prevent raveling.

P

Pattern

It is the paper or cardboard template from which the parts of a garment are traced onto the fabric before cutting out and assembling.

Pile

A surface effect on a fabric formed by upright yarns, cut or loops of yarn raised from the surface of the fabric

Pinning

Attaching pins for keeping the fabric and pattern in place

Plain weave

A weave in which each weft yarn passes alternately over and under each warp yarn in a square pattern that is, the interlacing is one up and one down for the whole length of the fabric

Pleat

It is a type of fold formed by doubling the fabric back upon itself and securing it in place. It is commonly used in garments and upholstery to gather a wide piece of fabric to a narrower circumference.

Ply

It is one of the strands in a yarn. The thickness of yarn is also determined by how many plies or strands it has twisted together.

Point presser

A small tool used to insert into a tight corner or small space for ease of pressing

Point turner

A tool used to turn a sewn corner to the right side with a sharp, crisp point

Polyester fabric

It is a generalised term for any fabric, which is made using polyester yarns or fibres. This name is used for a synthetic, man-made polymer, which, as a specific material, is most commonly referred to as a type called polyethylene terephthalate (PET).

Pre-shrink

Washing the fabric before cutting to allow it to shrink depending upon the type of fabric

Princess seam

It is a lengthwise seam passing through the apex and giving shape to the garment. The seam may originate from the armhole, shoulder and neckline. The seams are named accordingly. For example, a princess seam originating from the shoulder is called a shoulder princess.

Pucker

It is tightly gathered or contracted into wrinkles or small folds, caused due to incorrect density of stitches, blunt point needle, insufficient backing, and incorrect thread tensions.

R

Raw edge

Fabric ends with an unfinished look

Rib weave

It is a variation of plain weave with cords in the warp or weft direction.

Ripping

To cut or tear apart in a rough or vigorous manner to rip open a seam

Rubber ring

This is a ring on the bobbin winder which comes in contact with the nut of the balance wheel. This should never be allowed to become oily which will make it slippery and will not be able to make proper contact with the balance wheel.

Ruffles

It is a pleated piece of fabric often used as trim on clothes. A ruffle on the bottom of a dress is like a fancy wrinkle. It can be used as linear trims to finish any edge of the garment.

S

Seam

A line along which two or more fabrics are joined by fusion, glueing, sewing, stapling. Usually near edges of the fabric pieces.

Seam allowance

It is the area between the edge and the stitching line on two (or more) pieces of material being stitched together. It can range from 1/4 inch wide to as many inches as required (mostly not more than three inches).

Seam finish

Any technique that finishes the raw edges of a seam

Seam roll

It is a cylindrical-shaped long tool used to press open long seams or to slide inside a sleeve for creaseless pressing.

Selvedge

It runs parallel to the lengthwise grain of the fabric which is a tightly woven finished edge of fabric.

Sewing needle

It is a fine cylindrical piece of metal with a sharp point at the lower end, a hole or eye in it, used in sewing.

Sewing threads

It refers to special types of yarns that are designed to pass through a sewing machine. The basic function of a thread is to deliver aesthetics and help in the performance in stitches and seams.

Shank

The back of a button through which the thread passes, to attach the button to the garment

Shears

It is a cutting instrument in which two blades move past each other, like scissors, but these are typically larger. These are also known as large scissors.

Sheer

Any such transparent or very light-weight fabric as sheer chiffon, crepe, georgette or voile of various constructions and yarns, especially silk and manufactured fibre yarns. Sheers are made in both spun and filament yarn constructions.

Shirring

It is a process to gather (an area of fabric or part of a garment) by means of drawn or elasticised threads in parallel rows.

Shuttle

It holds the bobbin case and moves to form the loop as the machine is operated. It is fitted below the feed dog.

Skipped stitches

In skipped stitches, there is no needle thread or looper thread movement during certain respective portions of the stitch cycle. It is one of the most common sewing machine problems. It can be one skipped stitch or multiple skipped stitches between normally sewn stitches.

Snagging

In fabrics, a yarn or part of a yarn pulled or plucked from the surface

Snap tape

It is perfect for keeping bodysuits closed and taut that is, not loose. Snap tape is made up of snap fasteners, sometimes called press studs, which have been applied to pieces of fabric. The snaps are made of mainly metal or plastic.

Stabiliser

In the context of a garment, it is a fabric under the layer used to hold the shape of the fabric/garment or support its strength.

Staple yarn

It is produced from short-length fibres called staple. With the exception of silk, mostly the fibres that come from natural sources are staple fibres.

Stay stitch

Stitching placed on or just outside the seam line, used to stabilise the fabric

Stitch

Loop or loops of one or more threads when bound with each other, either by interlooping, interlacing, intralooping or combination of these three while sewing fabric, each unit of such configuration is called stitch.

Stitches per inch (SPI)

A stitch per inch (SPI) is measured by counting the number of stitches found within one inch. The number of stitches per inch has a direct influence on the seam strength, the stitch appearance and the seam elasticity on stretch fabrics. Using the correct number of stitches per inch can greatly enhance the strength, appearance and performance of the seam for a given fabric type and application.

Stitch length

Length of a stitch determined by the movement of the feed dog.

Stitch line

It refers to a line in the paper pattern where one complete movement of a threaded needle passes through a fabric or material over the line.

Strand

A general term for one component of a rope, thread, or ply yarn, or any of the fibers that are twisted or plaited together to form the aforementioned. Sometimes the term also is applied to the entire rope, cable, thread, or ply yarn.

Stretch fabric

The fabric in which the properties of substantial elongation (stretching) and recovery that is, coming back to its original position, have been produced

Stripe

A design consisting of bends or straight lines against a plain background

T

Tacking

Fastening pieces of fabric together, mostly temporarily, with stitches

Tassels

A bunch of loosely hanging threads or cords knotted at one end and attach for decoration of garments such as dupattas, scarf, kurtis and home furnishing items

Terry

It is a woven fabric, usually cotton, or a blend with manufactured fibre, with loops pile on one or both sides. Loops may cover the entire surface or may form stripes, cables, checks or other pattern. The fabric is noted for its ability to absorb moisture.

Thread tail

The left-out thread, unfinished or untrimmed threads on the edges

Thread tension

The degree of tightness of stitches in machine sewing or the state of the thread being stretched tight

Top stitch

It is a row of continuous stitches on the top or right side of a garment or any other article. It is a sewing technique where the line of stitching is designed to be seen from the outside of the garment, either decorative or functional. Top stitching is used most often on garment edges such as necklines and hems, where it helps facings to stay in place and gives a crisp edge.

Trim

It is any decorative item, ribbon, lace, etc., that is put on a garment or other item that is being sewn. The word trim is also used to define the act of trimming excess seam allowances or fabric with scissors.

Trimming materials

Additional material used for decorative or functional purposes on a garment and on other items are trimming materials.

True bias

Also called true across, it refers to a bias of 45 degrees to the selvedge.

Tucks

A flattened, stitched fold in a garment or material, typically one or several parallel folds put in a garment for shortening, tightening, or decoration

Twill weave

It is a type of textile weave with a pattern of diagonal parallel ribs. This is done by passing the weft thread over one or more warp threads then under two or more warp threads.

U

Upholstery fabric

Any fabric used as upholstery, for example, to cover furniture. It is made in a wide variety of fibres including cotton, linen, silk, wool, manufactured fibres, and blends. Weaves include plain, twill, satin, jacquard and dobby. Some knits are also used.

V

Velvet

It is a warp ply fabric with shorts closely woven cut pile that gives the fabric a rich, soft texture. Originally the pile was made of silk but now, it is also made of cotton, manufactured fibres, and various blends.

Voile

It is a lightweight, sheer fabric, made of hard twisted yarns in a low count plain weave. It is made of cotton, worsted, silk, rayon or acetate.

W

Warp

It is the lengthwise yarns used in the weaving operation. This forms the basic structure of the fabric. Warp yarns generally have more twist than weft yarns because they are subjected to more strain in the weaving process, and therefore, require more strength.

Weft

The crosswise yarn that interlaces with warp in weaving is known as weft or filling yarn. Weft yarns are carried over and under the warp. Filling yarns, generally have less twist than warp yarns because they are subjected to less strain in the weaving process and therefore, required less strength.

Worsted

The yarns spun wholly from combed wool to ensure that all the fibres are reasonably parallel. The fabrics made from such yarns are called worsted fabrics.

Y

Yarn

It is a continuous strand of textile fibres that may be composed of endless filaments or shorter fibres twisted or otherwise held together. Yarns may be single or ply, and form the basic elements for fabric/threads.

Yoke

It is a shaped pattern piece which forms part of a garment, usually fitting around the neck and shoulders, or around the hips to provide support for looser parts of the garment, such as a gathered skirt or the body of a shirt.

Z

Zigzag stitch

The Z-shaped stitches used to finish raw edges. It may be used for decoration purpose also.

Practical Exercises

Activity 1

Collect any ten pictures showing different stitches/parts of a sewing machine/fabric, etc., from the terminology listed above and prepare a scrapbook of the same.

Material Required

1. Scrapbook
2. Ten pictures of your choice from the terminology listed above
3. Adhesive/glue
4. Scissors
5. Coloured pens/pencils

Procedure

1. Search and collect any ten pictures showing different stitches/parts of a sewing machine/fabric, etc., from the terminology listed above.
2. Cut the pictures very neatly with scissors.
3. Paste them in a scrapbook.
4. Label them.

Check Your Progress

A. Fill in the blanks with the most appropriate answer from the choices given below

1. True bias refers to a bias of _____ to the selvedge.
   (a) 90 degrees
   (b) 45 degrees
   (c) 50 degrees
2. Selvedge is a tightly woven factory edge of fabric that runs parallel to the _____ grain.
   (a) width wise
   (b) crosswise
   (c) length-wise
3. _____ is the finished bottom edge of a garment.
   (a) Warp
   (b) Selvedge
   (c) Hem
4. _____ is the distance between the cutting line and the hemline.
   (a) Hem allowance
   (b) Hem
   (c) Hemline

5. _____ is a strip of fabric of any width gathered and attached to a garment as an edging.
   (a) Gathers
   (b) Frill
   (c) Dart
6. _____ is basically an unbleached, plain woven cotton fabric used for making test fits.
   (a) Voile
   (b) Mulmul
   (c) Muslin

B. Arrange the jumbled words

(a) seae	(d) pwar	(g) radngfit	(i) ctshit
(b) iabs	(e) denele	(h) fewt	(j) tpatner
(c) anigr	(f) hteard		

C. Questions

1. Enlist any ten sewing terminologies and explain the same.
2. Explain the given terminologies:
   (a) Grain
   (b) Hem
   (c) Seam allowance
   (d) Selvedge

SESSION 3: VARIOUS PARTS OF A SEWING MACHINE AND ITS ATTACHMENTS

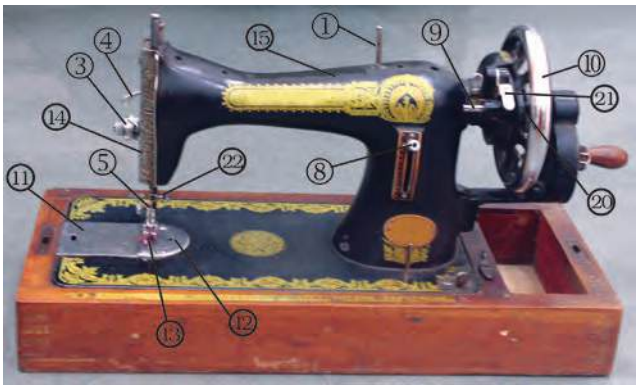
The basic structure of the mechanical sewing machines is the same—whether it is a hand-operated sewing machine, treadle sewing machine or motorised sewing machine.

Sewing machine: parts and their functions

The basic parts of a sewing machine are:

1. *Spool pin* is a metal rod placed on the top of the machine for correct positioning of the reel of thread.
2. *Thread guide* takes the thread from the spool pin to the needle through a small hole. It holds the thread in position from the spool to the needle. It smoothens the thread and protects it from abrasion.

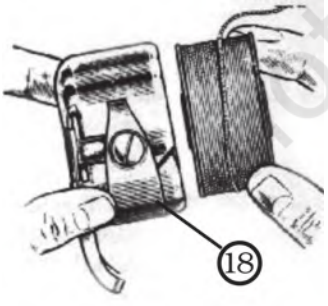
3. *Tension disc* is a combination of two concave discs placed together with the convex sides facing. From spool pin, the thread passes through the thread guide, then between the tension discs to the needle. Tension discs control the delivery of the upper thread from the spool to the needle. The tension of the thread is adjusted by a spring and nut which decreases or increases the pressure.
4. *Thread take-up lever* is a lever fitted to the body of the arm located above the tension disc. It receives its up and down motion from the front axle. At the outside end of the lever, there is a small hole through which the thread passes. The take-up lever first loosens the top thread during the stitch formation, and then removes any slack to set or lock the stitch.



(a)

(b)

(c)



(d)

(e)

Fig.1.14 (a–e): Parts of a sewing machine

5. *Needle bar* is a metal rod to hold the needle at one end with the help of a clamp. Its main function is to give motion to the needle.
6. *Presser foot* is a detachable device for holding the material in place on the feed dog while stitching. This device is not used when attachments for tucks, ruffles or embroidery are used.
7. *Presser foot lifter* is the lever attached to the presser bar (located inside the face plate) to control the up and down movement of the presser foot. It must always be lifted up to take out the material from the machine.
8. *Stitch regulator* controls the length of the stitch.
9. *Bobbin winder* is a device which helps in winding the bobbin (located inside the slide plate) properly. The thread passes through it tightly or loosely, as desired.
10. *Fly wheel (or balance wheel)* is a round wheel located at the upper right of the sewing machine. This is made to revolve the machine. It controls the motion of the machine manually or electrically.
11. *Slide plate* is a rectangular plate, which facilitates the removal of the bobbin case without lifting the machine top.
12. *Needle plate or throat plate* is a semi-circular disc with a hole to allow the needle to pass through it. The fundamental purpose of this plate is to provide a levelled surface for the material and to prevent the dust from entering the inner parts of the sewing machine.
13. *Feed dog* consists of a set of teeth fitted below the needle plate. When the machine is in motion, the feed moves upwards, thus advancing the material as each stitch is made. It helps to move the material forward while sewing.
14. *Face plate* is a cover, which when removed, gives access to the oiling points on the needle bar, presser bar and take-up lever.
15. *Arm* is a horizontal part of the head that houses the drive shafts.

16. *Check spring* is a small wire spring behind or at the top of the tension discs. It provides a little amount of tension on the thread of the needle and acts a shock absorber.
17. *Slack thread regulator* is a metal hook near the tension discs.
18. *Bobbin case* is fixed in the shuttle case placed in the bottom chamber (the hollow space under the slide plate) of the sewing machine and moves into position to catch the top thread and form the stitch as the needle is lowered into the bobbin case. The lower tension of the thread can be adjusted (by loosening or by tightening) by a small screw fixed on the bobbin case.
19. *Clutch or thumb screw* is in the centre of the fly wheel and it engages and disengages the stitching mechanism.
20. *Rubber ring* is a ring on the bobbin winder which comes in contact with the nut of the balance wheel. This should never be allowed to become oily, as it will make it slippery and will not be able to make proper contact with the balance wheel.
21. *Bobbin winder tension angle* is a device situated near the bobbin winder which helps to wind the bobbin evenly.
22. *Needle clamp* is a screw that is tightened to hold the needle in position.
23. *Handle driver* is attached to the handle attachment of the machine and helps to drive it with hand.
24. *Shuttle* holds the bobbin case and moves to form the loop as the machine is operated. It is fitted below the feed dog or to its left side.
25. *Treadle drive* is a large wheel located under the board in the treadle machine. It is connected to

Fig 1.15: Shuttle and shuttle case

the balance wheel with a leather belt. As it rotates, the power is transmitted to the balance wheel by the leather belt.

26. *Treadle* is the foot rest at the base of the treadle machine which is pressed with the feet to operate the treadle machine.
27. *Pressure regulating screw* is the screw above the presser bar, which can be tightened to increase the pressure on the fabric when stitching with fine/ lightweight fabric and loosened to accommodate thick fabric.

Fig.1.16: Blind hem foot

Fig.1.17: Braiding foot

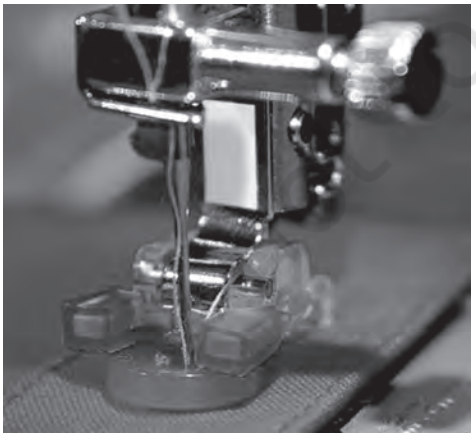


Fig.1.18: Button fixing foot

Sewing machine: attachments and their functions

Different machines have separate attachments for different sewing processes such as hemming, gathering, etc., but they operate differently on various makes of machines. The details of attachments are mostly given in the manual provided with the machine. Students may discuss with the teacher and according to the availability of the sewing machine and attachments, they can practise on it. Some common sewing attachments are given here.

Blind hem foot

It is an additional attachment basically used for edge finishing of various apparels like trousers and skirts, and home furnishing items like curtains, etc. (Fig.1.16).

Braiding foot

It allows lot of flexibility while attaching elastic cord, braid or cord (Fig.1.17).

Button fixing foot

It can attach two-holed buttons and four-holed buttons to the material or garment. In this machine, the foot holds the button in place and then attaches the button to the fabric using zigzag stitch (Fig.1.18).

Buttonhole foot

It is used for preparing precise buttonholes or binding the raw edges. These attachments are complicated to use on straight stitch machines. In such cases, it is advisable to handsew the buttonholes. On a sewing machine, the buttonhole attachment produces a simple buttonhole stitch by swinging the needle from side to side. Insert the attachment by removing the presser foot and putting the buttonhole attachment in its place (Fig.1.19).

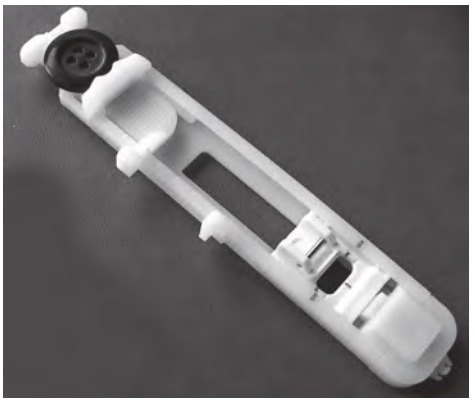


Fig.1.19: Buttonhole foot

Circular sewing attachment

It allows the operator to stitch in a circular pattern using straight stitch, zigzag stitch and any decorative stitches. Circles mostly up to 26 cm in diameter are stitched perfectly using this popular attachment, which is very essential for craft and decorative work. This is suitable for most top loading machines (Fig.1.20).

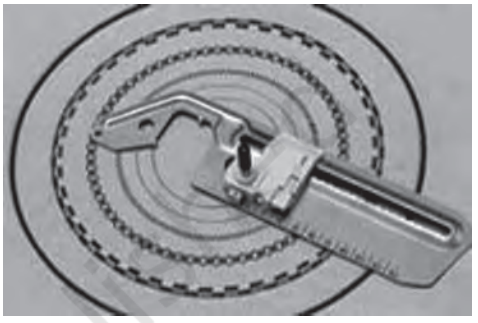


Fig.1.20: Circular sewing attachment

Cording foot

To attach decorative cords and threads, a cording foot is attached to the machine. This foot is designed for stitching closed to a raised edge. It is used for applying cord to the seam (Fig.1.21)

Fig.1.21: Cording foot

Decorative tape foot

This attachment is used to fix trimmings and ribbons on the fabric (Fig.1.22).

Fig.1.22: Decorative tape foot

Gathering foot

It is attached to create gathers on a fabric with high speed and precision to create perfect ruffles. This attachment gathers the fabric as it is stitched with fullness locked in every stitch (Fig.1.23)

Fig.1.23: Gathering foot

Zigzag foot

It is attached to create designs in fabric using zigzag stitches of different widths (Fig.1.24).

Fig.1.24: Zigzag foot

Fig.1.25: Hemmer foot

Fig.1.26: Overcasting foot

Fig.1.27: Ruffling foot

Hemmer foot

It works on the sleek and small edges of fabrics as it automatically curls using either a straight stitch or decorative stitch at the hemlines. It works for hems which are too small to do by hand. It is best suitable for light weight fabrics. Hemmers make hems from three-sixteenths of an inch to seven-eighths of an inch wide, right on the machine. This attachment means hours saved from hand turning and basting. The hem is turned by the hemmer, and at the same time the line of stitching is guided close to the edge of the hem (Fig.1.25).

Overcasting foot

It delivers an accurate and consistent overcasting stitch where the thread is locked around the edge of the fabric and aligned with it to prevent the fabric from ravelling (Fig.1.26).

Ruffling foot

It easily makes and attaches ruffles on different types of fabric and finish the fabric edges. This attachment is capable of taking gathered or pleated frills, and will take and apply frills to another section at the same time. It is useful in making children's clothes and curtains. It is one of the most important attachments of sewing machine, and reflects a great deal of credit upon the inventors of these remarkable time-and-money-saving bits of steel. The method of using this attachment varies with different machines (Fig.1.27).

Zipper foot

It is the footer used for attaching mainly zips and snap tape. Zipper foot has a

narrow toe foot which gives more precision and visibility. The foot needs to be adjusted to right or left to stitch both sides of the zip. This foot also attaches decorative cording and piping. There are two kinds of zip foot attachment: one with an adjustable foot, the other with a non-adjustable foot (Fig.1.28).

Fig.1.28: Zipper foot

Elastic foot

It helps in attaching elastic to the fabric and provides even tension every time to avoid pulling and tugging on the needle (Fig.1.29).

Fig.1.29: Elastic foot

Embroidery foot

It is suitable for shirring fabric. Its design allows the elastic thread to pass easily under the presser foot. On sewing machines, the elastic is couched onto the fabric. The thread is fed through the presser foot hole and pulled gently. The more it is pulled, the more the fabric gathers. On a straight stitch machine, the elastic is wound around the bobbin (Fig.1.30).

Fig.1.30: Embroidery foot

Overlock foot

It is useful for producing a durable finish on seams which fray easily or are bulky. It is suitable for use on a sewing machine and is most effective when the fabric is positioned under the presser foot so that the stitches form slightly over the fabric edge. A metal bar holds the edge in place to make sure that the stitches are set correctly. Test that you have the correct positioning and stitch width before you start to sew. Fig. 1.31 shows the attachment of overlock foot. It can be attached to the sewing machine.

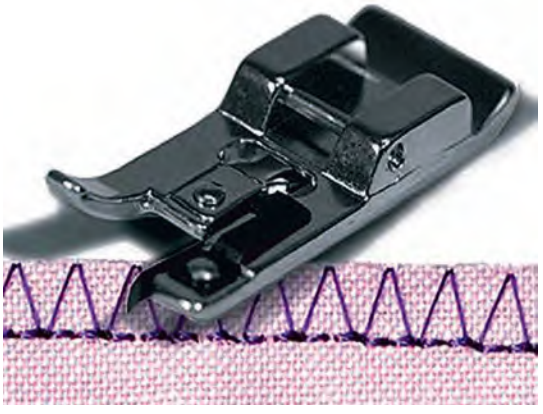


Fig.1.31: Overlock foot

Practical Exercises

Activity 1

Draw the sewing machine and label its different parts.

Material Required

1. Pencil
2. Sharpener
3. Eraser
4. Practical file
5. Ruler

Procedure

1. Draw a diagram of the sewing machine in the practical file.
2. Label the different parts of the sewing machine.

Activity 2

Make a chart of the different attachments of a sewing machine.

Material Required

1. Chart sheet
2. Pictures of different attachments of sewing machine
3. Adhesive/glue
4. Scissors

Procedure

1. Search and collect pictures of different attachments of the sewing machine.
2. Cut the pictures very neatly with scissors.
3. Paste them on a chart sheet.
4. Label them.
5. Place the chart in the classroom/practical lab.

Activity 3

Identify the different parts and attachments of the sewing machine under the guidance of instructor/teacher.

Material Required

1. Sewing machine
2. Different attachments (as per availability)

Procedure

1. Identify the parts of the sewing machine one by one.
2. Identify the different attachments of the sewing machine one by one.

Activity 4

Visit a sewing machine shop/boutique/workshop/garment manufacturing unit. Study the machines and their attachments used. Prepare a report on the parts, attachments and their functions.

Material Required

1. Notebook
2. Pen
3. Camera (if available/mobile phones with camera)
4. Vehicle (bus) for field visit

Procedure

1. Visit the local sewing machine shop/boutique/workshop/ garment manufacturing unit with the teacher and study different types of machine and its latest developments.
2. Identify the different parts of the sewing machine and explain its functions.
3. Identify the sewing machine attachments.
4. Write down the types of sewing machine used in shop/ boutique/workshop/garment manufacturing units and write about its parts, functions and operations.
5. Prepare a report of the field visit using photos and materials collected from the site.

Check Your Progress

A. Fill in the blanks with the most appropriate answer from the choices given below

1. _____ is a metal rod to hold the needle at one end with the help of a clamp.
   (a) Thumb screw
   (b) Bobbin winder
   (c) Face plate
   (d) Needle bar
2. _____ consists of a set of teeth fitted below the needle plate.
   (a) Face plate
   (b) Elastic foot
   (c) Feed dog
   (d) Fly wheel
3. _____ sewing foot delivers a consistent and accurate overcasting stitch around the edge of the fabric
   (a) Ruffling
   (b) Overcasting
   (c) Cording
   (d) Zipper

4. The function of the clutch is to _____ .
   (a) engage stitch mechanism
   (b) raise presser foot
   (c) control the speed of the machine
   (d) feed the thread to the needle

B. Short answer questions

1. Write down the functions of the slide plate and feed dog.
2. Differentiate between a bobbin winder and bobbin case.
3. Explain the function of hemmer foot and zipper foot.
4. Write short notes on:
   (a) Button fixing foot
   (b) Overcasting foot
5. Enlist any five sewing machine attachments.

C. Long answer questions

1. Write down the different parts of a sewing machine and their functions in detail.
2. Write down the functions of any five sewing machine attachments.