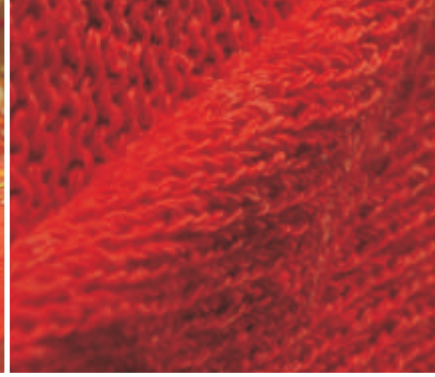
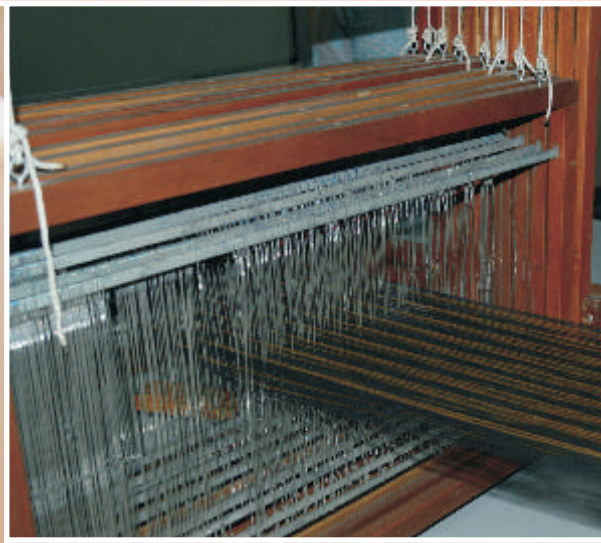
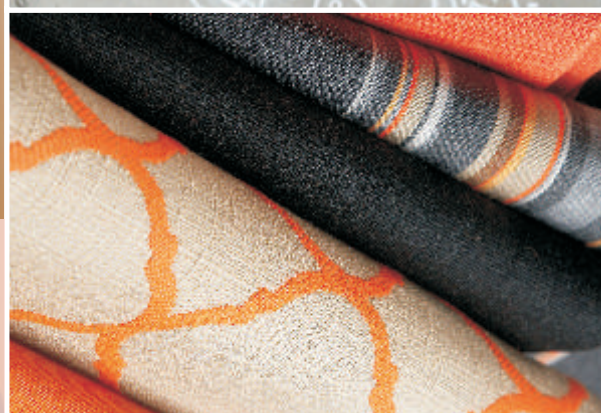




Fabric Study

Students Handbook + Practical Manual Class XII



CENTRAL BOARD OF SECONDARY EDUCATION
Shiksha Kendra, 2, Community Centre, Preet Vihar, Delhi-110301

BUILDING SKILLS•BUILDING FUTURE•

FABRIC Study

Students Handbook + Practical Manual

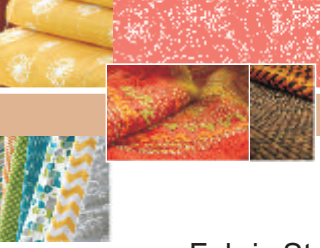
for

Class - XII

CENTRAL BOARD OF SECONDARY EDUCATION

in collaboration with

NATIONAL INSTITUTE OF FASHION TECHNOLOGY



Fabric Study Students Handbook + Practical Manual for Class XII

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भारत का संविधान

उद्देशिका

हम, भारत के लोग, भारत को एक सम्पूर्ण [1]प्रभुत्व-संपन्न समाजवादी पंथनिरपेक्ष लोकतंत्रात्मक गणराज्य बनाने के लिए, तथा उसके समस्त नागरिकों को:

सामाजिक, आर्थिक और राजनैतिक न्याय,
विचार, अभिव्यक्ति, विश्वास, धर्म
और उपासना की स्वतंत्रता,
प्रतिष्ठा और अवसर की समता
प्राप्त कराने के लिए
तथा उन सब में व्यक्ति की गरिमा
[2]और राष्ट्र की एकता और अखंडता
सुनिश्चित करने वाली बंधुता बढ़ाने के लिए

दृढ़संकल्प होकर अपनी इस संविधान सभा में आज तारीख 26 नवम्बर, 1949 ई॰ को एतद्द्वारा इस संविधान को अंगीकृत, अधिनियमित और आत्मार्पित करते हैं।

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1. संविधान (बयालीसवां संशोधन) अधिनियम, 1976 की धारा 2 द्वारा (3.1.1977) से "प्रभुत्व-संपन्न लोकतंत्रात्मक गणराज्य" के स्थान पर प्रतिस्थापित।
2. संविधान (बयालीसवां संशोधन) अधिनियम, 1976 की धारा 2 द्वारा (3.1.1977) से "राष्ट्र की एकता" के स्थान पर प्रतिस्थापित।

भाग 4 क

मूल कर्त्तव्य

51 क. मूल कर्त्तव्य – भारत के प्रत्येक नागरिक का यह कर्त्तव्य होगा कि वह –

(क) संविधान का पालन करे और उसके आदर्शों, संस्थाओं, राष्ट्रध्वज और राष्ट्रगान का आदर करे;

(ख) स्वतंत्रता के लिए हमारे राष्ट्रीय आंदोलन को प्रेरित करने वाले उच्च आदर्शों को हृदय में संजोए रखे और उनका पालन करे;

(ग) भारत की प्रभुता, एकता और अखंडता की रक्षा करे और उसे अक्षुण्ण रखे;

(घ) देश की रक्षा करे और आह्वान किए जाने पर राष्ट्र की सेवा करे;

(ङ) भारत के सभी लोगों में समरसता और समान भ्रातृत्व की भावना का निर्माण करे जो धर्म, भाषा और प्रदेश या वर्ग पर आधारित सभी भेदभाव से परे हों, ऐसी प्रथाओं का त्याग करे जो स्त्रियों के सम्मान के विरुद्ध हैं;

(च) हमारी सामासिक संस्कृति की गौरवशाली परंपरा का महत्त्व समझे और उसका परिरक्षण करे;

(छ) प्राकृतिक पर्यावरण की जिसके अंतर्गत वन, झील, नदी, और वन्य जीव हैं, रक्षा करे और उसका संवर्धन करे तथा प्राणी मात्र के प्रति दयाभाव रखे;

(ज) वैज्ञानिक दृष्टिकोण, मानववाद और ज्ञानार्जन तथा सुधार की भावना का विकास करे;

(झ) सार्वजनिक संपत्ति को सुरक्षित रखे और हिंसा से दूर रहे;

(ञ) व्यक्तिगत और सामूहिक गतिविधियों के सभी क्षेत्रों में उत्कर्ष की ओर बढ़ने का सतत प्रयास करे जिससे राष्ट्र निरंतर बढ़ते हुए प्रयत्न और उपलब्धि की नई उंचाइयों को छू ले;

[1](ट) यदि माता-पिता या संरक्षक है, छह वर्ष से चौदह वर्ष तक की आयु वाले अपने, यथास्थिति, बालक या प्रतिपाल्य के लिये शिक्षा के अवसर प्रदान करे।

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1. संविधान (छयासीवां संशोधन) अधिनियम, 2002 की धारा 4 द्वारा प्रतिस्थापित।

THE CONSTITUTION OF INDIA

PREAMBLE

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a [1]**SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC** and to secure to all its citizens :

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity; and to promote among them all

FRATERNITY assuring the dignity of the individual and the[2] unity and integrity of the Nation;

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949, do **HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.**

---

1. Subs, by the Constitution (Forty-Second Amendment) Act. 1976, sec. 2, for "Sovereign Democratic Republic" (w.e.f. 3.1.1977)
2. Subs, by the Constitution (Forty-Second Amendment) Act. 1976, sec. 2, for "unity of the Nation" (w.e.f. 3.1.1977)

THE CONSTITUTION OF INDIA

Chapter IV A

FUNDAMENTAL DUTIES

ARTICLE 51A

Fundamental Duties - It shall be the duty of every citizen of India-

(a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;

(b) to cherish and follow the noble ideals which inspired our national struggle for freedom;

(c) to uphold and protect the sovereignty, unity and integrity of India;

(d) to defend the country and render national service when called upon to do so;

(e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;

(f) to value and preserve the rich heritage of our composite culture;

(g) to protect and improve the natural environment including forests, lakes, rivers, wild life and to have compassion for living creatures;

(h) to develop the scientific temper, humanism and the spirit of inquiry and reform;

(i) to safeguard public property and to abjure violence;

(j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;

[1](k) to provide opportunities for education to his/her child or, as the case may be, ward between age of 6 and 14 years.

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1. Subs. by the Constitution (Eighty - Sixth Amendment) Act, 2002

Foreword

The Indian textile and fashion industry contributes substantially to its exports earnings. It is also the second largest domestic employer after agriculture. The garment industry is classified into organized and unorganized sectors catering to a diverse consumer segment. The unorganized segment comprises small-scale readymade apparel stores, independent fabric and tailoring shops etc. The organized sector comprises single-brand or multi-brand retail outlets, designer boutiques etc. to cater to different strata of consumers. The domestic apparel market is expected to grow @ 11% CAGR primarily driven by high value growth due to organized and branded segment. The Indian textile and apparel trade is estimated at USD 662 billion in 2011 and is expected to grow at 5% CAGR by 2021.Employment in the Indian textile and apparel sector stands at 45 million with an additional employment of 60 million in allied sectors.

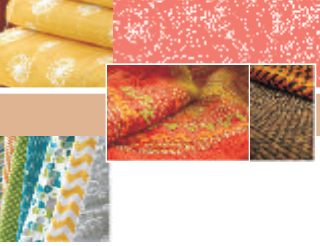
The Central Board of Secondary Education (CBSE) has taken the initiative of developing a range of vocational courses in areas of emerging interest for those students who may not pursue higher education due to financial constraints or for any other reason. In keeping with this objective, the vocational course on Fashion Design Garment Technology (FDGT) for students of Std XI and XII offers an option to those who would like to enter the fashion industry right after completion of secondary level of education. While academic courses have more theory-based curricular content and do not develop extensive hands-on skill competency, it is envisaged that vocational courses will inculcate not only knowledge but also the related skills which are required by specific industry segments. The FDGT course combines a gamut of theoretical with practical inputs in order to enable students to gain professional competency education in the area of fashion design and garment technology.

The content of the subject is the outcome of consultative discussions among CBSE officials and teachers, senior NIFT faculty members and alumni, industry members representing the export and domestic garment sector including fashion designers.

The Board would like to place on record the support received from Shri P K Gera, IAS, Director General NIFT and Sr. Prof Banhi Jha, Dean - Academic. We also acknowledge the contribution of Sr. Prof. Banhi Jha, Prof. Vandana Narang - Project Anchor, Prof. Malini D, Dr. Rajitha & Mr. K.D. Sharma faculty of NIFT for their time and effort in developing the FDGT textbooks for Std XII. The contribution of Dr. Biswajit Saha, Additional Director and Ms. Swati Gupta, Deputy Director Vocational Education Cell, CBSE is also deeply appreciated.

Any suggestions and feedback from the readers for improvement in the future editions of the subject is welcome.

Shri Vineet Joshi
Chairman, CBSE



Preamble

Textile products play a vital role in meeting man's basic needs. Often interpreted only as clothing the usage of textiles goes beyond the scope of just clothing. The use of textiles has been traced back over 8500 years and fabric forms the base of fashion. Fashion and textiles sector is very dynamic, and is constantly changing in response to the demands of the global marketplace. The common theme running throughout these areas is an understanding of the properties of fibers, yarn and fabric composition and its value addition.

Fashion Design and Technology as a profession includes the entire process of designing and producing fashion apparel for which an understanding of the fibre, yarn and fabric and their properties is essential. The subjects of this course provide an insight on usage of fabrics and the basic techniques of value addition through embroidery, dyeing and printing. The main objective of the course is to develop professional competency in the field of textiles - its appreciation, understanding of various techniques of surface ornamentation, and exploration of traditional techniques of embroidery.

Fabric study as a course introduces the students to fundamental aspects of textiles, appreciation, ornamentation and value addition. The students develop the skill of handling and using fabric in various aspects of design and also provide a direction to choose their career for further studies.

Acknowledgement

CBSE

- Sh. Vineet Joshi, IAS, Chairman
- Sh. M.V.V. Prasada Rao, Director (Vocational and Edusat)
- Dr. Biswajit Saha, Additional Director (Vocational Education)
- Ms. Swati Gupta, Deputy Director (Vocational Education), CBSE Anchor

NIFT Team

- Mr. Prem Kumar Gera, IAS
- Sr. Prof Banhi Jha, Dean (A)

Anchor

- Dr. Vandana Narang, Professor, NIFT

Contributors

- Prof. Malini Divakala, NIFT
- Dr. I. Rajitha, Associate Professor, NIFT

Cover Page Designed by

- Ms. Priyadarshini Venkat, NIFT

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UNIT-1: INTRODUCTION TO FIBER AND YARN

Food, clothing and shelter are the three basic human needs. While food keeps us healthy, shelter offers covering and clothing offers protection. Fabrics are so much a part of daily life that it is impossible to think about survival without them. Clothes, towels, napkins, bed linen, floor coverings, dust clothes etc. The daily life revolves around them and the choice of these to perform the specific function for their application makes them appropriate for usage.

An informal knowledge of textiles is known to all which enables one to think about the choice of clothing for a hot sunny day or a rainy day or a chilly weather. Studying textiles involves a basic understanding of the various units that comprise a fabric

1.1 Terminology, Properties, End uses

Fibers are the smallest part of the fabric. They are fine hair like substances categorized as either natural or man made.

Based on their length fibers can be classified as Staple Fibers and Filament fibers.

- Short Fibers - Staple Fibers
- Long Fibers - Filament Fiber

Fig. 1 Staple fibers

Fig. 2 Filament fiber

Based on their origin Fibers are classified as Natural or Man Made fibers.

Natural fibers are those that are in fiber form as they grow or develop and come from animal, plant or mineral sources. **Man Made fibers** are made into fiber form from chemical compounds produced in manufacturing facilities.

- Natural fibers - Plants and animals
- Man-made fibers - Chemical substances

1.2 Classification of Fibers

- Natural fibers can be further classified upon their source as:
- Vegetable or Cellulosic fibers, may come from the seed, stem or leaves.
- Animal or Protein fibers are obtained from the hair covering of the animal or from the secretions of an insect.
- Mineral fiber is the one that is formed in the ground.
  - Cellulosic fibers- Plant sources (seed, stem, leaves etc) Ex: Cotton, Linen
  - Protein fibers- Animal sources (hair coverings, secretions) Ex: Wool, Silk
  - Mineral fibers - Ground Ex: Asbestos

FIBERS				
Natural			Man Made	
Plant	Animal	Mineral	Regenerated Cellulosic	Synthetic
Cotton	Wool	Asbestos	Rayon	Nylon
				Polyester
Linen	Silk		Lyocell	Acrylic
				Spandex

1.2.1 Vegetable or Cellulosic fibers

Cotton

A Seed fiber, found attached to the seed of the cotton plant is the most important apparel fiber. The fiber is natural cream or tan colored with length ranging between of ½ to 2 ½ inches.

Favourable Properties: Cotton, identified as a comfortable fiber exhibits good strength, high absorption, soft hand and good heat conductivity thus making it an ideal choice for clothing in summer. The fiber is also widely used as medical, surgical and sanitary supplies and possesses good heat resistance and can be ironed at high temperature. Its nature of high absorption enables the fiber to be dyed and cleaned easily.

Unfavourable Properties: The fiber has a little lustre, and wrinkles easily. The fiber is susceptible to attacks by mildew, fungus, silverfish and bacteria.

End uses: The combination of properties like , pleasing appearance, comfort, easy care, moderate cost and durability makes cotton ideal for warm weather clothing, active wear, work clothes, upholstery, draperies, carpets, towels and bedding.

Flax

A bast fiber, obtained from the stem of the Flax plant, the fiber when made into a fabric is called Linen. Is one of the oldest textile fibers, and Linen has been used as mummy wraps. It is a medium weight fiber of naturally light tan color with a fiber length between 2 - 36 inches

Favourable Properties: Has excellent strength and is the strongest of the vegetable fibers. It has slightly more lustre than cotton, and absorbs moisture readily. It has the highest safe ironing temperature.

Unfavourable Properties: Similar to cotton wrinkles easily but can be easily laundered.

End Uses: Linen is majorly used as dress materials and table linen.

1.2.2 Animal or Protein Fibers

Wool

Wool is one of the earliest fibers to be spun into yarn and made into cloth. Wool is a protein

fiber obtained from the hair of the sheep, and is similar to the human hair. It is of a naturally cream, brown or black color with a fiber length of 1 - 18 inches. The best known wool is obtained from Merino sheep, which is native to Australia and New Zealand. It emits a smell of burning hair when burnt and leaves a brittle black bead.

Favourable Properties: The wool fiber is scaly and has crimp in its structure due to which the air gets trapped enabling the body to remain warm. . Wool fiber burns slowly with spluttering and once removed from flame it is self-extinguishing.

Unfavourable Properties: The fiber is very weak and gets even weaker when wet. The fiber is sensitive to alkalis such as strong detergents and hence it is best to dry clean or wash with mild soaps with a very gentle action, otherwise shrinkage or loss of shape may occur . It is readily attacked by moth and carpet beetles.

End Uses: Based in the length and fineness of the fibers wool can be converted into two types of fabrics, Woollens, which are made of shorter lengths of wool fibers and Worsteds, which are made of longer length of wool fibers. Worsteds fabrics are expensive are used as suiting.

Silk

Silk is considered as the “queen of fibers”. The Chinese were the first to develop silk and reel it from the cocoon, in 2600 BC. The discovery of silk is accidental, when the princess was having a cup of hot tea sitting under a mulberry tree a cocoon fell into a cup on trying to remove it from the tea a continuous strand was unraveled. Silk is obtained from the cocoon of bombyx mori whose larvae feeds on mulberry leaves. The cocoons are boiled in hot water to suffocate the moth inside. Once the moth is allowed to grow it pierces the cocoon to escape hence its life cycle in terminated inside the cocoon itself reducing the length of the only naturally occurring filament fiber. Cultivation is called sericulture. Silk produced from other species of moth is known as Wild Silk like Tussah silk, Muga Silk etc.

Favourable Properties: Silk has rich subdued lustre, is porous, which allows the skin to breathe, provides warmth without the weight or itch of wool. It is one of the strongest natural fiber but looses strength when wet.

Unfavourable Properties: Silk is sensitive to heat. A warm iron should be used. The fiber has poor resistance to prolonged exposure to sun light and can be attacked by moth. Curtains and draperies should be protected from direct light as silk weakens faster than cotton or wool. Silk is damaged by alkalis but resistant to acids.

End Uses: Dresses, blouses, lingerie, scarves, men’s ties, upholstery and draperies.

1.2.3 Man Made Fibers

Rayon

Rayon was the first manmade fibre created from cellulosic raw material. Because of its luster and soft hand feel, it resembled silk and came to be known as ‘artificial silk’. However, it is more like cotton in its chemical properties.

Properties: It is very absorbent, and creases very easily, but unlike cotton it is very weak, further loses strength when wet. It burns rapidly with a yellow flame and an afterglow, and emits the smell of burning paper. It should be washed carefully with gentle action in warm water and detergent. The ironing temperature is about 190 degrees Celsius.

End Uses: Rayon is used alone and is often blended with other fibres like silk, linen etc. It has an excellent drape, and so is ideal for drapes and curtains, apparel and other household textiles.

Lyocell

Described as an environmentally friendly fiber, Lyocell is a manufactured fiber produced from wood pulp. The fiber is produced from wood harvested from tree farms specifically developed for this end use. The properties of lyocell fibers are more like those of cotton than any of the other regenerated cellulose fibers. Lyocell can be used by itself or blended with any natural or manufactured fiber. It can be processed in a variety of fabrications and finishes to produce a range of surface effects.

Properties: Lyocell fabrics possess a soft, flowing drape that attracts designers. It will wrinkle but not as severely as rayon, and it performs more like cotton than rayon. It has a soft hand and high absorbency.

End Uses: Hosiery, casual wear, upholstery and window treatment fabrics. Used as blends with wool, cotton and other manufactured fibers.

Nylon

Invented in 1938, this synthetic fibre was used to first make stockings that were cheap and durable and other products as varied as ropes, parachutes, tyre chords, mosquito nets and tent. Nylon is thermoplastic in nature, which means that when it is heated it softens and can be remoulded to any shape, which it retains on cooling. This affords it greater design flexibility as pleats, puckers etc. can be permanently set into the fabric.

Properties: Nylon is known for its high strength, both in wet and dry state. It does not crease or wrinkle, and is very light in weight. It is not absorbent, and also has a problem of static build-up that cause garments to cling to the body, and attract dust and dirt. It pills easily, i.e., the fibres break and form small balls that adhere to the surface of the fabric. It is highly resistant to micro-organisms, and mild acids and alkalis. Nylon is an easy-care fabric-machine washable and drip dry, and requires very little ironing. It is heat sensitive and so should be ironed at very low temperatures (not more than 135 degrees Celsius) to prevent scorching.

End Uses: Socks, ropes, parachutes, tyre chords, mosquito nets and tents

Nylon is used for lingerie, hosiery and laces. Carpets, rugs, ropes swimwear, upholstery are some other uses of nylon.

Polyester

Polyester, also known as Terelene, is one of the most commonly used synthetic fibres.

Polyester is thermoplastic in nature. It is also an easy care fibre and can be made into wash and wear fabrics. Polyester fabrics should be ironed at 145 degrees Celsius.

Properties: It has good strength, which does not decrease on wetting. The fibres are light in weight and do not show wrinkling and creasing either. They are not absorbent, which makes them difficult to dye and remove stains from. For this reason and also because they are poor conductors of heat, they are unsuitable for warm weather wear. They show pilling and static build up. Polyester is resistant to weak acids and alkalis, and is not damaged by organic solvents used in dry-cleaning. They are also not damaged by insects or micro-organisms. It melts in the flame, and forms a grey hard non-crushable bead. It emits a dark acrid smoke simultaneously.

End Uses: It is used for outerwear, lingerie, swimwear, and for home furnishings.

Acrylic

Acrylic is used most commonly as a wool substitute. As it is a thermoplastic fibre, it can be given crimp like wool and also be cut to the same staple length as wool. Acrylic can be dry-cleaned or washed, and it dries much faster than wool. Ironing should be done at low temperatures of 135 degrees Celsius.

Properties: it is stronger, lighter and more resistant to microbes than wool. Acrylic does not crease easily. It has better moisture absorption than polyester, but less than nylon. It shows static build up and pilling. Acrylic fibers shrink away from the flame and decompose before melting. This fiber burns with a yellow flame and produce a gummy residue that drips away to form a hard brittle black colored bead.

End Uses: It is used in apparel, blankets and other home furnishing. It can also be blended with wool.

Spandex

Spandex has come to be a very popular fabric not just for sports and exercise wear but also day to day clothing, because of its excellent elasticity. Spandex can elongate 5 to 8 times its original length, and yet return to its original length on releasing. This not only camouflages its low strength but also contributes to its durability. Garments are not made of 100% spandex, rather it is blended with other fibres. Even a small percentage of spandex changes the performance and appearance of a fabric and enhancing its shape retention, crease recovery, and smooth appearance.

Properties: Spandex is not very absorbent and is a poor conductor of heat. It is resistant to body oils and perspiration, and also to chlorine, which makes it suitable for swim wear and exercise wear. Garments with spandex content should not be washed or ironed at very high temperatures as it reduces its elasticity. Ideal ironing temperatures are 135 degrees Celsius.

End Uses: Spandex is used in fabrics for apparel, hosiery, lingerie, and sportswear.

1.3 YARN

What do you find when you pull a thread from a cloth and what happened when you tried opening the thread? You must have found small hair like fibers. A group of such fibers have been aligned together and twisted to form a continuous strand called the YARN. The fibers individually are small and thin and cannot be made directly into a fabric. So they have to be grouped to be made into a yarn which makes them long, strong and thick. The yarns are used to make fabrics.

Yarn is a continuous strand of textile fibers, filaments or materials in a form suitable for knitting, weaving or otherwise intertwining to form a textile fabric.

1.3.1 Yarn Making

The process of conversion of fiber into a yarn is called as Spinning. The spinning process helps to hold the fibres together and makes the yarns strong, smooth and fine. Fibers are converted into yarns by twisting them together, much in the same way as wicks are made for diyas. The direction of twist can either be in a clock wise or anti clock wise and accordingly the twist is referred to as "S" or "Z" twist. The direction of twist does not change the properties of the yarn. The properties of the yarn do depend upon the amount of twist given to the assembly of fibers. The amount of twist given to a yarn is measured as twist per inch (TPI). The amount of twist given to a yarn influences several of its properties:

- Higher the TPI, finer is the yarn
- Twist improves the strength of the yarn
- Increase in twist increases the elasticity of the yarn
- Absorbency of the yarn reduces with increase in twist
- Lustre of the yarn decreases with increase in TPI

Fig. 3 Yarn Twist

Spun and Filament Yarns

Yarns made from short length of fibers like cotton and wool are called spun yarns. Yarns that are made of long length of filament fibers are called filament yarns. The amount of twist given to spun and filament yarns is different. While spun yarns are usually given a higher twist the filament yarns require lower twist.

1.3.2 Types of Yarns

Yarns can be classified into three types:

Single yarns: a group of fibers twisted together to create a yarn.

Ply yarns: when two or more singles yarns are twisted together, they form a ply yarn

Cord Yarns: when two or more ply yarns are twisted together, a cord yarn is formed

Cord yarns are stronger than ply yarns which are in turn stronger than single yarns.

Novelty Yarns

Novelty yarns are also produced by twisting or folding. They are used for decorating fabrics or for giving fabrics a new and unusual structure. Even a simple fabric made from novelty yarns will appear appealing due the element of interest brought in by the irregular yarn structure. These irregularities may be knots, curls, bumps or similar effects. These yarns though may not be strong or durable. Most of the novelty yarns are ply yarns, and based on the purpose, each yarn is referred to as base/core, effect, or binder.

- The **base/core** yarn provides the structure and strength.
- The **effect yarn** creates decorative detail such as knots and loops.
- The **binder yarn** is used to tie the effect yarn to the base yarn if binding is necessary.

Types of novelty yarns are:

Nub Yarns: The effect yarn is wound over the core yarn in such a way that thick and thin areas are created on the yarn

Boucle Yarns: They have large loops projecting from their surface at regular or irregular intervals

Chenille Yarns: these yarns resemble caterpillars, as tufts of fibers are inserted uniformly in the yarn twist, perpendicular to the yarn

Flock Yarns: yarns to which small tufts of fibers are added at regular intervals, and held in place by the twist

Crepe Yarns: yarns which have been given very high twist, and are exhibit a grainy feel.

Spiral Yarns: tow yarns of different colors and twist are pled together in such a manner that the loosely twisted effect yarn is wound on the core yarn which has high twist.

Ratine Yarns: is similar to the boucle yarn, but the loops projecting are held in place by the binder yarn.

Endless variation of novelty effects could be created, by varying the component yarns, color, twist, fiber content etc.

Sewing Threads: Sewing threads are special kinds of yarns. While yarn is any bunch of fibers twisted together, a thread is a yarn with high twist, smooth surface and high strength. Threads are used for stitching purposes, whereas, yarns can be used in making fabrics through the various types of processes like, weaving, knitting, crocheting etc.

SUMMARY

Food, clothing and shelter are the three basic human needs. While food keeps us healthy, shelter offers covering and clothing offers protection. Fabrics are so much a part of daily life, that it is impossible to think about survival without them.

Fibers are the smallest part of the fabric. They are fine hair like substances categorized as either natural or man made. Natural fibers are those that are in fiber form as they grow or

develop and come from animal, plant or mineral sources. Man Made fibers are made into fiber form from chemical compounds produced in manufacturing facilities.

Yarn is a continuous strand of textile fibers, filaments or materials in a form suitable for knitting, weaving or otherwise intertwining to form a textile fabric

The process of conversion of fiber into a yarn is called as Spinning. The spinning process helps to hold the fibres together and makes the yarns strong, smooth and fine. Fibers are converted into yarns by twisting them together, much in the same way as wicks are made for diyas. The direction of twist can either be in a clock wise or anti clock wise and accordingly the twist is referred to as "S" or "Z" twist.

Yarns made from short length of fibers like cotton and wool are called spun yarns. Yarns that are made of long length of filament fibers are called filament yarns. Novelty yarns are also produced by twisting or folding. They are used for decorating fabrics or for giving fabrics a new and unusual structure.

Test your learning:

1. **From the given fibers circle the odd fiber and specify the reason why is it the odd fiber:**

   Cotton Linen Wool Silk

   _____

   _____

2. **Label the following with the correct answer:**

3. **Complete the classification chart.**

Fibers				

4. **Define the following:**

   Single Yarns : _____

   Ply Yarns : _____

   Cord Yarns : _____

UNIT-2: UNDERSTANDING FABRIC STRUCTURES

Fabric is the material that is used to make clothing or household articles.

The third successive stage in the making of a fabric is understanding the various methods of creating fabrics. Following are basic structures that are used to form fabrics which can be listed in the decreasing order of importance as:

Weaving (Interlacing)
Knitting (Interlooping)
Felting (Fiber Entanglement)
Decorative Fabric Constructions – Netting, Lace , Crochet, Braiding, Macramé

2.1 WOVEN FABRICS

You all must have seen the seat of a chair or a charpoy made with nylon or cotton. These are made with tape - when two sets of tapes are interlaced with each other at right angles. Similarly a fabric is also made by interlacing two sets of yarns at right angles.

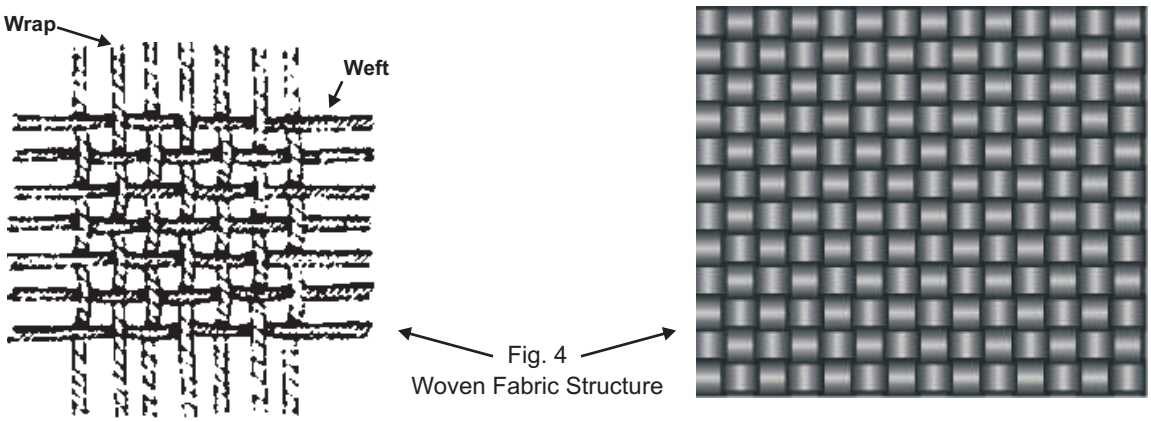


Fig. 4
Woven Fabric Structure

Woven fabrics are made by interlacing two sets of yarns at right angles to each other. The length wise yarns are called the **warp yarns / ends** and the width wise yarns are called the **weft yarns / filling / picks.** The lengthwise edges of the fabric are the selvages.

Grain indicates a direction parallel to either the warp or the weft. Direction i.e. 45 degree to both the warp and weft is termed as bias. The stretch is maximum along the direction of the bias. Woven fabrics have their best drape in the bias direction.

Fig. 5 Grain in a fabric

2.1.1 Making Woven Fabrics

The machine on which the fabric is woven is called a **loom.** The process of making the fabric on the loom is known as **Weaving.**

The loom:

a) The warp beam, located in the back of the loom is a large roller on which the warp yarns are wound. Re The number of yarns depends upon the pre-determined yarns per inch and the desired width of the final fabric. If the fabric is to have warp stripes, the colored yarns are tied as per the pattern of stripe desired on the fabric.

b) The warp yarns pass through the harnesses, that have many vertical wires called heddles, each with an eye in the middle. Each warp yarn is threaded through the eye of one heddle. The purpose of the harness is to lower or raise the warp yarns to create an opening or shed for passing the weft yarn. Minimum two harnesses are required in a loom and as the structure of the fabric design becomes complex, the number of harnesses are increased. In a simple loom all the odd numbers of yarns are attached to one harness and the even number of yarns are attached to the second harness. When the first harness is raised, the odd numbers of yarns are lifted to form a shed. This process is called shedding

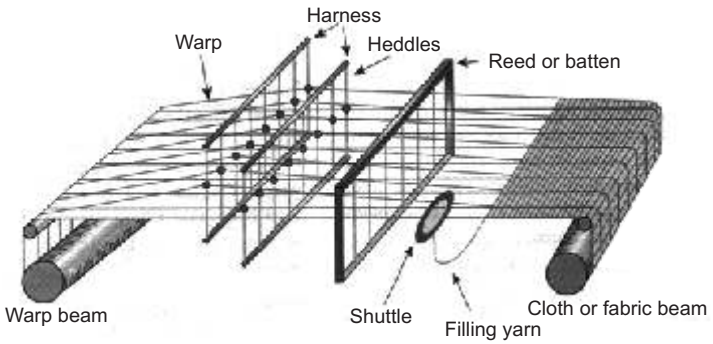


Fig.6 Weaving Loom

c) The weft yarn is inserted in this shed by using a boat shaped device called shuttle, which carries the yarn on a bobbin or pirn. In shuttle less looms the weft is inserted with other devices such as air or water jets. This process is called picking

d) The warp yarns, after passing through the harness pass through a reed. The reed is a frame with thin vertical wires and looks similar to a comb. Once the weft is inserted the reed is pulled by the weaver to make the fabric compact. This process is called beating up.

e) Finally the woven fabric is wound onto a cloth beam which is located in the front of the loom nearest to the weaver. This process is called take up.

2.1.2 Motions of the loom

The weaving sequence is a repetition of the following primary and secondary operations.

The primary operations are:

Shedding: the raising and lowering of the warp yarns by the harnesses to make an opening for the filling yarn to pass through

Picking: the process of inserting the weft in the shed

Beating: Pushing of the newly laid weft against the cloth

Secondary operations are:

Let Off: the slow unwinding of the warp beam to supply more warp yarn to be woven

Take Up: the woven fabric is wound up onto the cloth beam. The secondary processes i.e. take up and let off happen simultaneously.

2.1.3 Basic Weaves

There are many types of weaves used to make different kinds of fabrics like cambric, poplin, matt, satin, velvet, towels, denims, etc. There are three basic weaves. They are Plain weave, Twill weave and Satin weave. All other weaves are a variation or a combination of these weaves.

Plain Weave

It is the simplest and the most used weave. In this case, the warp and weft yarns alternate with each other, i.e. each weft yarn goes over one warp yarn and under the next warp yarn. Fabrics with plain weave are reversible unless one side is made the face by finishing or printing.

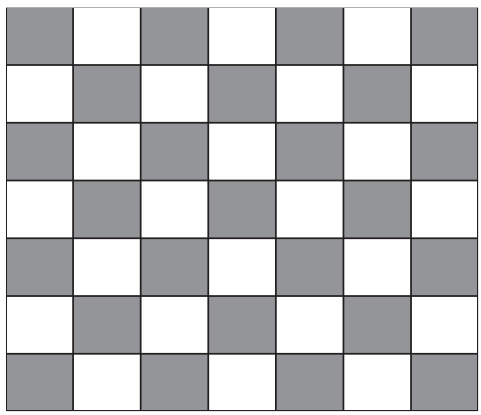


Fig. 7 Plain Weave Construction

Important Features:

Fabrics with plain weave have firm constructions, tend to wear well and ravel less than comparable fabrics with other weaves. Since the surface is plain it offers good background for printed or embossed designs, but the fabrics tend to wrinkle more than fabrics of other weaves. However the fabrics possess no surface interest unless colored yarns are used.

Basket Weave

It is a variation of plain weave. Basket weave is made by having groups of two or more warp yarns interlaced in plain weave pattern

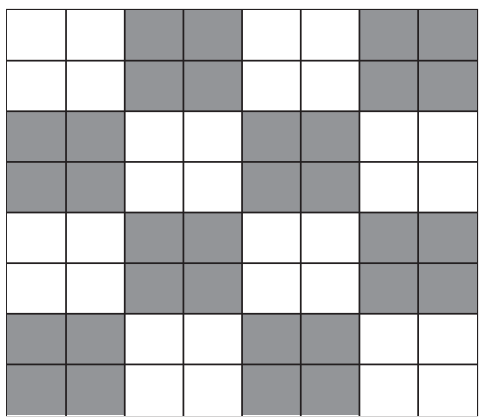


Fig. 8 2 x 2 Basket weave

Important Features:

Basket weave is a decorative weave and is made with relatively low yarns per inch and low twist yarns to increase the weave effect. These fabrics are not very stable since the yarns can move easily

Rib weave

It is usually made by using several yarns as one or a thick yarn in either the warp or weft direction to produce the rib effect. The interlacing is in the plain weave pattern.

Important Features:

The fabrics with rib weave are reversible unless one side is made the face by finishing or printing.

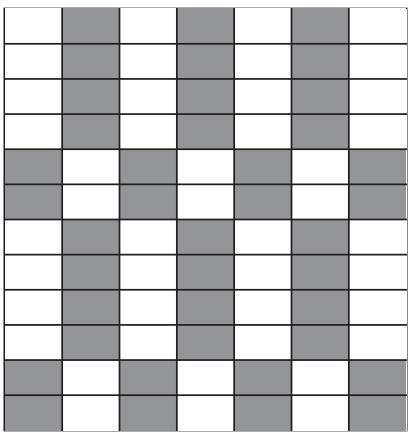


Fig. 9 Warp Rib Weave

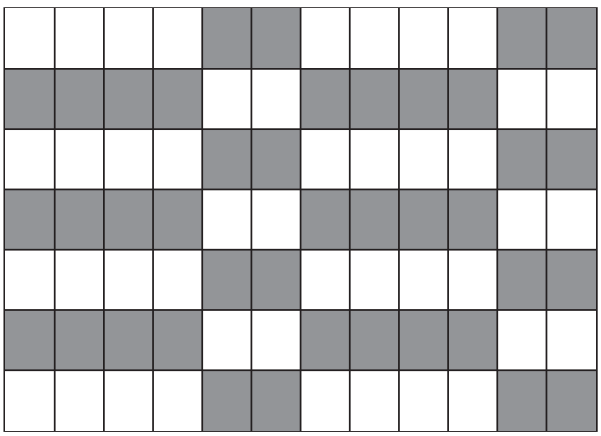


Fig. 10 Weft Rib Weave

Twill Weave

Twill weave produces a diagonal line on the face or the back of the fabric. The direction of the twill can be varied to create interesting effects such as broken twill, herringbone twill, pointed twill etc. Fabrics made by this weave are characterized by high strength and compact weaving.

Important Features:

As the fabric exhibits high strength twills are widely used for work clothes and suiting fabrics

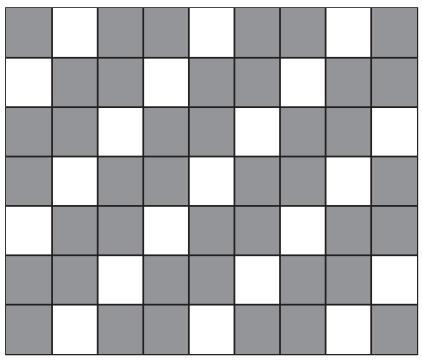


Fig. 11 Twill Weave

Satin Weave

Satin weave is characterized by a smooth, shiny and slippery surface created as a result of long floats present on its structure. As a result the warp yarns are seen more on the surface of the fabric. Reflection of light from these yarns give a shine to the fabric. Satin weave requires 5 to 12 harnesses. Moreover, the yarns used for making this weave have lesser twist as compared to the yarns used for other weaves. All these together give the fabric a soft, smooth and shiny appear.

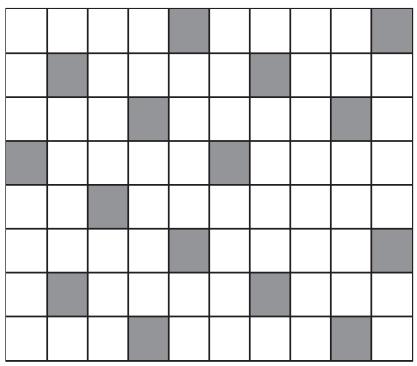


Fig. 12 Satin Weave

Important features:

Satin weave produces a very even surface because of the many warp or weft floats. However, the fabric has a poor wearing quality due to the less interlacements

2.2 KNITTED FABRICS

Knitted fabrics are described as structures produced by the interloping of yarns. Knitting has been a traditional method of producing items such as sweaters, underwear, hosiery and baby blankets. A single yarn or several yarns may be used to for the loops. Loops are formed, and then new loops are drawn through the previously formed loops. The continuous addition of new loops creates the knitted fabric. Apart from using hand knitting needles, commercially knitted fabrics are constructed on knitting machines.

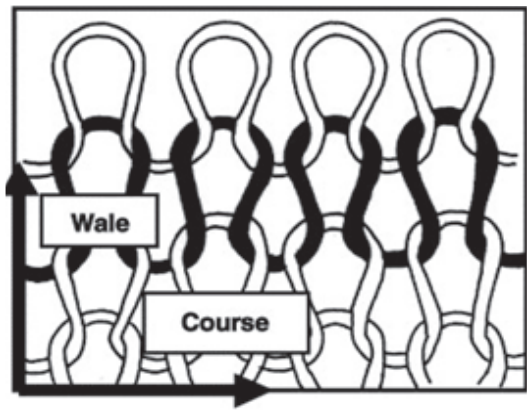


Fig. 13 Knitted Fabric

Basic terms used to describe knits are:

Wale: Vertical column of loops. These can be compared to the warp yarns of the woven

Courses: horizontal row of loops. These can be compared to the weft yarns of the woven.

Stitch: each single loop is called a stitch

Count: Total number of wales and courses per square inch of knitted fabric

Gauge: fineness of the fabric given by the number of stitches/ needles per unit width of the machine

2.2.1 Types of Knits

Knitted fabrics can be classified into two broad categories - Weft Knits and Warp knits

Weft Knits

Is a type of knitting in which yarns run horizontally from side to side across the width of the fabric. Hand knitting is a weft knitting procedure. All stiches in a course are formed by one yarn. Weft knits are made as either flat or open width fabrics (like woven fabrics) on Flat bed knitting machines, or as tubular fabrics (like seamless vests or socks) on circular knitting machines

Warp Knits

It is used for making flat width fabrics. Warp knitting produces a vertical loop structure. The yarns form a vertical loop in one course and then move diagonally to the next wale to make a loop in the following course. The yarns zigzag from side to side along the length of the fabric. Each stitch in a course is made by a different yarn. There is usually one yarn for each knitting

needle. The warp knits produce fabrics such as tricot, raschel etc. Jacquard attachment can also be used to create variations.

2.2.2 Common Knit Fabrics

Jersey: is also known as single knit. Fabrics of this type have all loops drawn to one side of the fabric and are most easily recognized by the fact that the smooth side is the face and the back has textured or mottled appearance. It has low stretch in the width and curls at the edges

Rib knits: they have lengthwise ribs alternating on the face and back. To identify rib knit fabrics it may be necessary to stretch the fabric width wise. The appearance of alternating columns of plain stitches in the lengthwise direction is evidence of a rib knit. Rib knit lie flat and do not curl like the jersey knits. Rib knits have greater elasticity in the width than the length and are often utilized for cuffs, neck lines, collars, sweater bottoms etc.

Interlock: it is a variation of rib knits and appears like two fabrics knitted back to back. These fabrics have low stretch, better shape retention and are easier to cut and sew.

Jacquard knits: they have intricate pattern and design similar to the woven jacquards

Pique: it resembles a miniature honeycomb pattern and is usually seen in sportswear.

2.3 NON WOVEN FABRICS AND FELTING (ENTANGLED FABRICS)

The art of producing fabrics directly from fibers matted together began before spinning and weaving were invented. Felting is the process of making fabric by the entanglement of fibers in the presence of heat, pressure and moisture.

Non-woven fabrics are adhesive bonded fabrics, in which the fibers are held together by a binder such as synthetic rubber, heat bonded fabrics using a mixture of manmade fibers with different melting points and needle punched fabrics, in which the fibers have been entangled by barded needles.

All these non-woven fabrics have special uses such as interlinings and stiffeners for garments, disposable diapers or nappies, tea bags, bandages, hats, filters and carpets.

2.4 DECORATIVE FABRIC CONSTRUCTION

Netting: is an open mesh form of fabric construction that is held together by knots or fused thermoplastic yarns at each point where the yarns cross each other.

Lace: is a derivative of netting. The technique of lace making involve looping, knotting, braiding, twisting or stitching thread into decorative open work patterns.

Crochet: is a simple form of warp knitting, usually done by hand. Basic fabric is made by forming a row of stitches with a length equal to the fabric width and then returning along the chain making double crochet stitches by inserting the needle into previous loops. The technique can create solid fabric or open lace like fabric.

Braiding: is a simple form of narrow fabric construction. The braid is created from a number of interlacing yarns. Braiding is used to create tubular structures such as hose pipes, shoe laces, cords or ropes. The simplest form of braiding is the plaiting of three strands.

Macramé: is created through a technique of knotting, macramé differs from other laces in texture and appearance. It is generally made of heavy yarn knotted into relatively large designs.

SUMMARY

Fabric is the material that is used to make clothing or household articles. **Woven fabrics** are made by interlacing two sets of yarns at right angles to each other. The length wise yarns are called the **warp yarns/ ends** and the width wise yarns are called the **weft yarns / filling / picks.** The lengthwise edges of the fabric are the selvages. The machine on which the fabric is woven is called a loom. The process of making the fabric on the loom is known as **Weaving.**

There are many types of weaves used to make different kinds of fabrics like cambric, poplin, matt, satin, velvet, towels, denims, etc. There are three basic weaves. They are Plain weave, Twill weave and Satin weave. All other weaves are a variation or a combination of these weaves.

Knitted fabrics are described as structures produced by the interloping of yarns. Knitting has been a traditional method of producing items such as sweaters, underwear, hosiery and baby blankets. Knitted fabrics can be classified into two broad categories, **Weft Knits and Warp knits.**

Some of the common knit fabrics are jersy knit, rib knit, interlock, jacquard and pique.

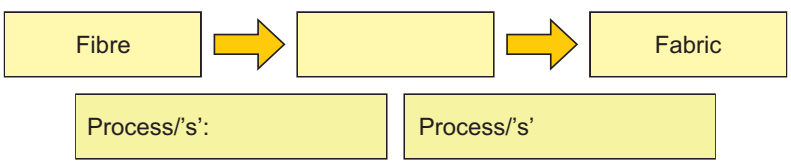
The art of producing fabrics directly from fibers matted together began before spinning and weaving were invented. Felting is the process of making fabric by the entanglement of fibers in the presence of heat, pressure and moisture. **Non-woven fabrics** are adhesive bonded fabrics , in which the fibers are held together by a binder such as synthetic rubber, heat bonded fabrics using a mixture of manmade fibers with different melting points and needle punched fabrics, in which the fibers have been entangled by barded needles .

All these non-woven fabrics have special uses such as interlinings and stiffeners for garments, disposable diapers or nappies, tea bags, bandages, hats, filters and carpets.

Net, lace, crochet, braiding, macramé, are some decorative knit fabrics.

Test your learning:

1. **Fill the missing gaps with respect to conversion of Fibre to fabric and mention the processes of conversion.**



2. Plot the basic weaves:

PLAIN WEAVE

BASKET WEAVE

RIB WEAVE

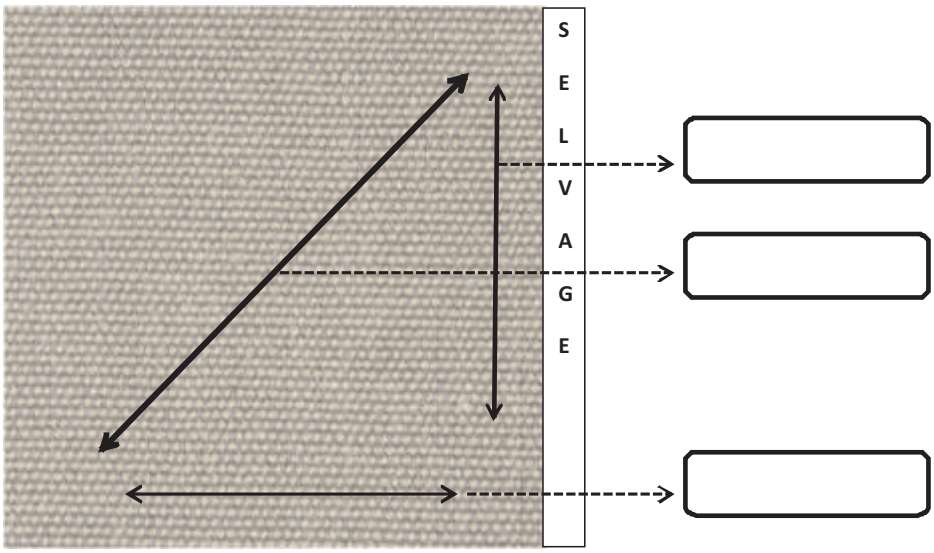
TWILL WEAVE

SATIN WEAVE

3. Match the following:

Knitting	entanglement of fibers
Weaving	smooth surface
Macramé	interloping
Felting	diagonal line
Twill weave	loom
Satin weave	decorative fabric construction

4. Plot the grains of a woven fabric



UNIT-3: FABRIC TERMINOLOGIES AND END USES

The product category of textiles is segmented into three large groupings viz. Apparel, Home furnishings or Industrial. Though not exhaustive, the following segmentation indicates representative classifications of fabric end uses:

Apparel				
Women's wear	Men's wear	Girls wear	Boys wear	Infant wear
Sportswear: Skirts, Blouses, T Shirts, Slacks,				
Swim wear/Beach wear				
Dresses: Casual/ evening wear				
Intimate apparel: underwear, sleep wear, robes, lounge wear				
Maternity wear				
Outer wear: sweaters, coats, jackets, rainwear				
Coats and Suits				
Accessories: hats, scarves, bags, gloves, umbrella, hosiery				
Home furnishings				
Furniture : Upholstery/ Slip covers				
Draperies: Curtains				
Domestics: Sheets/ Mattresses/ Pillows/ Spreads				
Linens: Table cloths, Napkins, Towels, Wash cloths				
Floor coverings: Carpets, Rugs, Paddings				
Miscellaneous: Lamp shades, Throws				
Industrial				
Used in Manufacturing Plants : Conveyor Belting, Printer's Blankets, Tapes, Filters				
Outdoor: Furniture, Awnings, Tents, Boat Sails				
Footwear: Sneakers, Soft Shoes				
Transportation (Automobiles, etc.): Flooring, Tires, Interior				
Miscellaneous: Laundry Bags, Aprons, Luggage, Flags, Hoses				

Brocade: A heavy, exquisite jacquard type fabric with an all-over raised pattern or floral design. Common end-uses include such formal applications as upholstery, draperies, and eveningwear.

Burlap: A loosely constructed, heavy weight, plain weave fabric used as a carpet backing, and as inexpensive packaging for sacks of grain or rice. Also, as fashion dictates, burlap may also appear as a drapery fabric.

Cambric: Fine, light weight closely woven fabric of linen or cotton with a high thread count. It is a plain weave fabric available in white and colors. Used chiefly for hand kerchiefs, children's dresses, underwear and night gowns

Canvas: Cotton, linen, or synthetic fabric made with a basic plain weave in heavy and firm weight yarns for industrial or heavy duty purposes. Also referred to as "duck", although, the term "canvas" usually relates to the heavier and coarser constructions.

Casement: general term for sheer fabrics for curtains of plain weave variations. May be of fine or combination of heavy yarns using any kind of fibers and blends

Chambray: A plain woven fabric that can be made from cotton, silk, or manufactured fibers, but is most commonly cotton. It incorporates a colored warp (often blue) and white filling yarns

Chiffon: A plain woven lightweight, extremely sheer, airy, and soft silk fabric, containing highly twisted filament yarns. The fabric, used mainly in evening dresses and scarves, can also be made from rayon and other manufactured fibers.

Crepe: A lightweight fabric of silk, rayon, cotton, wool, man-made, or blended fibers, and characterized by a crinkled surface. This surface is obtained through the use of crepe yarns (yarns that have such a high twist that the yarn kinks), and by chemical treatment with caustic soda, embossing, or weaving (usually with thicker warp yarns and thinner filling yarns). Although crepe is traditionally woven, crepe yarns are now used to produce knit crepes.

Crepe De Chine: Traditionally, a very sheer, pebbly, washable silk with the fabric degummed to produce crinkle. Today, it is a sheer, flat crepe in silk or man-made fibers. It is used for lingerie, dresses, and blouses.

Damask: A glossy jacquard fabric, usually made from linen, cotton, rayon, silk, or blends. The patterns are flat and reversible. The fabric is often used in napkins, tablecloths, draperies, and upholstery.

Denim: Firm, left hand twill weave of white filling and colored warp usually blue. Strong, durable, heavy weights used for work clothes and sports wear. Lighter weights come in colors and patterns, are softer and may be used for sportswear and furnishings.

Drill: A heavy, strong, durable twilled fabric of cotton or man-made fibers, similar to denim that has a diagonal 2x1 weave running up to the left selvage. When strength of fabric is essential, drill is suitable for slacks, uniforms, overalls, and work shirts.

Felt: A non-woven fabric made from wool, hair, or fur, and sometimes in combination with certain manufactured fibers, where, the fibers are locked together in a process utilizing heat, moisture, and pressure to form a compact material.

Flannel: A medium-weight, plain or twill weave fabric that is typically made from cotton, a cotton blend, or wool. The fabric has a very soft hand, brushed on both sides to lift the fiber ends out of the base fabric and create a soft, fuzzy surface. End-uses include shirts and pajamas.

Georgette: A sheer lightweight fabric, often made of silk or from such manufactured fibers as polyester, with a crepe surface. End-uses include dresses and blouses.

Gingham: A medium weight, plain weave fabric with a plaid or check pattern. End-uses include dresses, shirts, and curtains.

Organdy: A stiffened, sheer, lightweight plain weave fabric, with a medium to high yarn count. End-uses include blouses, dresses, and curtains/draperies.

Organza: A crisp, sheer, lightweight plain weave fabric, with a medium to high yarn count, made of silk, rayon, nylon, or polyester. The fabric is used primarily in evening and wedding apparel for women.

Oxford: A fine, soft, lightweight woven cotton or blended with manufactured fibers in a 2 x 1 basket weave variation of the plain weave construction. The fabric is used primarily for shirtings.

Poplin: A fabric made using a rib variation of the plain weave. The construction is characterized by having a slight ridge effect in one direction, usually the filling. Poplin used to be associated with casual clothing, but as the "world of work" has become more relaxed, this fabric has developed into a staple of men's wardrobes, being used frequently in casual trousers.

Satin: A basic weave, characterized by long floats of yarn on the face of the fabric. The yarns are interlaced in such a manner that there is no definite, visible pattern of interlacing and, in this manner, a smooth and somewhat shiny surface effect is achieved. The shiny surface effect is further increased through the use of high luster filament fibers in yarns which also have a low amount of twist. A true satin weave fabric always has the warp yarns floating over filling yarns.

Terry Cloth: Typical uncut piles weave fabric. This fabric is formed by using two sets of warp yarns. One set of warp yarns is under very little tension; when the filling yarns are packed into place, these loose yarns are pushed backward along with the filling yarns, and loops are formed. Typical uses include towels, robes, and apparel.

Tulle: A lightweight, extremely fine, machine-made netting, usually with a hexagon shaped mesh effect. End-uses include dance costumes and veils.

Velvet: A medium weight cut-pile constructed fabric in which the cut pile stands up very straight. It is woven using two sets of warp yarns; the extra set creates the pile. It is woven on a special loom that weaves two piece of velvet at the same time. The two pieces are then cut apart and the two lengths of fabric are wound on separate take-up rolls. Velvet, a luxurious fabric, is commonly made with a filament fiber for high luster and smooth hand. Velvet is a type of tufted fabric in which the cut threads are very evenly distributed, with a short dense pile, giving it its distinct feel. Velvet can be made from any fiber.

Voile: A crisp, lightweight, plain weave cotton-like fabric, made with high twist yarns in a high yarn count construction. It is similar in appearance to organdy and organza. Used in blouses dresses and curtains.

Worsted: A tightly woven fabric made by using only long staple, combed wool or wool-blend yarns. The fabric has a hard, smooth surface. Gabardine is an example of a worsted fabric. A common end use is men's tailored suits.

SUMMARY

The product category of textiles is segmented into three large groupings viz. Apparel, Home furnishings or Industrial. Fabric are used for various enduses vis a vis., apparel, lingerie, outer wear, home furnishings and other accessories like bags, scarves, hats, socks, etc. A number of fabrics used for different end uses to name some are cambric, poplin, chambray, denim, drill, canvas, brocade, flannel, organdy, etc.

Test your learning:

1. Segregate the following fabrics according their weave structure.

Gaberdine, Organza, Gingham, Drill, Chiffon , Canvas, Chambray, Denim, Voile, Flannel.

_____ Weave	_____ Weave

2. Choose the right answer

a. A pile fabric most suited for bath robes or towels is _____

(Velvet, Terry Cloth, Flannel, Felt, Chambray)

b. Fabric most suitable for napkins, table cloths, upholstery and draperies is _____ (Poplin, Drill, Damask, Canvas, Velvet)

` c. Fabric suitable for veils is _____ (Organdy, Chiffon, Worsteds, Tulle, Oxford)

3. List out the industrial usages of fabrics.

UNIT-4: SURFACE ORNAMENTATION

In the last three decades, Indian textile industry has witnessed drastic changes. The competitive atmosphere and quality consciousness, has reached a new mark. With the steady improvement in technology and application standards, a gradual rise was observed in consumer demands. And to reach up to that mark, a manufacturer has to add something to their products to get some added value for their product. This value added products not only reward with considerable increase in profit but also build the brand image.

This part of the course introduces the students to the knowledge and skill of ornamenting the fabric for value addition. There are various techniques of adding value on textiles like embroidery, appliqué, patch work, dyeing, printing, etc.

4.1 EMBROIDERY

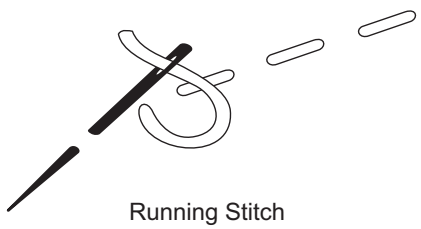
Embroidery is the art or handicraft of decorating fabric or other materials with needle and thread or yarn. There are different types of embroidery which are known by special names such as cut work, appliqué work, drawn thread work, smocking, etc. Embroidery may also incorporate other materials such as, pearls, beads, mirrors, metal strips, sequins, etc. Embroidery is done by hand and machine. Initially, wool, linen, and silk have been in use for thousands of years but today, embroidery is practiced with cotton, rayon, wool, silk, zari, etc.

4.1.1 Common Embroidery Stitches

In general embroidery stitches are worked with two strands of embroidery skein. Sometimes more strands may be used for special effects. In the beginning and ending of the stitches avoid using knots. Begin with a back stitch leaving a short length of the thread (about 2 inches) extending on the wrong side which can be caught and held under the first few embroidery stitches. To end the work, take the thread to the wrong side and work a back stitch again.

a) Running Stitch

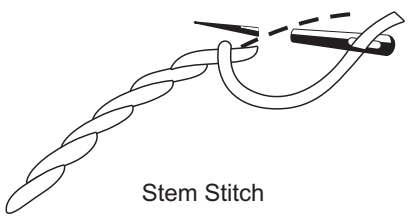
This is an easy outline stitch which can be equal or unequal. Work the stitch from right to left. Bring the needle up at one point and down at the second point as in fig. Pick several stitches on needle at a time before pulling it through.



Running Stitch

b) Stem Stitch

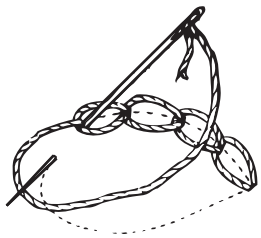
This is a line stitch used for outlining designs especially stems and leaves. It can also be used for filling small designs by working several lines side by side. Work should be done from the bottom upwards each time taking a stitch almost vertically down, but with a slight slant as shown in the fig.



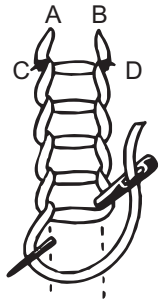
Stem Stitch

c) Chain Stitch

This is one of the most popular embroidery stitches for outlining or worked in close rows for filling an area. Work the stitches towards you starting from the top of the line. Bring the thread out to the right side of fabric. Insert needle in the fabric at the same point, holding the thread down with your left thumb. Bring needle point out a short distance ahead and pull it through, keeping the working thread under the needle. The result is a loop as shown in the fig above. Other variations in the basic chain stitch that can be worked are **open chain, twisted chain,** square chain, etc.



Chain Stitch

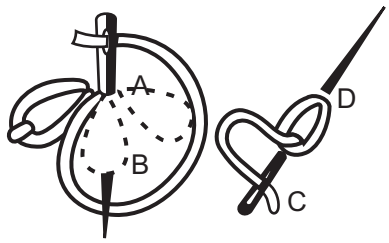


Twisted Chain

Open Chain Stitch

d) Lazy Daisy Stitch

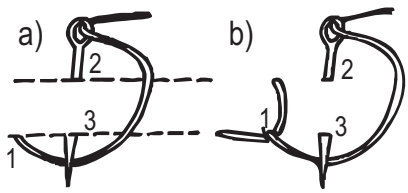
This is an elongated chain stitch used to work petals of small flowers. Bring the thread out on the right side near the base of one petal. Take a long stitch, length of a petal and pull the needle through the fabric, looping the thread under the needle. To hold the end of the loop in place insert the needle down over the thread that forms the loop. Bring out the needle again near the base of next petal as shown in the fig.



Lazy Daisy Stitch

e) Blanket Stitch

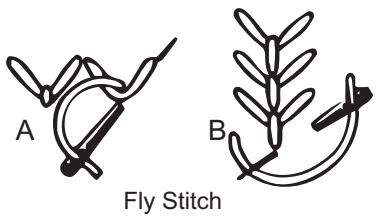
This stitch is used as edging for blankets and other articles or as part of design for which the blanket stitch makes the border. The work should be done from left to right, stitching towards you. Bring thread out on the lower line, insert needle in position on upper line and take a downward stitch with the thread under the needle point. Draw out the thread as shown in the fig. Stitches may be of the same size at regular distances apart or grouped as spaced according to the effect desired.



Blanket Stitch

f) Fly Stitch

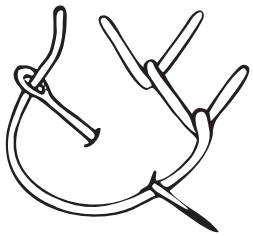
This is an open chain stitch done as V. Work from left to right, bring needle out at a point which will be the top of left side of V. Hold thread down with left thumb, insert needle at the top of the right side of the V and bring it out at the base of the V, keeping the working thread under the needle.



Fly Stitch

Draw out the thread and reinsert the needle below the base of the V to hold the loop in place as shown in the fig.

g) Feather Stitch



Feather Stitch

The working of this stitch is similar to that of blanket stitch, but the stitches slant towards a centre line from either side. First mark a line lightly to indicate the centre line. Work from top to bottom, bring needle out at the beginning of the marked line. Hold the thread down along the centre line. Starting from the right of the line take a stitch with the needle slanting downwards, and bring it out on or near the centre line with the thread held under as shown in the fig. Pull the needle through, and take the next stitch from the left of the line with the needle slanting down and to the right.

h) Buttonhole Stitch

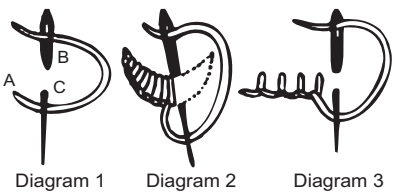
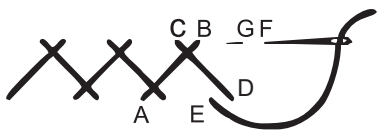


Diagram 1 Diagram 2 Diagram 3

Buttonhole Stitch

It is worked like the basic blanket stitch, except that the stitches are placed very close together to form a firm edge as shown in the fig. This stitch is particularly used in cutwork embroidery. A button whole stitch wheel is a popular method for doing flowered motifs.

I) Herringbone Stitch



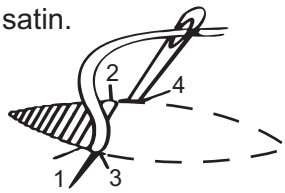
Herringbone Stitch

This is used as a decorative stitch as well as for finishing hems and raw edge seams also. Stitches are worked from left to right along two parallel lines. Bring out the thread at the bottom left hand corner of the work. Insert needle on top line at a point away to the right and take a short stitch through the fabric from right to left so as to get a slanting stitch. Next take a short stitch through the fabric from right to left on the lower line to get another slanting stitch crossing the first one at a point little below the top line as shown in fig. On the wrong side two rows of running stitches are seen. This stitch can be done in the reverse way and used as **shadow work**.

j) Filling Stitches

A couple of stitches are used in embroidery for outlining or filling in spaces or motifs or centre of objects for decorative purposes. Chain, stem, running, french knots, seed stitches, button hole, fishbone, etc are commonly used as filling stitches also. The other commonly used filling stitches are basic satin and long and short satin.

Basic Satin Stitch



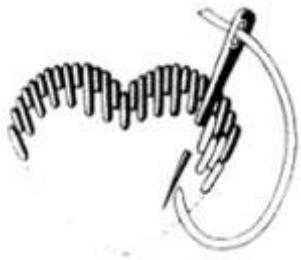
Basic Satin Stitch

This is a filling stitch used to cover regular or irregular shaped spaces. Bring the needle out at the starting point on the right side and take a stitch carrying the

thread across the design and bringing the needle back very close to the starting point. Continue the stitches very closely and evenly till the entire space is filled.

Long and Short Stitch

This is used for filling large shapes and for shading areas in design. Firstly, one row of alternatively long and short stitches are worked side by side closely following the outline of the shape. In the succeeding rows, stitches of equal length about the same as the longer stitch of the first row are worked. In the final row, the stitches should end on the edge of the design. The direction in which the long and short stitches fall is very important for proper shading effect. Before starting, decide the direction in which the stitches will take within each shape.



Long and Short Stitch

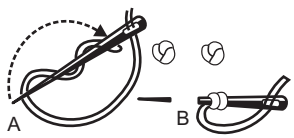
k) Couching Stitch

Lay a single cord or a number of threads of either matching or contrasting color on the line of the design. Catch the laid thread down firmly with another thread of desired color by working small stitches at regular intervals across it as shown in the fig.

Couching Stitch

l) French Knot

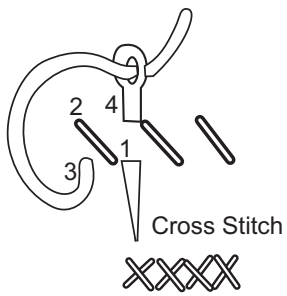
This resembles a knot and is usually applied to the centre of flower. Bring out the thread to the right side. Hold the thread tight with left thumb and wind three to four times around the needle. Now holding the thread firm, insert needle in fabric close to where it first emerged as show in fig. Pull thread to the wrong side and bring out the needle to the point where the next knot is to be worked.



French Knot

m) Cross Stitch

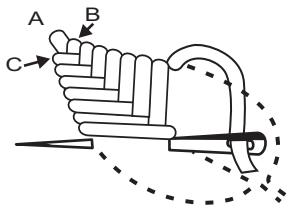
This stitch is suitable to be applied on fabrics with small checks or thick yarns which can be counted. Stitches are worked diagonally from left to right or right to left along two parallel lines. After completing the first round of crosses, work in the opposite direction filling in the second half of crosses as shown in the fig.



Cross Stitch

n) Fishbone Stitch

It is another leaf filling stitch. Its finished effect is similar to a fish bone with a spine down the centre. Bring needle up at point 1 and take a small stitch 2 down the centre line. Bring needle up at 3, insert at 4 directly across from point 3. Exit out from 2, carry yarn under needle point and pull through as

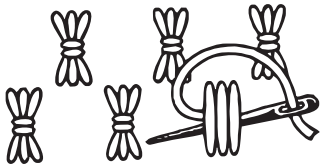


Fishbone Stitch

shown in the fig. Proceed to next stitch. Now point 2 is point 1 of next stitch.

o) Sheaf Stitch

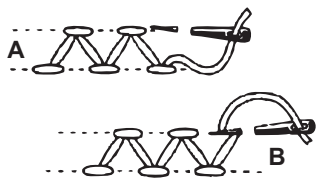
The Sheaf Stitch is commonly used in smocking. However, it would make a striking and bold border if repeated all across the row. First, three long vertical **straight stitches** are worked fairly loosely. Bring the needle up on the left side of the second pleat, and thread the needle under the first Straight Stitch without piercing the fabric. Now thread the needle under all three stitches, without piercing the fabric as shown in the figure. Pull gently to draw the straight stitches together.



Sheaf Stitch

p) Chevron Stitch

This stitch is worked in two lines. Bring the thread through on the lower line on the left side, insert the needle a little to the right on the same line and take a small stitch to the left, emerging at center of the stitch being made. Next, insert the needle on the upper line a little to the right and take a small stitch to the left (A). Insert the needle again on the same line a little to the right and take a small stitch to the left, emerging at center (B). Work in this way alternately on the upper and lower lines.



Chevron Stitch

4.2 DYEING AND PRINTING

Dyeing is the method of coloring the fibre, yarn or fabric using coloring solution i.e., the dye solution. Dyes are coloring substances that are dissolved in water and through a chemical reaction impart a particular hue to the fabric with affecting the feel or hand of the fabric. Dyes can be categorized into:

Natural Dyes	Synthetic Dyes
Historically, the primary source of dye, has generally been nature, with the dyes being extracted from animals or plants. Since the mid-18th century, however, humans have produced artificial dyes to achieve a broader range of colors and to render the dyes more stable to resist washing and general use.	Artificial dyes had their beginning in 1856, when an English chemist, H. W. Perkin, working with coal tar in his laboratory, accidentally discovered the first coal-tar color, a beautiful mauve. A little later, a French chemist discovered the way of getting magenta by means of the same substance, coal tar. In the last fifty years several hundred colors have been produced.
They are obtained from natural resources i.e., leaves, flowers, fruits, roots, bark, stem and seeds, etc.	They are chemical based and available in powder form, pigment form, etc.

Vegetable colors are extracted from logwood, indigo, fustic, cutch, butternut, sumac, madder, brazilwood, safflower, sapanwood, peachwood, camwood, Persian berries, turmeric, saffron, henna, pomegranate rind, etc. Cochineal, an insect, yields a natural dyestuff. Several minerals are also used, as, for example, prussian blue, chrome yellow, and iron buff.	Dyestuffs are now divided by dyers and chemists into the following large classes - acid dyes, basic dyes, direct or substantive cotton dyes, sulphur dyes, mordant dyes, vat dyes, disperse dyes, etc.

Printing is an art, which may be defined as localized dyeing which in turn produces designs in numerous innovative ways. Over centuries, a variety of techniques for printing have been evolved. The application of pattern on to fabric by the use of dyes, pigments or other coloring substances was influenced by a variety of hand and machine processes. The design is transferred on a flat surface using device coated with dye, by simply stamping on to the fabric. The same design may be repeated many times across the fabric and this is called repeat.

Printing can be done manually otherwise called as block printing, screen printing, stencil printing and can also be done on machines most commonly done by flat bed printing, roller printing, discharge printing, etc.

4.2.1 Styles of Printing

There are three basic types of printing - direct, discharge and resist.

1. Direct Printing

The most common and direct approach to apply color pattern on the fabric is by directly printing on a white or dyed background using some coloring agent which is prepared in the form of a paste. The printing paste is prepared by dissolving a known quantity of dye in limited amount of water to which a thickening agent gums, glues, alginates, resins etc may be added to provide necessary viscosity to the paste. Pigment printing is done without thickeners and is used as such; the consistency is obtained by mixing resins, solvents and water in required proportion.

2. Discharge Printing

It is another approach of applying color to the fabric. The color is destroyed or removed from the designed areas of the piece dyed fabric. Sometimes the ground color is removed and printed with another color in its place. Usually, a white or light pattern is desirable to enhance the bright and dark ground color.

3. Resist Printing

In this method, a substance impermeable to dye or water is coated on the fabric in prescribed area which prevents the absorption and penetration of the dye. The resisting agent seals the air pores in the fabric, thus making it non-porous. The resisting agents used may be natural or of synthetic origin e.g., starch, wax, clay, resins, glue, gum, gelatin and synthetic or chemical agents.

4.2.2 Methods of Printing

Patterns produced in different colors and style often add value to enhance the aesthetic appeal, add variety, novelty, symbolism and is a means of expression. As often color gives meaning to the design, design in turn gives meaning to colors. There different methods of printing that are practiced. Some common techniques are as below:

i. Stencil Printing

It was first started in China and Japan. Stencils are templates with design cut out on card board, wood, metal, plastic or sturdy film or a wax coated paper. The design can be fine and delicate with large spaces sufficient enough for great amount of color to be applied. Color is usually spray painted or stamped with a brush in the cut out areas of the stencil. Separate stencils are used for different colors in a particular design or pattern. However, stencil printing is limited to few colors only.

Fig. 14 Stencil Printing with brush

ii. Screen Printing

This printing was also know as silk screen printing, as the screen was made with a silk bolting cloth. In this method, the design is transferred on to a woven fabric with open mesh areas so that the printable materials can be pressed through the mesh. A squeezee is moved across the screen stencil, forcing print material through the mesh openings.

There are two types of screen printing techniques that are generally used.

a. Flat screen printing
b. Rotary screen printing

Fig. 15 Screen Printing

iii. Block Printing

It is one of ancient techniques of printing on fabric by using wooden blocks. It is popular in India and in many other parts of the world even today. It is evident from the history that man knew printing even before 2000

years. Blocks are made of wood with design engraved on the flat surface so that the raised portions of design helps to take the printing paste gets imprinted when stamped. Separate blocks are used for each color. Since block printing is a manual process, it is found to be slow and time consuming. Now-a-days, design is affixed with metal wire which gives a fine print when stamped.

Fig. 16 Block Printing Process

iv. Roller Printing

It involves a series of rollers as in rotary printing. Separate rollers are used for printing different colors. About 16 colors can be printed in a design. The diameter of the roller designates one repeat. The rollers are made of copper with chromium plating for more durability. The design roller is transferred either by photoengraving or pantograph. The rollers are arranged in order on the machine and the fabric to be printed moves over a rotating drum. The roller with design rotates against a moving brush that supplies the color from roller and a doctor blade scrapes of the excess dye from the roller.

Fig. 17 Roller Printing Machine

v. Transfer Printing

A type of printing process also called sublimation (changing from solid to gaseous state) printing is the technique in which the design from one surface is transferred to the other. The heat transfer printing method uses heat and pressure to transfer an image or design from a piece of transfer paper to the desired object. In this method pigments in paraffin or thermoplastic base can be melted and bound on to the fabric surface by application of heat and pressure. An effective method of transfer printing involves transferring a design by vapourizing if from a paper to the cloth by two methods: dry heat transfer and wet heat transfer.

Fig.18 Heat transfer printed T-Shirt

4.3 RESIST DYEING TECHNIQUES

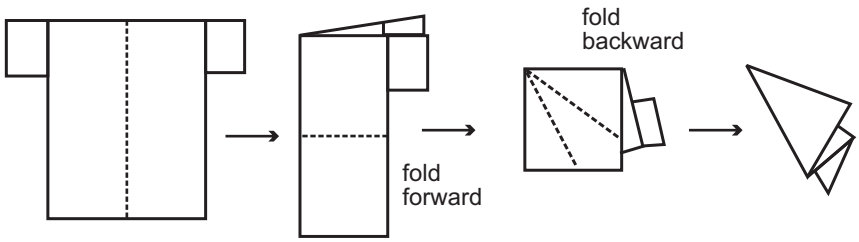
Resist Dyeing is a term for a number of traditional methods of dyeing textiles with patterns. Various methods are used to "resist" or prevent the dye from reaching the cloth, thereby creating a pattern and ground. The most common forms used are wax, some type of paste, or a mechanical resist that manipulates the cloth such as tying or stitching, clamping,

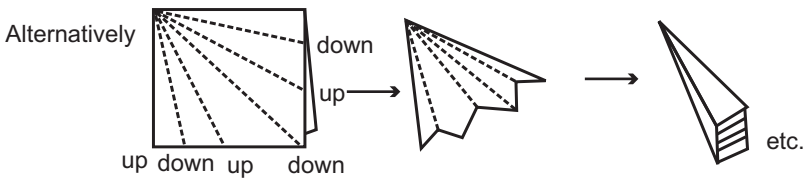
folding, etc. Another form of resist involves using a chemical agent in a specific type of dye that will repel another type of dye printed over the top. The most well-known varieties today include tie and dye, batik, block printing and stencil printing.

4.3.1 Different Techniques of Resisting a Fabric

1. Fold Resist

The fabric is crumpled, knotted or pleated into folds. Thus, when dipped into the dye, the solution cannot penetrate into the folds. A blurred pattern according to the fold is obtained.





2. Stitch Resist

The design or folds or pleats are fixed by stitching through them or leading threads through the material in simple running stitches. Then the fabric is pushed or drawn close together as possible which are knotted on the ends. Folds and perforations and sometimes the thread form the pattern. The Indonesian term for this technique is tritik.


Stitch Resist

3. Wrap Resist

Rolled or folded material is partially wrapped in such a way that no dye can penetrate the reserved places. Simple wrappings yield stripped patterns. If the material is folded in a second direction after the first dyeing, a chequered design is got.


Wrap Resist

4. Tie Resist


Tie Resist

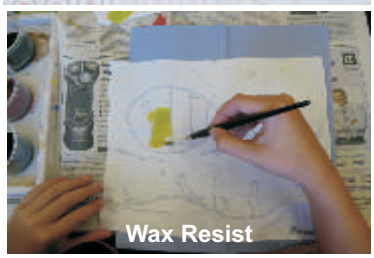
Individual parts of the outspread fabric are lifted and completely or partially tied in such a way that, a spherical or mould like forms are got. Variations are possible by different ways of folding the material.

5. Stencil Resist


Stencil Resist

Stencils that prevent dyes from penetrating into the fabric are fixed on it before the color is applied. This method is more suitable for painting or for spraying the dye on the fabric than for dyeing textiles from the open areas.

6. Wax Resist


Wax Resist

Parts of the fabric are sprayed, painted or coated with molten wax, which when on drying become hard. They then serve as reserves which can be removed after dyeing by immersing in hot water, and by washing, dissolving or rubbing off.

The other methods of resisting used are mordant resist, mud resist and yarn resist methods.

4.3.2 Techniques

Most common resist dyeing techniques are tie and dye, batik, block printing, stencil printing, etc.

i. Tie and Dye


Fig. 19 Tie and Dye on Fabric

It is an ancient craft in Africa, Indonesia and India flourishing as a craft even today. Tie-dye is a process of tying and dyeing a piece of fabric or cloth which is made from knit or woven fabric usually cotton; typically using bright colors. It is a modern version of traditional dyeing methods used in many cultures throughout the world.

Tie-dyeing is accomplished by folding the material into a pattern, and binding it with string or rubber bands. Dye is then applied to only parts of the material. The ties prevent the entire material from being dyed. Designs are formed by applying different colors of dyes to different sections of the wet fabric. A wet fabric is much easier to dye than a dry fabric. Once complete, the material is rinsed, and the dye is set.

The dyeing in tie an dye always progresses from lighter shade to darker. Bind the white fabric together to resist the penetration of the first dye usually a light color like yellow. The cloth is allowed to dry and without untying the second time the fabric is tied and dyed

in the next color, say red and then repeat the process of drying and tie the fabric for resisting the second color and dye in the third color. In this manner the process is continued for some more color.

ii. Batik

Batik is the word that describes a form of resist dyeing or printing. Batik cloth was produced originally in Java. In Africa it is being a village craft, in India as a handicraft people are engaged in producing export quality wall hangings, domestic utility products. But in the recent years this craft is practiced in various parts of the world. The special feature of batik is its crack effect of wax, which is deliberately allowed to form, enable the dye to penetrate and produce a threadwork of fine dyed veins on the cloth.

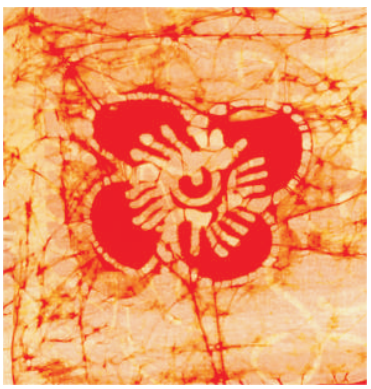


Fig. 20 Batik

To make batik, selected areas of the cloth are blocked out by brushing or drawing hot wax over them, and the cloth is then dyed. The parts covered in wax resist the dye and remain the original color. This process of waxing and dyeing can be repeated to create more elaborate and colorful designs. After the final dyeing the wax is removed and the cloth is ready for wearing or showing.

iii. Block Printing

India has been renowned for its printed and dyed cotton cloth since the 12th century and the creative processes flourished as the fabric received royal patronage. Though the earliest records mention the printing centers in the south, the craft seems to have been prevalent all over India. This process, though considered by some to be the most artistic, is the earliest, simplest and slowest of all methods of printing.

Fig. 21 Hand Block Printing

The method of hand printing of textiles is found all over India. The important cotton printing centers are in the desert regions of Gujarat and Rajasthan. Alizarin, indigo and many vegetable colors are used for hand painting in these regions. Direct printing is popular throughout India and it involves a bleached cotton or silk fabric printed with the help of carved wooden blocks. In hand block printing around three or four colors are generally used. Block printing was generally done with vegetable dyes but with advent of synthetic dyes, the ease of usage and the availability of synthetic dyes have replaced the vegetable dye in many cases.

Many of regions in India got inspired by the hand block prints and practiced this technique, the popular block printed textiles of India to name some are:

- Bagh prints - Madhya Pradesh
- Bagru, Dabu, Sanganeri prints - Rajasthan
- Kalamkari - Andhra Pradesh
- Ajrakh prints - Gujarat

Although, these printed textiles are popular some of Punjab, Maharashtra also practiced this technique. However, the major block printing centres are:

Major Centers of Hand Block Printing

S. No.	State	Places
1.	Rajasthan	Jaipur, Sanganer, Bagru, Farukhabad, Udaipur, Jodhpur, Kaladera, Jaisalmar
2.	Gujarat	Ahmedabad, Bhavnagar, Vasna, Rajkot, Jamnagar, Jetpur, Surat, Porbandar, Pethapur, Dhamadka, Khavda and Bhuj
3.	Tamil nadu	Tanjore
4.	Andhra Pradesh	Masulipatnam
5.	Madhya Pradesh	Bagh in Dhar district

Block printing by hand is a slow process it is, however, capable of yielding highly artistic results, some of which are unobtainable by any other method.

iv. Stencil Printing

The art of stenciling is very new. It has been applied to the decoration of textile fabrics from time immemorial by the Japanese, and, of late years, has found increasing employment in Europe for certain classes of decorative work on woven goods for furnishing purposes.

Fig. 22 Stencil Printed Fabric

The pattern or design is cut out of a sheet of stout paper or paper dipped in wax or thin metal with a sharp-pointed knife. The portion of the design where color has to be applied is cut out with a sharp-pointed knife and the uncut portions represent uncolored portion of the design. The sheet is now laid on the material to be decorated and color is brushed through its interstices.

A suitable planning is required before printing. Separate stencils are to be used for different colors.

SUMMARY

In the last three decades, Indian textile industry has witnessed drastic changes. The competitive atmosphere and quality consciousness, has reached a new mark. With the steady improvement in technology and application standards, a gradual rise was observed in consumer demands. And to reach up to that mark, a manufacturer has to add something to their products to get some added value for their product.

There are various techniques of adding value on textiles like embroidery, appliqué, patch work, dyeing, printing, etc.

Embroidery is the art or handicraft of decorating fabric or other materials with needle and thread or yarn. There are different types of embroidery which are known by special names such as cut work, appliqué work, drawn thread work, smocking, etc. Embroidery may also incorporate other materials such as, pearls, beads, mirrors, metal strips, sequins, etc. Embroidery is done by hand and machine.

Some of simple embroidery stitches like, running, chain, stem, satin, herringbone, fishbone, feather, fly, couching, etc may be used to ornament the fabric using simple embroidery threads and sometimes with a combination of beads, sequins, zardozi, pearls, stones, etc for addition ornamentation.

Dyeing is the method of colouring the fibre, yarn or fabric using colouring solution i.e., the dye solution. **Printing** is an art, which may be defined as localized dyeing which in turn produces designs in numerous innovative ways. Over centuries, a variety of techniques for printing have been evolved. The application of pattern on to fabric by the use of dyes, pigments or other colouring substances was influenced by a variety of hand and machine processes.

There are three basic types of printing - direct, discharge and resist. The different methods of printing that are practiced are **stencil, block, screen, roller, transfer printing techniques**.

Resist dyeing is a term for a number of traditional methods of dyeing textiles with patterns. Various methods are used to "resist" or prevent the dye from reaching the cloth, thereby creating a pattern and ground. The most common forms used are wax, some type of paste, or a mechanical resist that manipulates the cloth such as tying or stitching, clamping, folding, etc.

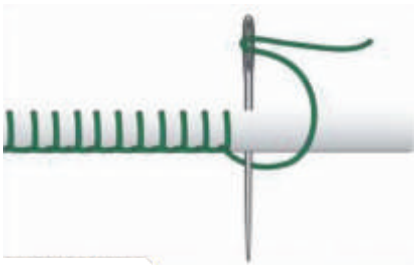
Most common resist dyeing techniques are tie and dye, batik, block printing, stencil printing, etc.

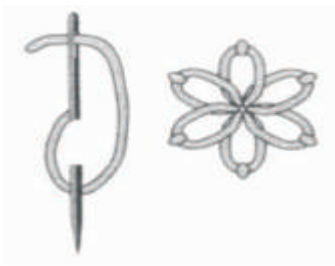
Test your learning:

I. Match the following stitch with the application

1.	Running stitch	(	)	filling leaf pattern
2.	Buttonhole stitch	(	)	outline stitch
3.	French knots	(	)	filling and shading areas
4.	Fish bone	(	)	cut work embroidery
5.	Long and short satin	(	)	centre of flowers

ii. Identify the following stitches:





_____ _____ _____

iii. Can you identify the following:

_____ _____ _____

iv. List some materials used for resisting the fabric in tie and dye

S. No.	Technique	Material Used
1.	Tie and Dye	
2.	Batik	
3.	Stencil Printing	
4.	Block Printing	

UNIT-5: OVERVIEW OF INDIAN TRADITIONAL EMBROIDERIES AND DYEING TECHNIQUES

5.1 INDIAN TRADITIONAL EMBROIDERIES

Embroidery is the art or handicraft of decorating the fabric or other materials with needle, thread or yarn. Elaborately embroidered clothing for religious purposes or as household items have been a mark of cultural heritage in India. India is a diversified country having varied range of cultures and customs. The Indian arts and crafts have become world famous. Traditional techniques of embroidery have been passed over from generation to generation thus creating heirlooms of techniques and products over the various geographical locations along the length and breadth of the country. A few of such crafts of each of the Indian states have been briefed as under:

5.1.1 Embroideries of Different States

i. Kashida of Kashmir

Kashmir embroidery and shawls are well known for the beauty of color, texture, design and technique all over the world. The wool embroidery of Kashmir is universally famous. Probably the best known of Indian embroidery is the **Kashida of Kashmir.**

The purpose of embroidery was to imitate the designs of the woven shawls but over a period of time the embroiderers created a unique style of their own. By the middle of 20th century the embroidered shawl completely overshadowed the woven shawl. The finest shawls with intricate embroideries have become a fascination in the market.

Fig. 23 Kashida Carpet

Colors Used: The most commonly used colors in Kashmir shawls are white (sufed), green (zingari), purple (uda), blue (ferozi), yellow (zard) and black (mushki). Crimson (gulnar) and scarlet (kirmiz) were also used.

Motifs Used: The motifs are mostly taken from nature. Animals and human figures are not seen in Kashmir embroidery probably because of the Muslim influence in the area.

- Birds motifs used are ; parrot, wood pecker, canary, magpie and king fisher
- Floral motifs used are; iris, lotus, lily, tulip and saffron flower

- Other designs are; grapes, plums, cherries, almonds and apple blossoms
- The chenar leaf is considered to be an important motif

Fabric used: The fabrics used for embroidery is all types of silk, cotton and wool. The threads used are wool, silk, cotton and art silk

Stitches used: The common stitches used are satin stitch, the stem stitch and chain stitch. Occasionally darning and herring bone stitch are also used

ii. Chikankari of Uttar Pradesh

Chikankari work is called white embroidery. It is said that chikan work originated in Lucknow. It dates back to the reign of Emperor Harsha who used to wear embroidered garments of muslin and those garments had geese designs.

It is believed that there are two stories told about the origin of chikankari embroidery. One story is that “One day a traveller while passing through the village in hot season asked for water from a peasant staying near Lucknow, who taking pity on the plight of the traveller offered him rest in his house before resuming his journey. The traveller was so pleased with his hospitality that he promised to teach him an art which would never allow him to go hungry. The traveller then trained the peasant in the art of chikankari. After his pupil has mastered the technique, the traveller disappeared. Chinkankars believe that he was sent by God himself."

Another story states that "chikankari was introduced into Lucknow only in the 19th century through the court of Oudh who had a large harem. A princess of Murshidabad was married to the Nawab of Oudh. This princess was a seamstress and so took to embroidering a cap for the Nawab. It was worked with cotton thread on muslin cloth. When it was ready she presented it to the Nawab. The other inmates of the harem were jealous of the princess and so started work at different items trying to compete with her in the fineness of their stitch and the delicacy of their patterns. Thus a great art was born at the harem”

Fabrics Used: The fabric used for this work is plain white fabric. It is mostly done white on white. Fine muslin cloth is usually used but today it is done on cambric and similar fabrics.

Stitches Used : Chikankari does not employ a large variety of stitches although it makes use of ordinary stitches like the satin stitch, the stem stitch, the back stitch, the herring bone stitch and the button hole stitch.

There are two types of chikankari work-the flat style and the knotted embossed for example jali or netting in varieties of designs. The stitches are named as Taipchi. Khatawa, Bukhia, Murri, Phanda and Jali.

Taipchi is a simple darning stitch used in a cheaper work. It is usually employed for outlines or running designs. Taipchi is the flat style of chikan work.

Khatawa or Khalao is applique work. It is an exceedingly intricate kind of applique work. This embroidery belongs to the flat style of chikankari.

Bukhia constitutes of an inverted satin stitch or herring bone with designs outlined on the right side of the fabric. The thread is chiefly below the cloth. It is also called shadow work because the stitches that cover the wrong side of the cloth are in herring bone producing a shadowy effect.

Murri falls under embossed knotted style. Murri means rice shape. It is usually done on muslin cloth, Murri is worked in the centre of the flowers. This is a knotted variety of stitch to give a rich heavy embossed effect. The stitch is the French knot.

Phanda resembles grains like millet. This also is in embossed knotted style. This is a smaller and shorter form of the murri stitch. These are used to fill petals or leaves in a pattern.

Jali Work or netting or lace like trellis are somewhat like drawn thread work. This is done by breaking up the fabric into holes and not by drawing out the threads. The warp and weft threads are pushed apart with the needle into holes and tightened to give the cloth the appearance of a net.

This embroidery is of supreme excellence comparable only with the best European laces to which it corresponds in purpose and effect. Chikan reflects a purity that is dainty and delicate. Sari borders, blouses, kurtas, collars, hankies and white caps are all embroidered in chikankari.

Fig. 24 Chikankari of Uttar Pradesh

iii. Chamba Rumal of Himachal Pradesh

Chamba is a part of Himachal Pradesh. Chamba developed a distinct style of painting under the patronage of the local princes. It was once noted for the exquisite style of Pahari or Kangra school of painting. This style of painting influenced the embroidery of the place.

Embroidery is purely a domestic art. Chamba embroidery can be considered as a needle painting. The Chamba rumal is a square piece of cotton material on which fine and delicate embroidery is worked.

There are two different kinds :

- Pahari style of paintings which depicts the miniature style.

- Folk style in which the women embroidered their cholis and rumals (scarves) using their own patterns and designs.

Fig. 25 Chamba Rumal

Motifs Used: The designs on the rumal are embroidered to depict themes from Indian mythology, Mahabharata and Ramayana, Ras dances, Krishna Leela, Pahari paintings, Ragas and Raginis, hunting and marriage scenes and the game of chaupad (dice). Floral motifs are used for borders

In the folk style the designs are strange with bird like heads with

Beak like lips forming special characteristics. Also the figures of Krishna Radha and the Gopis drawn in folk style appeared very peculiar.

Fabrics Used: The fabrics used for Chamba rumal were fine cotton fabrics. Usually the ground material is cotton in white or cream color. This 'Cloth is generally unbleached and so appears cream colored. The cloth specially used for this purpose is hand spun, thin fabric like mal-mal. Another cloth used for base is hand spun and hand woven Khaddar.

Stitches Used: The designs are worked out with silk thread. The untwisted and dyed silk thread of wide variety of colors are used in this embroidery. The stitches used are double satin stich carried forward and backward alternately one on the two sides of the cloth at the same time, so that the space on both the sides is filed-up and the embroidery comes out in identical fashion on both the sides The stem stitch was used whenever necessary for the outlines to serve the purpose.

Colors Used: No Chamba rumal is in single color. Blue is predominant in some of the earlier samples. Krishna whenever depicted in a bare body, is embroidered in blue, with crimson feet. In few cases it is mauve. Green, orange, yellow and blue are the other colors used.

The Chamba rumals had special significance. The embroidered rumals were used to cover offerings, to deities to cover presents from the bride's home to that of the bridge-groom and vice versa. They were also used as presents for occasions or festivals. The rumals were worn round the neck or tied round the head. It was also used on household accessories such as dice-cloth caps, hand fans, pillow covers, wall hanging, ceiling covers etc.

iv. Kanthas of Bengal

A folk art of Bengal, is referred to as the "art of rags", since the base is of waste / used

material. Kanthas are originally made as quilts. It is said that to prepare a Kantha it sometimes takes six months to one year. It is a treasured possession in every home. The women in Bengal mostly wear white sarees Hence, the base material was always white for Kanthas This embroidery is done by all classes of people and worked by women only.

The fabrics used for Kanthas are old saris or dhotis pieced neatly together in layers in running stitches using white thread covering the entire field. The discarded old saris are placed on top of each other. The edges are folded and tacked together. The field is filled in with fine quilted work by means of a white thread. Further, detailed designs from stories and well known legends are depicted thorough embroidery.

Motifs Used: Human, animal figures, floral and foliage symbols are mainly used. The central design is usually a lotus with a number of petals and the field is interspersed with diverse patterns. The most common being the tree of life, conventional animal figures, birds, boats, chariots, The borders consist of creepers, floral scrolls, spirals and several linear devices. The common ritual motifs are lotus, the bull, the tiger and the mouse.

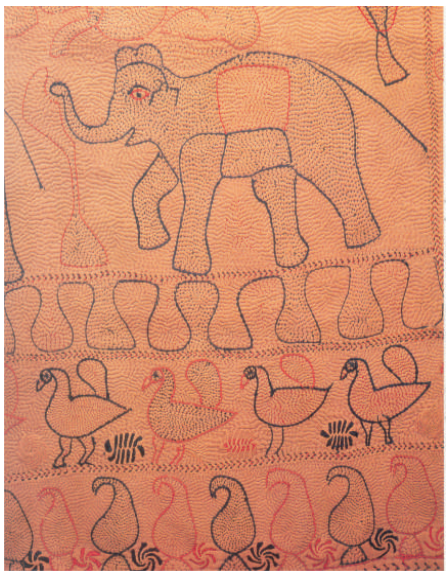


Fig. 26 Kantha work

Colors Used: The colors of the threads used are blue, green, yellow, red and black. The threads normally used are taken out from the borders of the discarded saris which are used for the base. Today instead of threads drawn from the borders, vividly colored silk or bright embroidery strands are used.

Stitches Used: Main stitches used are Darning, satin, and loop. For the border stem stitches are used. Most common and typical stitch used is very small darning stitches giving dotted lines. Applique work also is seen on the Kanthas.

There are seven types of Kanthas:

Lep: This is a thick quilted wrap used in winter as a cover.

Sarfni: This is also a quilted wrap or cover and used for ceremonial purpose

Bayton: Used as wraps for books, valuables etc. It is square in shape. Has a central motif and two to three borders.

Oar: Is rectangular in shape, is used for pillow cases.

Arsilata: Used as a wrap for mirrors and combs.

Durjani: It is square in shape and is supposed to be a wallet cover.

Rumal: This is a handkerchief of the size twelve inches square.

Sujni: It is a bed spread with less thickness and is used as a spread during ceremonial occasions.

v. Kasuti of Karnataka

Famous in the areas of Karnataka, the art of Kasuti embroidery was purely, a domestic art. Kashida in Hindi means embroidery while in Kanarese which is the language of Karnataka, Kasuti is its equivalent. Kasuti embroidery was famous in many places especially in the districts of Bijapur, Dharwar, Belgaum, Miraj, Sangli and Jamkhandi. Kasuti has not developed into a cottage industry but only a handicraft and a pastime for women. This embroidery is prepared by women for their personal use.

The five garments on which kasuti was done were kunchi (bonnet and cape combined), lenga (skirt), sharagu (pallv of a sari), kusuba (bodice|) and kulai (bonnet). These were the garments the women and children used and so, the mother was more than happy, if she could embroider them.

The material on which the Kasuti embroidery was done earlier was mostly khanns used as, blouse, pieces and sarees.

Today, Kasuti embroidery is done on any type of fabric. It is done on curtains, cushion covers and many other household articles of hand woven cloth. As far as designs are concerned, Hindu motifs predominate here and Muslim influence appears to be completely absent.

Fig. 27 Kasuti work

Motifs Used: Are from temple architecture, the gopurams of South India and also lotus flower, raths and palanquins, bird motif such as the parrot, the peacock, the swan, and the squirrel are common. Animal motifs used are sacred bull, the elephant and the deer. The other designs used for Kasuti embroidery are rattle, cradle, flower pot and tulsi pot. One will rarely see horses, lions or tigers but cats and dogs are never seen. Among the floral motifs lotus is mostly used.

Stitches Used: Stitches are simplest. Four types of stitches are used in Kasuti, namely Gavanti, Murgi, Negi and Menthi. Kasuti is done by counting the threads and the wrong and right sides are alike

1. Gavnti is a line and back stitch or double running stitch, This name is derived from Gaonti meaning a knot in Kannada Language.
2. Murgi appears like the steps of a ladder as the stitches are zig zag running.
3. Negi is ordinary running or darning stitch. It has the overall effect of a woven design.

The design created resembles woven patterns and hence the wrong and right sides are not identical.

4. Menthi is the ordinary cross stitch..

Today, mercerised cotton threads such as Kohinoor and Anchor threads or pure silk threads of strong nature and fast colors are suitable for Kasuti embroidery. A single strand is commonly used. A knot is never put at the end of the thread before the beginning of the work or at the end of the work.

Colors: The colors mostly used for Kasuti are orange, green, purple and red. White is predominant on a black and dark background.

Now Kasuti is done on clothes, saris, pillow covers, door curtains, table cloth etc., and also on fabrics of any kind.

vi. Phulkari of Punjab

Phulkari literally means flower craft. Phulkari is considered as an important part of the trousseau in Punjab Each of the important ceremonies connected with marriage is associated with wearing of a particular type of Bagh. The maternal grandmother or mother took pride in embroidering chope. The grandmother starts embroidering the chope on an auspicious day by inviting neighbours and friends to a solemn ritual. Later on, it grows into a lovely and magnificent shawl. A bagh or Phulkari, therefore, is not only a beautiful traditional art but a symbol of maternal love and faith expressed in embroidery.

Fabric Used: The beauty of the Phulkari depended a great deal on the color of the ground material. Khadder cloth was always used for embroidering baghs and Phulkaris. It was hand spun and hand woven cotton material.The color of the khadder fabric was mostly red, white and blue or black.

Thread Used: The thread used was pure silk. It is untwisted silken floss called pat. Golden yellow, green, white, crimson red and orange are the five colors prepared in selecting silk floss for Phulkari work.

Motifs Used: The motifs are made up of horizontal, vertical and diagonal stitches producing geometrical pattern in Phulkari designs. The designs are necessarily geometrical since it is done by counting the threads.

Stitches Used: Long and short darning stitches are used in Phulkari. It is a unique method of embroidery that, it is worked entirely on the wrong side of the cloth. The design is neither drawn nor traced.

In Phulkari the ornamentation is dispersed, whereas in the bagh, the whole field is covered with Pat or silk floss and not even a thread of the base fabric is visible with beautifully blending colors.

Kinds of Phulkari:

There are many types of Phulkaris. They may be grouped into four or five main classes.

The chope and suber were wedding Phulkaris and were presented to the bride by her maternal relations during the marriage ceremony.

The plain red or dark red khadder shawl known as saloo was used for daily household wear.

Til patra shawls have very little embroidery and are of inferior quality khaddar, and are often gifted to servants during marriages. Til patra literally means dotted with “til” seed design.

Fig. 28 Phulkari

Nilak is worked on black or navy blue khaddar with yellow and crimson red pat. This is popular among the peasant women.

Kind of Baghs:

Ghungat Bagh or the veil shawl because it has a triangular patch of embroidery on that portion of the shawl which covers the head when worn.

Varida bagh presented by the bridegroom's mother to the bride.

vii. Kutch Embroidery

Kutch lies in the extreme west corner of Gujarat. The most important Kutch embroideries are represented by Mochis, Kanbis, Ahirs and Rabari. The embroidery of Kutch is mostly carried out on articles of rural use and personal clothing like trappings for cattle, ghagras, cholis, torans or door hanging all indicating pastoral mode of life.

Fig. 29 Kutch Embroidery

Mochi Bharat: The needle work in Kutch is popularly known as Mochi Bharat that passes generally under the name Kutchi Bharat. Mochis or the members of the traditional shoemaker community were engaged in this particular craft earlier It is also referred to as aribharat named after a hooked needle ‘ari’.

The material generally used is satin. The stitch appears throughout as chain stitch

Kanbi Bharat: Kanbis are farmers, known for their patient work. Kanbi bharat is done in cotton thread using herring bone, chain stitches and darning stitches. The colors used are yellow white and

saffron as basic colors and green and purple are sometimes also used. Motifs used are parrots, sunflower mango shoots, creepers, sunflowers, cactus flower (keyda) parrots, peacocks. etc

Ahirs: The Ahirs are one of the ancient peasant community of Saurashtra. The embroidery was done by these rural folk on their own garments in their leisure hours and not for sale. Their embroidery is similar to the Kanbi embroidery. They also use 'ari" or the hooked like crochet needle Designs are large and flat and sometimes small mirrors are added to give a touch of glamour. The work is very fine and has a special delicacy.

Rabaris: Rabaris were a wandering tribe. Their style of embroidery is quite different when compare to that of Ahirs. The embroidery is quite impressive done on a dark background usually maroon with lighter color of threads worked in to highlight the stitches. Like patch work, pieces of colored and patterned fabrics are cut in different sizes and then sewn together on a plain background. It is done on canopies, wall decorations, and other items of household use, but not on garments. Rabaris also use double cross stitch in their embroidery which is mostly done on borders of skirts

viii. Gold and Silver Embroidery

Fig. 30 Gold and Silver Embroidery

Among all Indian embroideries gold and silver embroidery is probably the earliest and the most striking. Gold and silver embroidery is practised almost all over the country at places like Agra, Delhi, Lucknow, Kashmir, Bhopal, Varanasi, Surat , Bombay and Hyderabad are known for this type of work. There are two types of embroidery heavy and light work. Zardozl Is the heavier embroidery and Kamdani the lighter type. In Zardozi the stitches are very close together and they are very elaborate too. The lighter type Kamdani is used on fine fabrics and it is of a simpler kind, and less elaborate

Zardozi is prepared with the use of

- badla :thin strips of metal
- Gijaj : circular thin wire
- sitara : a small round metal piece to look like a star
- salma

Zardozi is prepared on curtains, heavy coats, cushions, shoes and animal trappings, whereas Kamdani which is of lighter type is done on apparel products like, caps, veils, etc.

Stitches used: many types of stitches are used in this type of embroidery. The laid stitch or couching, the satin stitch, the chain stitch, the stem stitch and the running stitch are the basic types of stitches. To be embroidered the cloth needs to stretched on a wooden frame and designs such as leaves and petals of flowers are padded to give a raised effect.

There are many forms of gold and silver embroidery:

- The Kathiawar work has gold and silver spangles and twisted gold wire. It is called as badlani in Surat
- Kamdani or badla is a form of gold and silver embroidery where flattened wires of gold or silver are stitched into the white cloth with the help of fine needles.
- Makaish work is done with the use of untwisted pure silver wire called badla. The work is very popular in the Northern part of India.
- Popular at Jaipur, the Gota work gives an overall effect of enameling. The Gota is cut into fine shapes of birds, animals, human figures, attached to the cloth and encased in wires of silver and gold, while the space around is covered by colored silks,

Gold and silver embroidery can be easily done on any type of fabric with a fusing below. The design is first traced on the fabric. Fine needles and thread need to be used to embroider the gold and silver work. The gold and silver work remains on the top and the wrong side will reveal only threads.

5.2 Traditional Dyeing Techniques

Textiles have occupied a prominent place in the world, in different geographic regions and in all climatic conditions, since ancient times. People naturally utilized whatever material was conveniently available; when they learnt weaving, garments were made. Over a period of time, the designing of textiles developed in the hands of artisans and they enriched fabric and garments through different techniques.

There are three main techniques of traditional textile decoration in the traditional Indian textiles of India : loom weaving and decorating, resist dyed work, which includes tying and dyeing as well as painting and printing process; and embroidery.

5.2.1 Tie Dyed and Ikat Textiles

Known throughout the world as ikat, a derivative of the Malay word mengikat, meaning 'to tie' or 'to bind'. This technique entails binding (resisting) and dyeing the warp and wefts before weaving. Within the subcontinent the cloths produced by this yarn resist work are called tie –dyed textiles – bandha and patola.

I. Bandhani

Bandhana and bandha are sanskrit words meaning to 'tie' and it is from this Indian word that the English name for a spotted handkerchief 'bandana' derives, but this tie and dye technique is internationally known by its Malay -Indonesian name, plangi. The term

bandhani refers both to the technique and to the finished cloth. By pinching up and resisting areas of the fabric before dyeing. Rajasthan and Gujarat are famed for their production of fine and prolific bandhani. Coarser bandhani is worked in Sind and Madhya Pradesh. The traditional garb of the rural women of western India includes odhni shawl, choli, gaghra and saris.

Fig. 31 Bandhani with Ties Intact

When simply tied bandhani textiles are inexpensive and this is one of the cheapest ways for women of the poorer communities to dress in a colorful fashion. When tied with many fine knots, the price of bandhani rises steeply and is then preserved for rich classes. The tie-dyed fabrics of Gujarat are perhaps the best produced in India. Also known as Bandhej, it is produced on superfine cotton mulmul, muslin sometimes combined with gold checks and motifs worked in the jamdani technique. In Gujarat very fine bandhani are made on silk and fine quality cotton which are worn as wedding garments.

Fig. 32 Bandhani with Ties Removed

The centres for this fine work and for much simpler work are Kutch and Saurashtra. Bhuj, Jamnagar, Porbandar, Morvi, Rajkot, Sundernagar, Pethapur are the other places in Gujarat.

This craft is also practised in many places of Rajasthan but the finest bandhani is tied at Bikaner and Sikar districts. In Rajasthan, a greater number of colors are used than in Gujarat and many of the colors are spot dyed by hand, rather than by being submerged in a dye bath. The tying of bandhani textiles is mostly carried out within the home, mainly by women or young girls. The material used is thin mill-made cloth, either a loosely woven silk known as georgette or a cotton known as mal-mal. This fabric is generally sold with the ties intact which represents the genuineness of the original tie dyed fabrics.

ii. Leheria

In the 19th century and early twentieth centuries, the Marwaris, merchants of Rajasthan and dominant business community of India, wore as their distinguishing mark elaborately tied, brightly colored stripped turbans. These turbans were made with

leheria technique which literally means 'waves' in Hindi. This process is practiced in the dyeing towns of Rajasthan - Jodhpur, Jaipur, Udaipur and Nathdwara. Fabrics generally turbans or sari lengths are rolled diagonally from one corner to the opposite selvage and then tied at required intervals and then dyed.

Fig. 33 Leheria

iii. Patola

The techniques, the quality and the originality of design of the ikat textiles of India are unsurpassed. Of special significance is the patola cloth. Patola weaving is an ancient Indian craft well known as a luxury export to Malaya and Indonesia in the 16th century, where the patola was cherished as the grab of nobility and revered for its magical and sacred properties. Today, these fabulous and costly silk textiles are made in Patan Gujarat on a very limited scale. Whereas, the double ikat and single ikat weaving tradition of Orissa and Andhra Pradesh are prospering and flooding the handloom cloth market with fashionably colored and patterned saris, garment and furnishing fabrics.

Fig. 34 Patan Patola from Gujarat

These double ikat textiles were woven in Patan, Surat and other centres, but there are now only families of Jains weaving them in Patan. Cheaper patola imitations are woven in single ikat at Rajkot, Saurashtra and both single and double ikat in Andhra Pradesh in the south.

Fig. 35 Rajkot Patola

Motifs were of flowers and jewels, elephants, birds and dancing women, used either around the border or in the central field and often with some geometric elements. Muslim communities restricted themselves to abstract designs.

Although the loom of the patola weaver appears simple, the methods of yarn preparation, weaving and adjustments to the woven cloth are labour intensive.

iv. Bandhas of Orissa and Andhra Pradesh

The ikat textiles of Orissa and Andhra Pradesh are woven and prepared with essentially same technique as the ikats of west, but the looms and tools are quite different. In Orissa the fine, detailed and curvilinear patterns are achieved using very thin yarn and by tying and dyeing small numbers of threads - commonly 2 or 3 in a cluster on a rectangular frame when compared to 12 in Gujarati patola ikat.

Western Orissa consists of Sundargarh, Sambalpur, Bolangir, Kalahandi & Phulbani districts, with Sambalpur & Bolangir being the primary handloom weaving areas. The sarees from this area are often called 'Sambalpuri sarees'. Most of western Orissa's traditional sarees were woven by Mehers, with the Bhulia Mehers specialising in ikat work.

The designs usually are in floral patterns, with animals and certain traditional motifs like fish, conch, rudraksha, gaja (elephant), stars, elephant, deer, parrot, nabagunjara, lotus, and other flowers, creepers, khumba (small triangles), danti (tooth like) patterns have been used in silk and cotton fabrics.

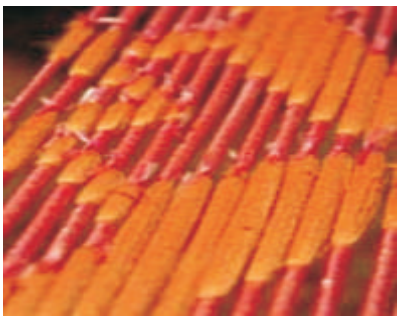


Fig. 36 Tied Yarns as a Pattern

Fig. 37 Yarns after Ties Removed

Fig. 38 Ikat of Orissa

v. Bandhas of Andhra Pradesh

Chirala is a village near the coast of Andhra Pradesh. The square double ikat cloths known telia or Asia rumals were produced here for the muslim market, to be used mainly for head cloths. They were sold in what is now Pakistan and Bangladesh and exported to countries of Middle East, Africa and to Burma. In Chirala, telia rumals were dyed with alizarin dyes, which left an oily smell from which the name derived. The Padmasali and Devangula communities are engaged in Ikat weaving in this region.

Fig. 39 Telia Rumal of Chirala

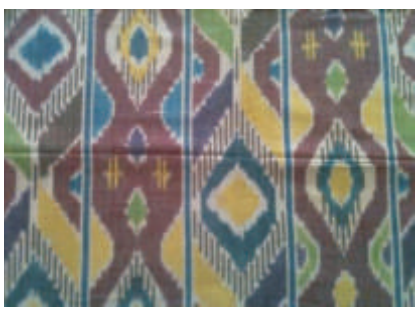


Fig. 40 Yardage Fabric

Fig. 41 Pochampalli Sari

Designs were either geometrical or figurative, sometimes of clocks and aeroplanes. Today, the few surviving weavers supply local customers such as fishermen, who use them as lungis or turbans.

The ikat weaving declined in chirala and started flourishing in Pochampalli and the surrounding villages. Pochampalli is a large village, about fifty kilometres from Hyderabad, the historic capital of Andhra Pradesh. Ikat weaving in Andhra Pradesh is also called as Chitka weaving in Andhra Pradesh. The 'ikat' textiles in Andhra Pradesh, especially of Pochampalli and Chirala are equally attractive. Typically, these areas produce silk saris, cotton saris, shirting materials, furnishings, bed sheets and so on.

The motifs now are abstract, modernist and geometrical with plenty of brilliant colors.

5.2.2 Resist Printed and Painted Textiles of India

Apart from the direct application of pigment on to the surface of prepared cotton yardage, the techniques of fixing color to woven cloth to create patterns and compositions again involves either the use of resist, mordant resist, or combinations of the two, applied with a pen, brush, metal or wooden block or through a stencil. In order to resist the dye, areas of the cloth that are to form the pattern or design are coated with impermeable substances such as wax, gum or rice paste, resin, starch or mud. Once the cloth has been dyed, the resist substances are removed by immersion in hot or cold water, or by ironing or brushing.

In mordant resist textile decoration techniques, the printing or painting of dyestuffs react with mordant prepared cloth; or alternatively, the painting or printing of mordants on to the cloth when immersed in a color bath, will cause the dyes to react and be fixed in patterns of applied mordant. Some of the examples of textiles printed by this technique are ajrakh, kalamkari, bagru, dabu, etc.

i. Ajrakh prints of Gujarat and Rajasthan

Ajrakh literally meant aaj ke din rakh, or 'keep it for today'. Textiles printed in this style are hand-printed using natural dyes on both sides by a laborious and long process of resist printing.

Colors: The usual colors of the craft are Red, Yellow, Blue and Black. Rich crimson and a deep indigo, with black and white highlights.

Motifs: A prints are dominated by geometrical shapes. Champakali, Raiya, Kharek, Nipad, Grinari etc

End Uses: Used on cradle spreads, lungis, sarees, dress materials, pillow covers and table cloths.

Fig. 42 Ajrakh Prints

ii. Kalamkari of Andhra Pradesh

Fig. 43 Masulipatnam Style Kalamkari

Fig. 44 Kalahasti Kalamkari

Kalamkari or Qalamkari is a type of hand-painted or block-printed cotton textile, produced in parts of India. The word is derived from the Persian words kalam (pen) and kari (craftsmanship), meaning drawing with a pen. The name kalamkari translates as pen (kalam) work (kari) in Hindi/Urdu, and was most likely derived from trade relationships between Persian and Indian merchants as early as the 10th century CE.

Fig. 45 Kalamkari wall Hanging

European merchants also had names for this type of fabric decoration: the Portugese called it pintado, the Dutch used the name sitz, and the British preferred chintz. There are two distinctive styles of kalamkari art in India - one, the Srikalahasti style and the other, the Machalipatnam style of art.

Colors Used: The dyes are obtained by extracting colors from parts of plants - roots, leaves along with mineral salts of iron, tin, copper, alum, etc., which are used as mordants. Red, blue, yellow, green and black are commonly seen.

Motifs Used: The motifs used were floral and animal designs. The Persian influence on the designs is visible as ornamental birds, flowers, creepers, and mehrabs or archways found chiefly from mughal architecture.

End uses: bed sheet, bed covers, dress material, table covers, saris, wall hangings, etc

iii. Bagh Prints of Madhya Pradesh

Bagh, which lends its name to the Bagh prints is a small tribal town in Dhar district of Madhya Pradesh. The khatri community, who comprise the 'chhipas' or printers came here about 400 years ago from Larkana in Sind which is famous for its Ajrakh prints. Bagh's proximity to the river was an important reason for its choice as flowing river water is vital to the process of printing.

Motifs: geometrical and floral compositions

Fabric Used: cotton, tassar, crepe, silk

Colors Used: The colors used in this process are vegetable and natural dyes like Indigo, turmeric roots, pomegranate skin, lac, iron. These natural colors do not fade, permeate the fabric and lend it a pretty look.

Fig. 46 Bagh Prints of Madhya Pradesh

End Uses: bed-covers, sarees, dress material, dupatta, pillow covers & cushion covers

iv. Bagru Printing

Bagru, a rural Indian village in Rajasthan is situated around thirty kilometers east of Jaipur city. Its traditional process of hand block printing on textiles, with rich natural colors has been known for many centuries. The elaborate and rich colored floral prints of Bagru are very distinctive. The village had a community of CHHIPAS, or traditional crafts people who printed fabrics by hand. Bagru is also famous for

Fig. 47 Bagru Printed Bed Sheet

its mud resist process Dabu and direct printing. Imprints are made with wooden blocks containing engraved designs

Until about fifty years ago, Bagru prints were used mostly for ghagras (skirts) and odhnis (scarves) for women in surrounding communities, and the chhipas relied solely on this local market.

Colors Used: beige, red, black background. The base color of Bagru prints is off- white.

Natural dye colors	madder, indigo, pomegranate rind, turmeric, etc
Pigment colors	Green, Pink, Brown, Violet, Blue, Rust.
Basic color combinations	cream, maroon and black; black and white and blue (indigo) and white.

Motifs : PATASHI with its tiny floral designs of buds, leaves and stems. JHAD with its interviewing trendrils and distinctive border lines. HATHI- the elephant.

Besides these the other motif used are floral, spiral, geometrical and figures like fishes etc.

End Uses: Bagru prints are immensely used in contemporary as well as conventional garments. Conventionally, Bagru prints were used mostly for ghagras (skirts), odhnis (scarves) and pagris (turbans). Today, the products made with Bagru block prints have entered into Home Furnishings, apparel and accessories.

v. Dabu Resist Dyeing

Fig. 48 Resist Paste Applied with Block

Fig. 49 Saw Dust Sprinkled Over the Resist Paste

Dabu printing is also a unique art form Found alongside Bagru prints. In this, a design is sketched onto the background cloth. The resist process called Dabu used here involves using wax or gum clay mixed with resin. With the help of brush or block or by hand this resist paste is applied to the portions of the cloth and sprinkled with saw dust. The saw dust sticks to the cloth as the

Fig. 50 Dabu Printed Fabric

clay dries. The saw dust also acts as a binder which prevents color penetration while dyeing. Thereafter, the entire cloth is dyed in selected colors in a cauldron of dye. The area where clay and sawdust mixture is present does not catch the dye and remains colorless. After dyeing and drying, the cloth is washed to remove the clay and the mixture. Some of the color penetrates onto the fabric caused by mud cracking. The result is veining which gives it batik like look to the fabric. The fabric is highlighted by printing specific outlines and patterns against the contrast color.

This unique form of printing is also environmentally non-toxic and uses no harmful or synthetic dyes. This resist process called Dabu used here involves using wax or gum clay mixed with resin.

SUMMARY

India is a diversified country having varied range of cultures and customs. The Indian arts and crafts have become world famous. Traditional techniques of embroidery have been passed over from generation to generation thus creating heirlooms of techniques and products over the various geographical locations along the length and breadth of the country. A few of such crafts of each of the Indian states are Kashida of Kashmir, Chamba rumal of Himachal Pradesh, Phulkari of Punjab, Kasuti of Karnataka, Chikankari of Lucknow, Kanthas of Bengal, Gold and Silver embroidery, etc.

People naturally utilized whatever material was conveniently available; when they learnt weaving, garments were made. Over a period of time, the designing of textiles developed in the hands of artisans and they enriched fabric and garments through different techniques.

There are three main techniques of traditional textile decoration in the traditional Indian textiles of India : loom weaving and decorating, resist dyed work, which includes tying and dyeing as well as painting and printing process and embroidery.

Examples of some of these techniques are bandani, leheriya, Ikat textiles – bandhas, patola, etc

Apart from the direct application of pigment on to the surface of prepared cotton yardage, the techniques of fixing colour to woven cloth to create patterns and compositions involves either the use of resist, mordant resist, or combinations of the two, applied with a pen, brush, metal or wooden block or through a stencil. Some of the examples of textiles printed by this technique are ajarakh, kalamkari, bagru, dabu, etc.

Test your learning:

1. Match the following;

Kashida	Punjab
Chamba	Kashmir
Chikankari	Art of rags
Phulkari	White embroidery
Kasuti	Ahirs

Kantha	Karnataka
Kutch	Himachal Pradesh

2. Answer 'T' for True and 'F' for False

a) Til patra is a type of phulkari ( )
b) Mochi bharat employs a chain stitch ( )
c) Kamdani is the heavier embroidery and Zardozi is the lighter embroidery ( )
d) Kutch embroidery is from Rajasthan ( )
e) Running stitch is mainly used in kantha embroidery ( )
f) Silken floss used for phulkari embroidery is known as pat ( )
g) Cross stich of kasuti is referred to as Menthi ( )
h) Taipchi, Murri and Phanda are types of kashida embroidery ( )
i) Gold and silver embroidery is practiced only in North India ( )

3. The following traditional techniques belong to which states:

a) Dabu ( )
b) Ajrakh ( )
c) Bagh ( )
d) Kalamkari ( )

4. What is tie and dye?

5. True or False

a) Kalamkari is hand painted textile only ( )
b) Bandhani is found in Orissa ( )
c) Chippas are the traditional printers ( )
d) Bandhas, patola and telia rumal are ikat textiles ( )
e) Leharia is a traditional printing technique ( )

FABRIC Study

Practical Manual

for

Class - XII

Contents

Practical - 1: Fiber, Yarn and Fabric

Aim: To collect various types of fabrics and identify fiber type (cotton, linen, wool, etc.); Yarn type - spun/ filament, fabric type-woven/knit/non-woven.

Fabric Swatch Folder:

Swatch No.	Swatch No.	Swatch No.
Fiber type:	Fiber type:	Fiber type:
Yarn type:	Yarn type:	Yarn type:
Fabric type:	Fabric type:	Fabric type:

Swatch No.	Swatch No.	Swatch No.
Fiber type:	Fiber type:	Fiber type:
Yarn type:	Yarn type:	Yarn type:
Fabric type:	Fabric type:	Fabric type:

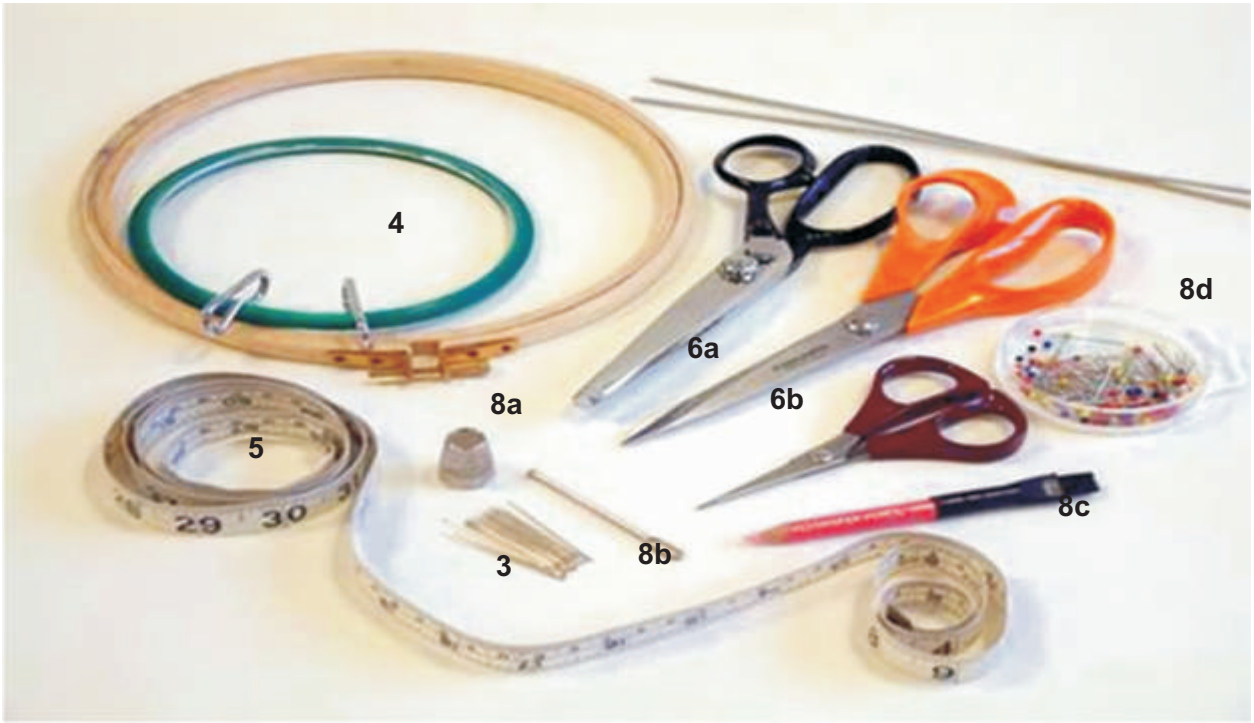
Swatch No.	Swatch No.	Swatch No.
Fiber type:	Fiber type:	Fiber type:
Yarn type:	Yarn type:	Yarn type:
Fabric type:	Fabric type:	Fabric type:

Swatch No.	Swatch No.	Swatch No.
Fiber type:	Fiber type:	Fiber type:
Yarn type:	Yarn type:	Yarn type:
Fabric type:	Fabric type:	Fabric type:

Practical - 2: Basic Embroidery Stitches

Aim: To understand and practice basic embroidery stitches

Tools and Equipment: Most commonly used tools and equipments are:



S. No.	Tools	Details
1.	**Yarn and threads**	Cotton, linen, silk, rayon, wool, twisted and untwisted floss. Available in a variety of colors in six strand skeins.
2.	**Fabrics**	Cotton, silk, linen, wool, jute, canvas, etc.
3.	**Needles**	Points are sharp and eyes are smooth and well polished. Crewel needles designed for embroidery have long oval eye and are therefore easily threaded
4.	**Frames**	It is necessary to hold the fabric taut for stitching. It has two rings, the outer ring has an adjustable screw and the inner ring support the fabric to be in place. They come in different sizes, hand held or attached to a stand made in wood or plastic.
5.	**Measuring tools**	a. **Tape** – is flexible, permitting accurate measurements over curved areas b. **Ruler** – is a good all purpose measuring device available in different sizes, 6”, 12”, 24” and so on.

		c. **Right angle triangles** – verifies the exact right angles especially when enlarging and reducing designs.
6.	**Cutting tools**	a. Shears - 7" and 8" are generally used for cutting fabrics. b. Embroidery scissors - small and sharp, good for fine work, cutting of threads, paper etc.
7.	**Design transfer materials**	Are used to mark and transfer the designs on fabrics such as: a **Tracing paper** – is useful to transfer original designs. Available in different sizes and weights. b. **Carbon papers** – this is a tracing paper with one side wax and is available in limited colours and aid in transfer of designs to fabric.
8.	**Other tools used are**	a. **Thimble** - a metallic ring worn on the middle finger of left hand to protect the finger and do the hand sewing quickly. b. **Bodkin** - This is a flat needle with a blunt and a large eye, used for threading elastic and tape. c. **Transfer pencil** - enables hot iron transfer from any design. d. **Pins** – all pins and dress makers pins

Transferring the Design:

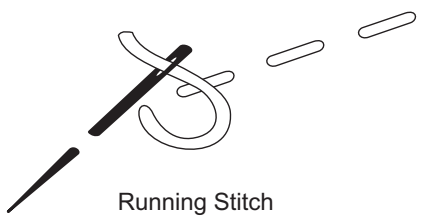
After selecting the design for embroidery work, the markings for the design should be transferred to the right side of the material without soiling it. There are several ways of doing this, the simplest is by using hot iron transfer keeping the face down on the material and then pressing it. Alternatively, a design from any source can be transferred with help of carbon paper too.

Common Embroidery Stitches

In general embroidery stitches are worked with two strands of embroidery skein. Sometimes more strands may be used for special effects. In the beginning and ending of the stitches avoid using knots. Begin with a back stitch leaving a short ength of the thread (about 2 inches) extending on the wrong side which can be caught and held under the first few embroidery stitches. To end the work, take the thread to the wrong side and work a back stitch again.

1. Running Stitch

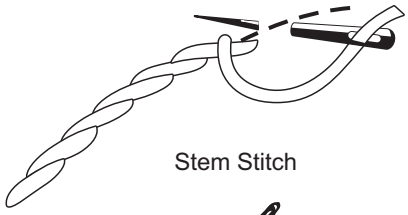
This is an easy outline stitch which can be equal or unequal. Work the stitch from right to left. Bring the needle up at one point and down at the second point as in fig. Pick several stitches on needle at a time before pulling it through.



Running Stitch

2. Stem Stitch

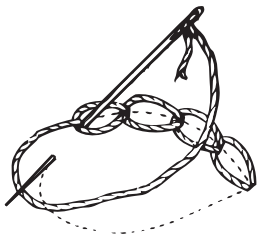
This is a line stitch used for outlining designs especially stems and leaves. It can also be used for filling small designs by working several lines side by side. Work should be done from the bottom upwards each time taking a stitch almost vertically down, but with a slight slant as shown in the fig.



Stem Stitch

3. Chain Stitch

This is one of the most popular embroidery stitches for outlining or worked in close rows for filling an area. Work the stitches towards you starting from the top of the line. Bring the thread out to the right side of fabric. Insert needle in the fabric at the same point, holding the thread down with your left thumb. Bring needle point out a short distance ahead and pull it through, keeping the working thread under the needle. The result is a loop as shown in the fig above. Other variations in the basic chain stitch that can be worked are open chain, twisted chain, square chain, etc. Open Chain stitch Twisted chain.



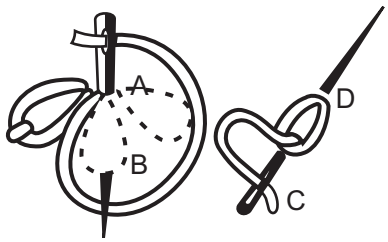
Chain Stitch

Open Chain Stitch

Twisted Chain

4. Lazy Daisy Stitch

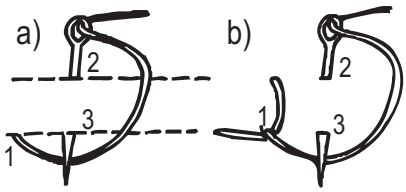
This is an elongated chain stitch used to work petals of small flowers. Bring the thread out on the right side near the base of one petal. Take a long stitch, length of a petal and pull the needle through the fabric, looping the thread under the needle. To hold the end of the loop in place insert the needle down over the thread that forms the loop. Bring out the needle again near the base of next petal as shown in the fig.



Lazy Daisy Stitch

5. Blanket Stitch

This stitch is used as edging for blankets and other articles or as part of design for which the blanket stitch makes the border. The work should be done from left to right, stitching towards you. Bring thread out on the lower line, insert needle in position on upper line and take a downward stitch with the thread under the needle point. Draw out the thread as shown in the fig. Stitches may be of the same size at regular distances apart or grouped as spaced according to the effect desired.

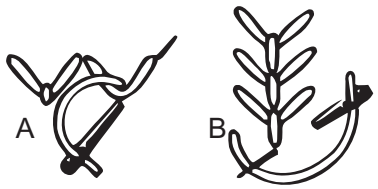


Blanket Stitch

6. Fly Stitch

This is an open chain stitch done as V. Work from left to right, bring needle out at a point which

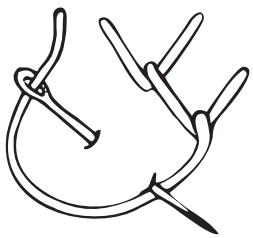
will be the top of left side of V. Hold thread down with left thumb, insert needle at the top of the right side of the V and bring it out at the base of the V, keeping the working thread under the needle. Draw out the thread and reinsert the needle below the base of the V to hold the loop in place as shown in the fig.



Fly Stitch

7. Feather Stitch

The working of this stitch is similar to that of blanket stitch, but the stitches slant towards a centre line from either side. First mark a line lightly to indicate the centre line. Work from top to bottom, bring needle out at the beginning of the marked line. Hold the thread down along the centre line. Starting from the right of the line take a stitch with the needle slanting downwards, and bring it out on or near the centre line with the thread held under as shown in the fig. Pull the needle through, and take the next stitch from the left of the line with the needle slanting down and to the right.


Feather Stitch

8. Buttonhole Stitch

It is worked like the basic blanket stitch, except that the stitches are placed very close together to form a firm edge as shown in the fig. This stitch is particularly used in cutwork embroidery. A button whole stitch wheel is a popular method for doing flowered motifs.

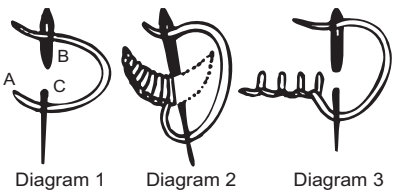
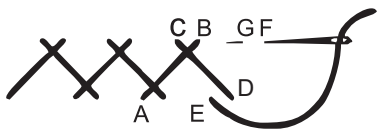


Diagram 1 Diagram 2 Diagram 3

Buttonhole Stitch

9. Herringbone Stitch

This is used as a decorative stitch as well as for finishing hems and raw edge seams also. Stitches are worked from left to right along two parallel lines. Bring out the thread at the bottom left hand corner of the work. Insert needle on top line at a point away to the right and take a short stitch through the fabric from right to left so as to get a slanting stitch. Next take a short stitch through the fabric from right to left on the lower line to get another slanting stitch crossing the first one at a point little below the top line as shown in fig. On the wrong side two rows of running stitches are seen. This stitch can be done in the reverse way and used as **shadow work**.



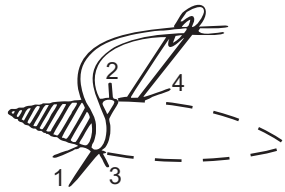
Herringbone Stitch

10. Filling Stitches

A couple of stitches are used in embroidery for outlining or filling in spaces or motifs or centre of objects for decorative purposes. Chain, stem, running, french knots, seed stitches, button hole, fishbone, etc are commonly used as filling stitches also. The other commonly used filling stitches are basic satin and long and short satin.

a. Basic Satin Stitch

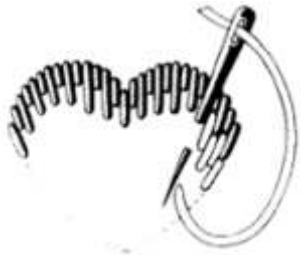
This is a filling stitch used to cover regular or irregular shaped spaces. Bring the needle out at the starting point on the right side and take a stitch carrying the thread across the design and bringing the needle back very close to the starting point. Continue the stitches very closely and evenly till the entire space is filled.



Basic Satin Stitch

b. Long and Short Stitch

This is used for filling large shapes and for shading areas in design. Firstly, one row of alternatively long and short stitches are worked side by side closely following the outline of the shape. In the succeeding rows, stitches of equal length about the same as the longer stitch of the first row are worked. In the final row, the stitches should end on the edge of the design. The direction in which the long and short stitches fall is very important for proper shading effect. Before starting, decide the direction in which the stitches will take within each shape.


Long and Short Stitch

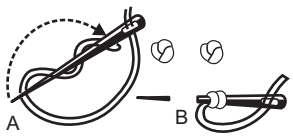
11. Couching Stitch

Lay a single cord or a number of threads of either matching or contrasting color on the line of the design. Catch the laid thread down firmly with another thread of desired color by working small stitches at regular intervals across it as shown in the fig.


Couching Stitch

12. French Knot

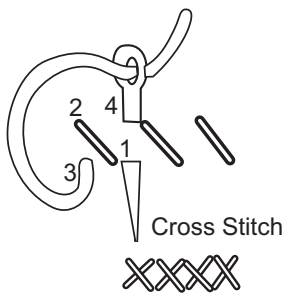
This resembles a knot and is usually applied to the centre of flower. Bring out the thread to the right side. Hold the thread tight with left thumb and wind three to four times around the needle. Now holding the thread firm, insert needle in fabric close to where it first emerged as show in fig. Pull thread to the wrong side and bring out the needle to the point where the next knot is to be worked.



French Knot

13. Cross Stitch

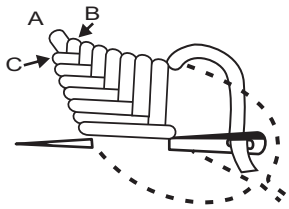
This stitch is suitable to be applied on fabrics with small checks or thick yarns which can be counted. Stitches are worked diagonally from left to right or right to left along two parallel lines. After completing the first round of crosses, work in the opposite direction filling in the second half of crosses as shown in the fig.



Cross Stitch

14. Fishbone Stitch

It is another leaf filling stitch. Its finished effect is similar to a fishbonewita spine down the centre. Bring needle up at point 1 and take a small stitch 2 down the centre line.Bring needle up at 3, insert at 4 directly across from point 3. Exit out from 2, carry yarn under

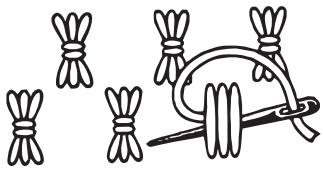


Fishbone Stitch

needle point and pull through as shown in the fig. Proceed to next stitch. Now point 2 is point 1 of next stitch.

15. Sheaf Stitch

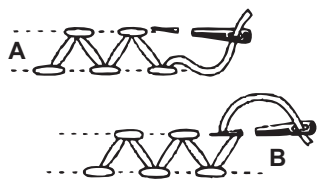
The Sheaf Stitch is commonly used in smocking. However, it would make a striking and bold border if repeated all across the row. First, three long vertical straight stitches are worked fairly loosely. Bring the needle up on the left side of the second pleat, and thread the needle under the first Straight Stitch without piercing the fabric. Now thread the needle under all three stitches, without piercing the fabric as shown in the figure. Pull gently to draw the straight stitches together.



Sheaf Stitch

16. Chevron Stitch

This stitch is worked in two lines. Bring the thread through on the lower line on the left side, insert the needle a little to the right on the same line and take a small stitch to the left, emerging at center of the stitch being made. Next, insert the needle on the upper line a little to the right and take a small stitch to the left (A). Insert the needle again on the same line a little to the right and take a small stitch to the left, emerging at center (B). Work in this way alternately on the upper and lower lines.



Chevron Stitch

Practical - 3: Tie and Dye

Aim: To understand and explore the techniques of tie and dye.

Materials Required:

Items	Type
Fabrics Used	All kinds of cotton cloth - muslin, lawn, cambric, poplin, voile, casement, skill, wool preferably in white or cream. Man made fabrics can also be dyed but with appropriate dyes. Sample size – 12" x 12".
Binding Material	Thread, twine, rubber band, clamps, clips, 3D objects like beads, the rmocoal balls, etc.
Dyes	Direct, napthol, natural dyes
Vessels	Made of steel, plastic, galvanized iron, glass, aluminium, etc are used
Others	Wooden spatulas, spoons, measuring spoons, scissors, pins, needles, ruler, clamps, clips, wooden blocks, 3D objects, etc.

Preparation of Fabric

The fabric to be tie dyed should be free of starch or any other finishes. Soak the fabric with little detergent overnight in warm water. Wash thoroughly and rinse. Rinse the fabric or garment and dry it. Press it with a hot iron.

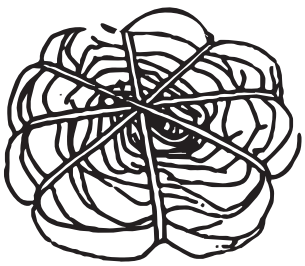
Tying Techniques in Tie and Dye

Tie-dye is a way of creating patterns of color by folding, tying, stitching, crumpling or otherwise preparing the fabric to inhibit the flow of the dye into the folds of the fabric. The pattern of the folds and where the colors are squirted determines the final design. The tying part of the process is very important. The cloth must be bunched up so closely that the dye cannot reach the inside of the sample. That is why this craft is called resist dyeing. Some of the simple techniques of tying on fabrics and garments or t-shirts are demonstrated below for you to practice and observe the patterns you get with these techniques and document.

1. Knotting

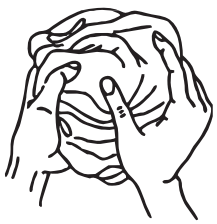
- Hold the cloth at both ends and twist into a long rope form.
- Tie this long rope into a knot and tighten as much as you can without damaging the cloth. Knot tying works best on long sleeves and light-weight material. You can tie as many knots as you have room for.
- Rubber bands or string can be tied over the knots to reinforce them as well as provide fine lines in the pattern.

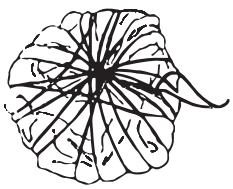
2. Spirals



- Lay your material on a flat surface. Place your thumb and a couple of fingers together on the cloth at the point which will be the center of the design.
- Using the weight of your fingers to hold the cloth in place, start twisting. After each twist, flatten the material with the palm of your hand to keep the folds from rising.
- With your other hand, bring the loose ends into the circle and continue to twist until the whole thing looks like a fat pancake.
- Now take rubber bands, and without disturbing the shape of the pancake slide the bands under the cloth so that they intersect at the center.
- Use as many as necessary to retain the circular shape, about twice the number shown in the illustration at right for most tie dyes.
- If you decide to immerse, instead of squirting, just set the cloth gently in the dye bath, do not stir. For an interesting effect, prevent the cloth from submerging, either by using less water or by placing the cloth on a prop to hold it out of the dye a little.

3. Marbling

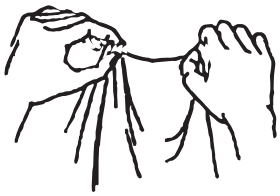
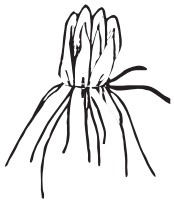
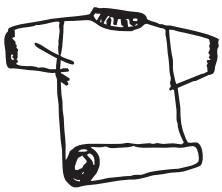
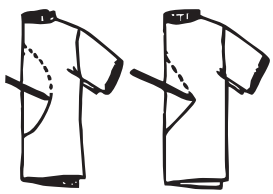


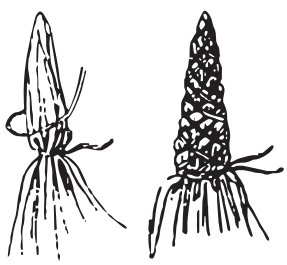


- Gather cloth together in small bunches until it is shaped like a ball. Try to expose as much of the cloth to the surface as possible. This effect works best on thin materials.
- Wrap the string or rubber bands loosely around the ball in as many directions necessary to retain the ball shape, and set gently in the dye bath.
- Do not stir. Just turn over once in a while.

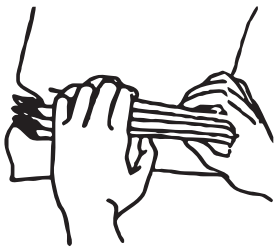
4. Rosettes

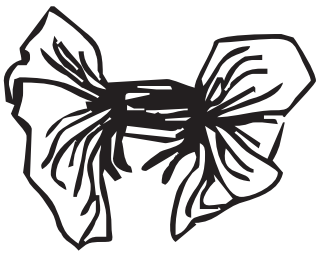
- A Rosette is many little circles, touching or overlapping each other.
- Using a pencil or your mind's eye, make a few dots on the cloth in any pattern. Each dot will be the center of a small circle.

	• With the thumb and forefinger pick up dot after dot and transfer to the other hand.
	• Wrap string or rubber bands several times around the base of all the circles which have been gathered together. • Continue to wrap to the tip and back, making sure your ties are very tight.
5. Stripes	
	• Roll the cloth very loosely, forming a long tube. The stripes will be at right angles to the tube.
	• Tie at one interval or as far apart as you want the stripes to run. Loop rubber bands or wrap string around the tube a few times and knot. • Make sure the ties are very tight. Now you can either immerse or squirt the dye on, alternating your colors, • Now you can either immerse or squirt the dye on, alternating your colors
6. Diamonds Ovals Squares	
	• Fold the cloth once along an imaginary line which will run through the intended form. • See possibilities below. Try hearts too.
	• Draw half of the intended design with a pencil or with your mind's eye, starting and ending on the crease.

	• Form pleats, starting at one end of your line. • Try to keep that line in the center between your hands while pleating until you come to the end of your line.
	• Wrap string or rubber bands around all the gathered pleats several times, and tie a secure knot.
7. Circles or Sun Pattern	
	• The circle design is relatively simple to create, yet it is easily one of the most dramatic. • Just pick up the cloth with thumb and forefinger at the point you choose to be the center of the circle.
	• With the other hand, try to arrange fairly neat and evenly spaced pleats around the central axis like a closed umbrella. • Smooth the cloth down, and hold tightly at the base.
	• With string or rubber bands, tie a strong anchor-knot around the base. • Continue wrapping to the tip and back again and secure at the base. Make sure the ties are very tight. • VARIATIONS: 1) Tie only part of the circle. 2) Tie at one inch intervals. 3) Poke the center or tip down inside the rest of the circle before tying.

8. Pleats





- Lay cloth on flat surface.
- Place thumbs of both hands together firmly on the cloth. Position fingers about an inch or two in front of your thumbs, and pinch the fabric to raise a fold.
- Continue to pinch up more pleats until you reach the end of the cloth.
- You can change directions as often as you want by gathering more material in one hand than in the other.
- Loop rubber bands or string very tightly around all the pleats several times and knot.
- You can use as many ties as you want.
- This useful technique is also employed in tying ovals, squares, diamonds or any shape you can imagine which has symmetry.

9. Tritik

- Plan a design or motif to be stitch resisted.
- Stitch along the outline of the design with a needle and thread.
- Pull one end of the thread closely and tighten.
- Tie the fabric tightly.

10. Object Tyeing

- Mark the points to tie the fabric as planned.
- Place a 3D object as in a plastic bead, thermocol ball,buttons, marbles, etc from below with the left hand.
- Hold the object through the fabric firmly from the top.
- Shift holding the fabric to the left hand and tie below the object from the top with a thread tightly.
- Complete the process for all the markings.

Dyeing

The steps involved in the dying process are as follows:

1. Before dyeing the tied up samples, soak it in clean cold water for a moment.
2. Take it out and squeeze it, or let it drain on newspaper or a towel before putting it in the dye. This is called 'wetting-out'.
3. Dyeing can be done with simple direct dyes (hot dye). The tied samples are put in the first colour.
4. Leave the samples in the dye for the required time and remove it.
5. Rinse it well in clean water.
6. Put the bundles to drain and then untie them and dry them in shade.

To Dye a Second or Third Colour:

1. If the samples are untied after the first dyeing, tie it up again. Bring the parts that need more colour to the out side of the bundle.
2. If the sample is tied up, rearrange or add more binding.
3. Wet out if necessary, dye, rinse, drain and untie. After opening the sample rinse it ones again. Let it dry in shade and press it.

Preparing the Dye Bath for Direct Dyeing

Chemicals Required:

Chemicals	Light shades (upto 0.5%)	Medium shades (0.5% to 1.5%)	Dark shades (above 1.5%)
Soda ash	0.5%	1%	2%
Glauber's salt or common salt	5%	10 - 15%	20 - 30%
Note: Quantity of chemicals to be added to the dye bath is calculated in percentages on weight of the material			

Direct dyes are dissolved in soft water by pasting with small quantity of cold water followed by addition of boiling water under stirring. The solution may be boiled if necessary to effect complete dissolution. The dye bath is set at 40 - 50 degrees centigrade with soda ash, and half the quantity of salt and with water equal to 20 times the weight of the yarn, and then add dissolved dyestuff solution. The samples are left in the dye bath for 15 minutes while the temperature is gradually raised to 90 - 95 degrees C and dyeing continued for 30 - 45 minutes. It is advisable to leave the sample while the dye bath cools for 10 -15 minutes. Sample is then rinsed in cold water and dried.

Practical - 4: Batik

Aim: To understand and explore the techniques of tie and dye.

Materials Required:

Process	Tools and equipment	Details
Material for batik	**Fabric**	• Natural fibres such as cotton, linen, muslin or silk. Synthetic fibres are not suitable as they cannot hold dye sufficiently. • Fabric in white or off white is preferable
Holding tools	**Frames**	• Old photo frames of wood. Softwood is preferred as it enables the fabric to be pinned. • To reduce the risk of tears to silks and finer fabrics it is possible to use masking tape to secure the material to the frame.
Waxing tools	**Wax**	• Available in a number of forms such as blocks, flakes or grains. • Paraffin wax is the easiest to use. • Beeswax offers less opportunity for cracking. • A mixture of both paraffin and beeswax.
	Electric Wax Pot	• This is the most efficient and effective way of heating and melting wax as it is thermostatically controlled.
	Brushes	• Varied sizes of cheap oil brushes. Brushes made from natural or synthetic fibres. Brushes with stiff bristles. **NOTE:** After use the brushes containing wax cannot be reused for paint or dye.
	Tjantings	• Tools used to draw precise lines of wax on to the material. Available in a range of sizes which allow a small amount of wax to flow from the reservoir.  • An electrically heated Tjanting is also now available.

Dyeing	**Dye Bath**	• Any suitable container which will allow the batik to be kept flat when submerged can be used.Steel, plastic, glass, etc are used for the dyeing process. • Naphthol dyes.
Pressing	**Hot irons**	• Dry heat iron to press the finished samples.

Waxing and Dyeing

- Transfer the design on to the fabric and plan the colours for different areas of the design.
- The first wax is applied over the penciled-in outline of the pattern. Almost always the original cloth is white or beige.
- The cloth is dyed in the first dye bath using cold dyes only. The dyeing starts with light and progresses to the dark colour. The area of the cloth where the wax was applied will remain white.
- Second application of wax is applied. Portions where the first colour has to be resisted, wax is applied again. The cloth is then dyed in the second dye bath in the next dark colour.
- Continue the same process as in the above step for a third colour. The fabric is submerged in the final dye bath. In this case it is the darkest colour as brown, black, blue, etc. Those areas of the cloth that have not been covered with wax will become brown.
- After the waxing and dyeing process is complete, fabric samples are washed in hot boiling water to remove all the wax. Put some soda or soap in the water and boil the fabric for few minutes. The wax will be removed from the fabric.
- The samples are pressed with a hot iron between newspapers to remove any left over wax from the fabric.

Dye Bath Preparation

Preparation of Naphthol Solution

Naphthols are generally water insoluble. Dissolving is done by pasting naphthol thoroughly with caustic soda and turkey red oil and little warm water followed by addition of boiling water. Further this solution may be boiled to ensure complete dissolution. Alternately, paste the naphthol with hot water followed by addition of caustic soda to the suspension and boil the solution till clear.

Following are some examples for preparation of naphthol solution

Quantity of chemicals required for dissolving 10 gms of Naphthol

Chemicals	AS/AS-OL/AS-D	AS-G	AS-TR
Turkey red oil (c.c)	10	10	10
Caustic soda flakes (gm)	6	5	7
Water (c.c)	400	330	800
Salt	20 g/litre	20 g/litre	20 g/litre

Quantity of chemicals required for preparation of 10 gm Base

Base	Water	HCL	Sodium nitrite	Sodium acetate	Acetic acid	Common salt
Blue B*	350cc	10 cc	10	10 gm	5 cc	25 gm/ L
Scarlet R**	350cc	17 cc	7	8.5 gm	6 cc	25 gm / L
Yellow GC*	350cc	10 cc	800	10 gm	5cc	20 gm / L
Red RC**	350cc	10 cc	20 g/litre	10 gm	7.5 cc	–

* base need HCL added followed by sodium nitrite while dissolving

**base need sodium nitrite added followed with HCL while dissolving.

Practical - 5: Block Printing

Aim: To study and explore the techniques of block printing.

Material Required:

Fabric	Cotton, silk, and blended fabrics either dyed or undyed of any weight and count.
Tables	Wooden tables with packing on the surface
Trolleys	Wooden trolley with a tray and a rack below to store the blocks
Blocks	Wooden blocks with design carved on the surface. Blocks with copper engraving are also available. They have more fineness and are long lasting.
Dye paste	Pigment colours are generally used. Dye paste made out natural/vegetable colours is also used. Other dyes used are rapid, naphthol, discharge, etc
Binders and mixing agents	Emulsifiers, kerosene, fixers, di ammonium phosphate, urea

Process of Block Printing

- The fabric to be printed is washed free of starch and soft bleached if the natural grey of the fabric is not desired. The fabric is dyed with the desired colour if required.
- The fabric is again washed to remove excess dye and dried thoroughly.
- The fabric is stretched over the printing table and fastened with small pins.
- Usually pigment dyes are used for cotton. Color is kept in a tray on a wheeled wooden trolley with racks which the printer drags along as he works.
- On the lower shelves printing blocks are kept ready. The colour is put on the jute cloth in the tray where the blocks are dipped before printing.
- The printing starts form left to right.
- The color is evened out in the tray with a wedge of wood and the block dipped into the outline color (usually black or a dark color).
- The block is applied to the fabric, it is slammed hard with the fist on the back of the handle so that a good impression may register.
- A point on the block serves as a guide for the repeat impression, so that the whole effect is continuous and not disjoined.
- The fabric, after printing is dried out in the sun. This is part of the fixing process.
- It is then rolled in wads of newspapers to prevent the dye from adhering to other layers and steamed in boilers for fixing the dye.

- After steaming, the material is washed thoroughly in large quantities of water and dried in the sun, after which it is finished by ironing out single layers, which fix the color permanently.

After Treatment

The fabric is dried till free from kerosene. It is then rinsed, soaped lissapol D (1 g/L) and soda ash (2 g/L) at boil for 1/2 an hour followed by rinsing and drying.

Recipe for Preparing Printing Paste

Chemicals Required:

Binder Emulsion

- Acramin SLN binder 200 parts
- Emulsifier W 5 parts
- Urea 50 parts
- Water 50 parts
- Kerosene mixed under high speed stirrer 665 parts

Printing paste Recipe

- Acramin Pigment 50 parts
- Binder emulsion 940 parts
- Fixer CCL 10 parts

The printing paste is prepared by mixing the above chemicals using a motorized stirrer for uniform consistency,

Practical - 6: Stencil Printing

Aim: To explore the technique of stencil printing.

Material Required:

- Fabric paints
- stencil printing brushesor sponges, tooth brush, comb
- Thick ivory sheets with design transferred and dipped in wax for stiffness or OHP sheets can be used.
- Paper cutter or knife to cut the stencil
- Piece of glass with smoothed edges
- Newspapers, plates to mix colours, water and paper towels,
- A fabric or garment to work on
- Iron-to-set fabric paints

Stencil Printing Process

The step by step process of stencil printing is demonstrated below:

The design is marked on the stencil sheets. Plan the colours and cut out the portions where each colour has to be applied. Separate stencils are used for different colours.

Cut out the portions of design for each colour


Colour is applied with a sponge or a stencil brush or by spraying technique using a tooth brush and comb

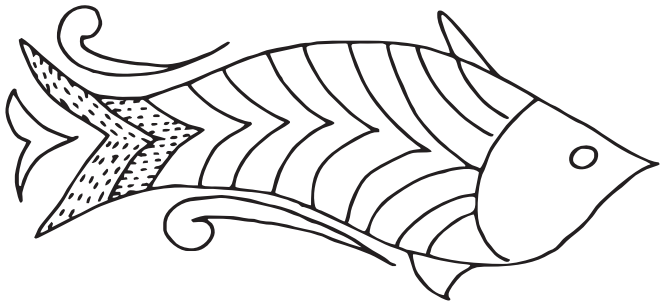

The printed fabric is then allowed to dry and pressed with a hot iron by placing the sample in between news papers. This helps fixing up the dye.

Practical - 7: Indian Traditional Embroideries

Aim: To practice various stitches used in Traditional embroideries.

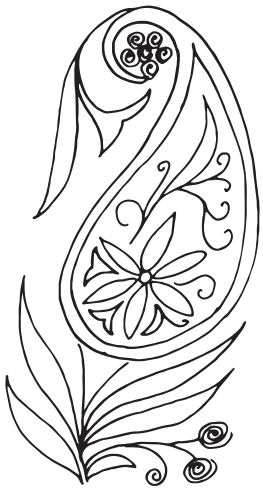
1. **Kantha Embroidery**

   Trace the motif on a 8"x 8" cotton cambric and fill the given motif with appropriate stitche and colors suitable for Kantha embroidery.



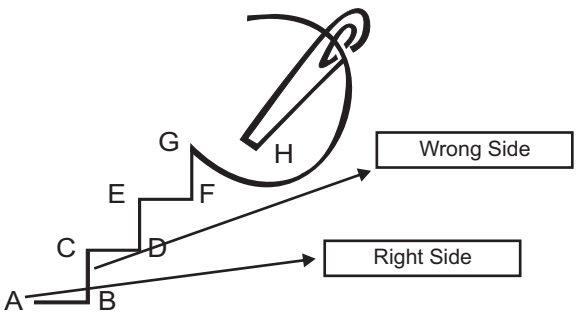
2. **Kashida Embroidery**

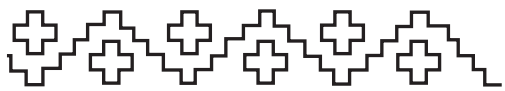
   Trace the motif on a 8"x 8" Silk fabric and fill the given motif with appropriate stitches and colors suitable for Kashida embroidery .



3. **Kasuti Embroidery**

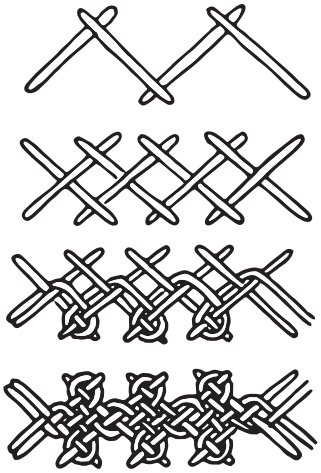
   Following the instructions given below execute a border design on a 8"x8" Matte fabric





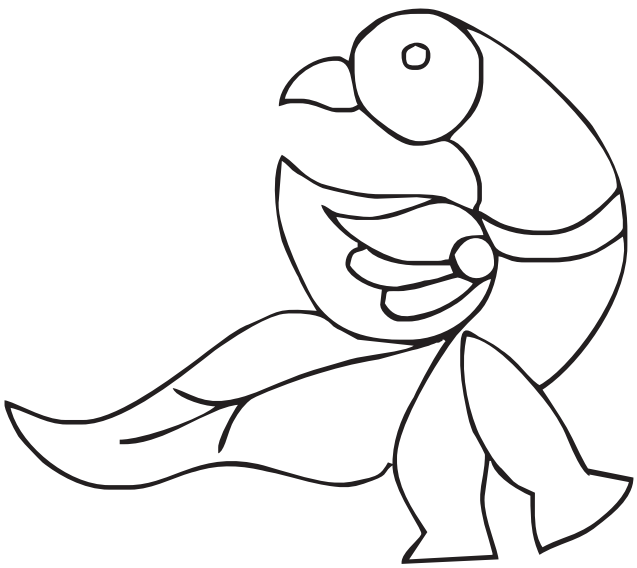
4. Kutch Embroidery

Following the steps given under create a border on a 8”x 8” cotton cambric fabric.

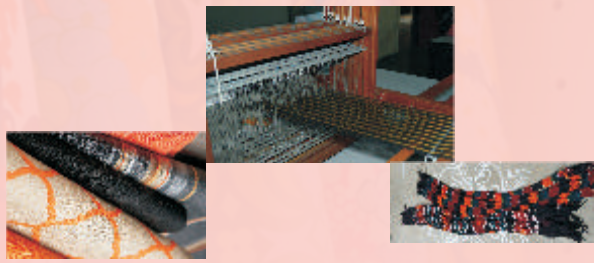


5. Zardozi Embroidery

Trace the motif on a 8’’x8’’ silk fabric fill the given motif with appropriate stitches and colors suitable for zardozi embroidery



BUILDING SKILLS•BUILDING FUTURE•



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Tel: 011-22527183 • Fax: 011-22526580
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