CHAPTER : 23

DYEING AND PRINTING

Due to lack of colour, finishing of cloth appears to be dull. Color does not only increase the beauty of cloth but also fills us with joy and cheerfulness. Dyes bring novelty and diversity in cloths. Use of color is going on from ancient times. In ancient times natural dyes were used. With the revolution of cloth industry, use of synthesized dyes has begun.

Types of dyes

1. **Natural Dyes**- Those dyes which are prepared from natural sources are called Natural Dyes. These dyes are obtained from plant sources, animal sources and mineral substances (Table no. 23.1).
2. **Artificial or Synthesized dyes**- In 1856, these dyes were discovered by Henry William Perkin while preparing quinine from aniline. These are also known as coal tar dyes.

(i) **Acidic Dyes-** These are used for dying woolen, silk clothes and synthetic fibres. These are not used for cotton clothes.

(ii) **Alkaline Dyes –** Useful for dying fibers made from woolen, silk and cellulose.

(iii) **Oxidase Dyes** – It is available in black and brown dyes. It is useful for dying cotton clothes and can also be used for dying silk and acetate clothes.

(iv) **Chrome Dyes –** Mostly clothes have dark dyes. After dying woolen clothes from acidic dyes, for the purpose of darkening the colour it is boiled in chromate solution.

(v) **Evident dyes –** For dying it, binder is not needed. It is of three types. Automatically Evident colour, Developed colour and Azoik colour, etc.

(vi) **Sulfur Dyes -** Used for dying Natural and artificial cellulose fibers.

(vii) **Disperse Dyes-** It is used for dyeing Nylon, Acrylic, Polyester, etc. clothes and Cellulose fibers.

(viii) **Achromatic Dyes-**

(ix) **Naphthol Dyes-** They are dark dyes for dyeing nylon, Polyester, Cotton and Rayon fibers. For dying them, binders are used.

(x) Vat dyes– Cotton, Linen and Rayon fibers are dyed. Along with nylon, Polyester and acrylic cloth can also be dyed. These are costly and insoluble.

Dyes- These are soluble in water. It can easily dye clothes. These are costly. These are assimilated in the fibers.

Pigment- These are insoluble in water. They remain stuck to upper layer of fibers. To dye cloth from a pigment, any type of sticking substance is used.

Table 23.1: Natural Dyes

Vegetables (different parts of plants -trees)		Minerals		Animals	
1. bark	Catechu	Iron powder	Chrome yellow, chrome green, chrome orange, Prussian blue,	1. fish	Purple, Tatareal
2. leaves	Henna				
3. stem	Turmeric			2. insects	Cochineal dye, red, orange color
4. flowers	Saffron, *Palash* (bastard teak), night jasmine				
5. fruits	Saffron, walnut, pomegranate, gooseberry, plum, *Harad* (Chebulic myrobalan), Baheda (Terminalia bellirica),				

Finishing of Clothes with dyes

Colour finishing which has brought novelty and variety in cloth industry is completed mainly by two methods:

(1) Dyeing (dipping the cloth in dye),

(2) Printing (Printing color on cloth according to a definite shape or pattern)

1. Dyeing– Dyeing is the process of adding color to textile products like fibers, yarns, and fabrics. Dyeing is normally done in a special solution containing dyes and particular chemical material for fixing the dye on textile products.

Stages of dyeing: dyeing can be done either with hands or machines.

(i) Fiber dyeing– This is known as dyeing of raw material. Dyeing on fiber is durable, dark and more even at all places. This is done in three ways:

(a) Top dyeing– Fibers of wool from which the short fibers have been removed is dyed by wounding the fibers on a reel.

(b) Drop dyeing– While preparing artificial fibers dye is added into the chemical solution and is passed through the spinneret.

(c) Stock dyeing– It is done by putting loose, unspun fibers in to large vats containing the dye bath, which is then heated at appropriate temperature required for the dye application and dyeing process.

(ii) Thread dyeing– the threads are tied to a rod and are dipped in large tanks filled with dyes. This dye stays on and does not get washed away.

(iii) Textile dyeing– keeping in mind demands of fashion and time, fabric can be dyed as per requirements. Fabrics can be re-dyed also. Fabric dyeing is not permanent as that on fibers and threads.

Methods of textile dyeing–

1. **Jig dyeing–** The fabric in jig dyeing is held on rollers at full width. These rollers are used for dipping the fabric in dyes at regular intervals. By this method any fabric can be dyed in any color in a short period.
2. **Cross dyeing–** This is a very popular method in which varied color effects are obtained in the one dye bath for a cloth which contains fibers with varying affinities for the dye used. Depending on affinities of fibers for different colors, dyeing can be performed. Single fabric with different colors thus look beautiful, attractive and fulfills the demands of consumers.
3. **Bandhani–** The dyeing method called as Bandhej is famous textile art of Rajasthan and Kathiawar. Bandhani of Jaipur and Patola of Gujarat are also famous.

Bandhani is a technique of tie and dye. The technique of Tie and Dye involves two stages: tying sections of a length of cloth (silk or cotton) and then dunking it into vats of colour. The tied part does not get dyed and the rest of the part gets dyed. To dye the fabric in many colors, dyeing starts with a light colour. As the dye gets dried the fabric is again tied and dipped in different colors.

4. **Reel dyeing–** Both the ends of a light weight fabric are sealed on a reel and then the fabric is dipped in a vat containing dye solution.
5. **United dyeing–** garment made from fibers of different categories is evenly dyed using this method.
6. **Continuous dyeing–** Excess long and big garments are dyed using machines. Dyeing to drying every function is performed by machines.
7. **Batik–** It is a technique of wax-resist dyeing applied to whole cloth, or cloth made using this technique. Using a brush hot wax is applied on the portion of fabric which has to be prevented from dyeing. After the wax dries the fabric is dipped in dye solution. Fabric except the wax applied portion gets dyed. After dyeing wax at some places get chapped. Wax has to be re-applied at the chapped places and then fabric is dipped for another round of dyeing. Wax is removed after the cloth is completely dried. This way beautiful and attractive dyeing is done.
2. **Printing–** Textile printing is the process of applying colour to fabric in definite patterns or designs. In properly printed fabrics the colour is bonded with the fiber, so as to resist washing and friction. For printing a semi-liquid paste of dye is prepared. Printing with different colors requires different design samples. Using any printing method, printing is done using different sample designs of colors. Thereafter the color of fabric is dried and fixed on the fabric.

Methods of printing–

1. **Block printing–** The blocks are usually made of wood or metal and the design is hand carved. Fabric is laid on a flat surface and the print paste is applied on the surface of the block and the block then pressed against the fabric. The process is repeated with different designs and colors.
2. **Roller printing**– Designs are carved on big rollers and the fabric passes through these rollers. The design gets pressed against the fabric. Different rollers with different design for different fibers are used. Hundred meters of fabric gets printed in a short period.
3. A method of printing same colored designs on both sides of fabric.

4. **Duplex printing–** A method of printing a pattern on the face and the back of a fabric with equal clarity.
5. **Spray painting–** In this method a mechanical air brush or hand held brush is used for spraying, making a design on the fabric.
6. **Screen printing–** In this method a special frame covered with a blocking substance is placed on the fabric and carefully printing paste is applied on the fabric. The area covered with blocking substance does not get any prints. Rest of the fabric gets printed.

In addition to these, Resist printing, Stencil printing, Warp printing, discharge printing, etc are also used for textile printing.

IMPORTANT POINTS:

1. Dyeing and printing are famous methods of textile finishing.
2. Dyes can be obtained both from natural and artificial sources.
3. Natural dyes are obtained from plant, animal and minerals sources.
4. Artificial or synthesized dyes are obtained from coal tar.
5. In dyeing, fiber, thread or fabric is dipped in dye to complete finishing work.
6. A semi-liquid paste is used for printing and colour is applied to fabric in definite patterns or designs

EXERCISE:

1. Choose the correct option–

(i) Developed dyes, evident dyes, azoic dyes are examples of
(a) Chrome dye (b) Evident dye
(c) Sulfur dye (d) Alkaline dye

(ii) Dyes and pigments are related to
(a) Natural colors (b) Artificial colors
(c) Sulfur colors (d) Synthesized colors

(iii) In Bandhej process of dyeing is by
(a) By tying the cloth
(b) directly dipping in color
(c) Both of the above
(d) dyeing by cutting

(iv) In roller printing, design is carved on
(a) Wooden block (b) rollers
(c) Both of the above (d) screens

2. Fill in the blanks–

(i) Dyeing and printing is a method of finishing using ————

(ii) ———— is obtained from natural colors.

(iii) ———— is obtained from artificial colors.

(iv) For dyeing textiles made from natural and artificial cellulose fibers ———— dye is suitable.

(v) In batik wax is used for ————.

3. Who and when discovered synthesized dyes?
4. What are natural dyes?
5. Write the types of dyeing.
6. Name any 5 methods of textile dyeing.
7. What is ——— printing?
8. What do you understand by dye finishing? Name the various dyes.
9. Write short notes on
(1) Dyes and pigments
(2) Cross dyeing
(3) Duplex printing
10. How is finishing done by dyeing method? Explain bandhej and batik.
11. What is printing? Write short notes on-
(1) Block printing
(2) Screen printing
(3) Spray printing

ANSWERS:

1. (i) b (ii) a (iii) a (iv) b
2. (i) dyes (ii) plants, animals and minerals
(iii) coal tar (iv) sulfur
(v) prevention from colors