

1. What is Printing ? or Define printing?
 → Printing is also called 'Localised dyeing' or partial (Semi) dyeing.

2. What are the objectives of Printing?

- * To make the textile material more attractive by using multi colour design.
- * To cover the fabric defects by using dark or deep designs.
- * To left it make the low quality of fabric is more valuable.
- * To have maximum production in printing unit.
- * House keeping is very clean.

3. Give comparison b/w Dyeing and printing

Dyeing
 * The main objective is dye single colouration for the entered fabric.

* Colour is applied in the form of dye solution.

* Fairly lower concentration of the design can be

carried out in prolonged time.

Printing
 * The main object of printing attractive design with multi colour effect.

* Colour is applied in the form of paste.

* Fairly high concentration is carried out in a short period.

to harden the screen.

* The Exhaustion of the dye bath is controlled by temp of the bath.

* Dyeing can be carried out by using dyeing m/c in jigger, muck jet dyeing m/c etc.

* After dyeing generally after treatment is required to improve the fastness property.

* During dyeing common chemicals are required i.e. Salt, acid, Base etc.

* Steaming or curing is not necessary for dyeing.

* Dyeing fabrics are soft.

* In a dyeing process dyes are applied on both sides of the fabric.

* In a dyeing process only one dyeing is used.

* The actual transfer of dye stuff is carried out by diffusion of the dye stuff. It can be carried out at room temp and suit temp.

* In printing Engg. wooden box, screen, Rotary screen, flock screen printing m/c etc.

* Very rarely after treatment is required to develop and improve the colour fastness.

* In printing high viscose face to be required is thickener Glycerin, Urea and etc.

* Steaming or curing is must for printing.

* Printed fabric is hard and harsh.

* In a printing process dye is applied on one side of fabric.

* In printing process one or more dyes are used.

* Thickness is not measured for dyeing. * Small amount of H_2O is measured for printing.

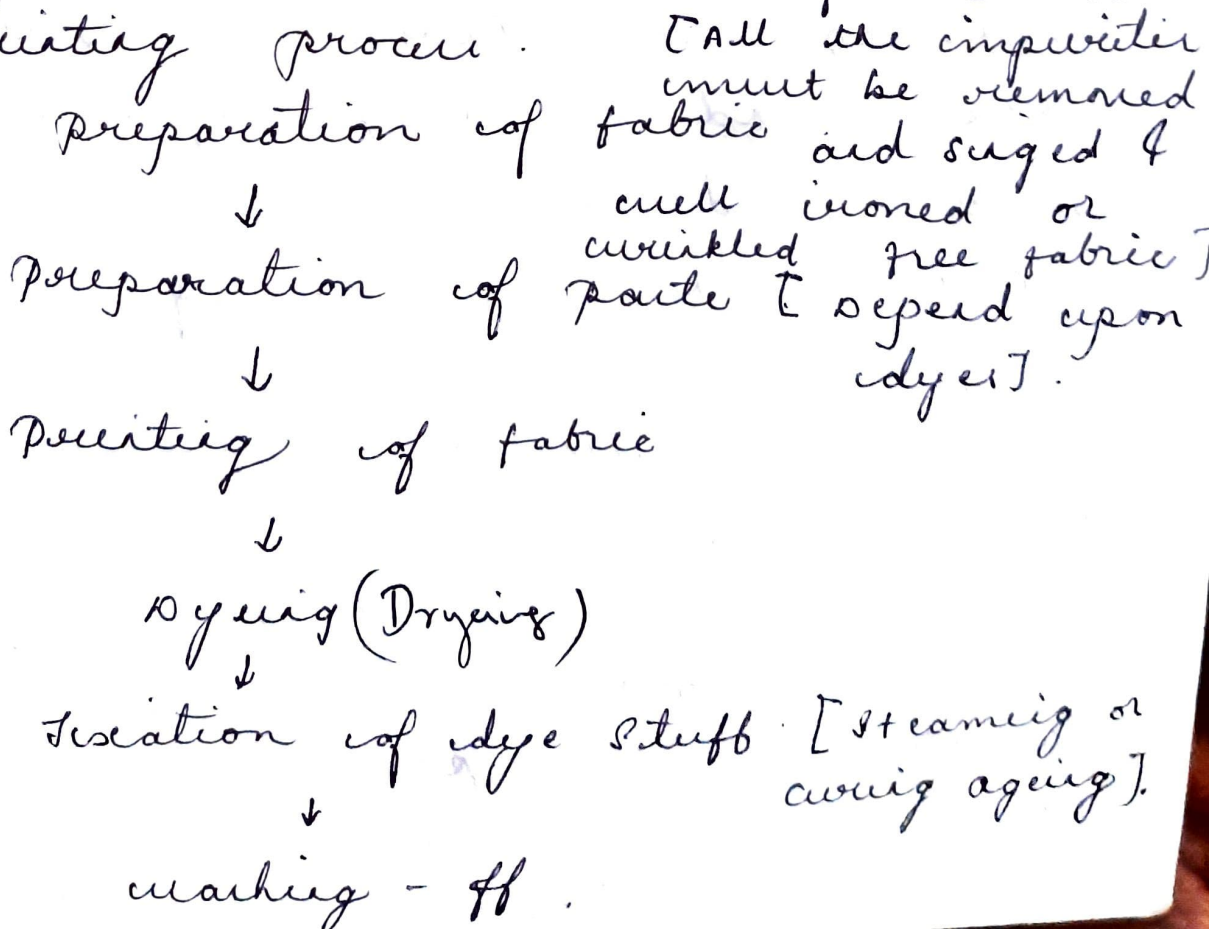
* The density of dye solution is less. * The density of printing paste is high.

* Dyeing fabric, yarn and fibres are dyed by dyeing. * Generally print on fabric.

47. What is textile printing?

It is process of apply colour in fabric in different patterns or designs. In properly printed fabric the colour is bonded with the fibre so as to resist washing and friction.

5. Give printing process steps or give printing process sequence or flowchart of printing process.



Preparation of printing paste.

6. What are the ingredients used in printing paste or how preparation of printing paste carried in our lab?

Types of specific formation depends on fibre \rightarrow colourant system used \rightarrow type of printing m/c.

Typical ingredients used.

- \rightarrow Dyes or pigments.
- \rightarrow Thickener.
- \rightarrow Binder, cross linking agents.
- \rightarrow Dispersing agent.
- \rightarrow Wetting agent.
- \rightarrow Hydroscopic agent.
- \rightarrow De-forming agent.
- \rightarrow Catalyst.
- \rightarrow Oxidising and Reducing agent.
- \rightarrow Corrosive and Smelling agent.
- \rightarrow Acid and alkalies.

7. What is the function of thickener used in printing paste.

- \rightarrow The main function of thickener is to avoid spreading of colour behind boundaries of the design.

Additional function of thickener

Viscosity of the paste.

Preparation of Screens for printing

8. What are the methods for preparation of screens?

of screen and briefly explain it.

→ There are 4 methods for printing (preparation of screens they are)

* Direct printing method.

* Profilm method.

* Relief method.

* Photographic method. (Black ^{ink} lacks &

⑨ Potassium dichromate or Peroxide)

Direct printing method : In this method the ink or nylon screen (sitting cloth) pointed to the screen when pattern to be measured on the screen printed add with a point. Blocking-off those portion for printing this method is labourer and it is delicate if any complicated figure.

⑩ Profilm method : - In this method profilm has "cellulose acetate" film coated with blue lacquer solution is ^{applied} ~~applying~~ on the screen. Before application 1st place the design at the center of the screen then apply the solution and allow to dry for 30-40 minutes. After completion of drying peel out cellulose acetate design by treating with warm water. Finally we get a measured pattern on

→ Dichromat gelatin ^{clarified}
used as sensitizer &
PVA blue lacquer
sol for harden
the screen

a screen which is ready for printing

11 RESIST METHOD: In this method suitable resist material coated on screen with required design then allow the dry for whole surface of the screen (30-40 min) apply blue blacker solⁿ after drying the screen wash with warm water and remove the resist material. clear sharp pattern obtained where the resist material obtained now the screen ready.

12 Photographic method.

Refer practice record

STYLES OF PRINTING

10/7/2015

13 Mention styles of printing used in industry
or what are styles of printing

- Direct style of printing
 - Resist style of printing
 - Aircharge style of printing
 - Gum & crepon of printing
 - ^{material} Madder style of printing
 - Azole style of printing
 - Carbonizing style of printing
- Steam style by 10/7/2015
V. Imp.
Brook style
Rain style
pts

14 What are the methods of printing?

- Block printing (wooden engraved block printing)
- Screen printing
- Roller printing
- Flat bed ^{screen} printing
- Rotary screen printing & etc.

Comparison between styles of printing and method of printing

15 Styles of Printing

- * It involves certain mechanical operation and chemical reaction
- * Discharge style of printing removes background colour of the dyed fabric which results beautiful white pattern.
- * In styles of printing
 - 1. Direct style
 - 2. Discharge style
 - 3. Resist style
- * In tie and die styles of printing symmetric designs are not obtained
- * In some styles of printing sharpness of printing is not possible.
- * In resist style of printing ground is not dyed before printing.
- * In styles of printing widely dye liquor is used.

Method of printing

- * method of printing involves the means of appliance are used to produce the printed effect.
- * Here in any back ground generally bleached or light tint colour and printed with multicolour effect.
- * In method printing appliances are used
 - 1. Block printing
 - 2. Screen printing
 - 3. Roller printing
 - 4. Rotary Screen printing
 - 5. Flat bed screen printing
- * In method of printing systematic design are obtained (symmetric designs are obtained)
- * In method of printing sharpness of pattern obtained
- * In method of printing either ground is colour or bleached.
- * In method of printing widely part is used in that either is must.

* Generally after treatment is required for the dyed fabric.

* Severe chemical & mechanical reaction on to the cloth. Hence, strength of the cloth is deteriorated.

* Rarely after treatment is used in method of printing.

* No such conditions are used. Hence strength of the fabric remains more or less the same.

11/07/20

Briefly explain styles of Printing.

→ Direct Style :- This style is also referred as Steam Style. In most of the cases the printed fabric is to be steamed to fix the colour. In this style the colour is applied directly to the fabric in the form of paste containing colouring matter consist of thickener, binder and other supporting chemicals. After printing the printed material is to be fixed by steaming or curing or thermofixing. In most of the cases dye stuff printed in direct style.

→ Discharge Style :- A chemical discharge print is obtained when a fully dyed fabric is printed with an agent which chemically destroys the ground shade of the fabric and produces a white discharge. Thus in discharge printing the whole cloth is dyed first and then printed with a paste containing a chemical discharging agent capable of attacking the dye loc. The printed cloth is further treated

ie steaming / curing and finally washed.
Beautiful ^{white} background design is obtained.
Resist or Reserved Style :- The resist style is like discharge style related to the production of wide and colour pattern on various colour ground. But the difference b/w two is that in the case of discharged style, the discharging agent is applied to the cloth after it has been dyed. Where as in resist style the cloth undergoes any type of dyeing in resist style of printing where the resist material is applied to the fabric then dye will not observe. Therefore any type of design can be create with the artistic application resist material on to the fabric. For example Batik printing First given white fabric patterned with wax. Then the whole fabric is dyed, after dyeing thoroughly washed it. Then boil the water with dyed fabric where the wax coated pattern open up and we will get white design rest of the fabric dyed.

MADDER STYLE OF PRINTING OR DYED STYLE OF PRINTING

The term "dyed style" this kind of style applied exclusively to mordant, mordant with mordanting agent like tannic acid and Tartaric Salt. In this case either you go for natural dye or Basic dye can be used.

The given white cloth printed with paste containing mordant agent. After drying the printed area. Then the whole fabric dyed with natural dye or Basic dye. Then use the fabric, finally where locally mordant material fix the basic dye colour and rest of the portion white colour remains. This style of printing is called madder style or dyed style of printing.

CRIMP OR CREPON STYLE OF PRINTING

The term Crepe fabric is highly twisted fabric. But in the case of printing with chemical reagents which exert a strong swelling action of the fibre and it causes a shrink. Crimp or Crepon style of printing. Crepe effect with using high twisted yarns in the fabric just by chemical treatment we can achieve this.

The best example of this type of shrinkage by using NaOH (mercerizing strength 18-25%) without tension on cotton goods. This method is used for producing Crepe effect on cotton fabric by printing what is known as Crimp or Crepon effect.

The fabric is printed with thickener of 18-25% of NaOH and other chemical used in a paste.

This paste can be applied either as straight pattern or either any motif design can be applied over the fabric. Then fixing (steam curing) takes place. Where concentrated NaOH is there, locally fabric gets shrink. In this way crimp or crepon effect can be produced.

CARBONISING STYLE OF PRINTING

The term carbonisation has been originally associated with wool for chemical destruction of vegetable matter. All the vegetable matters were burnt out with acid HCl or H_2SO_4 . When PK blended fabric normally 90/10, to produce as silky finish. The carbonization should be carried out with acid i.e. 70% of H_2SO_4 work it for 45 min at RT in a Tigger m/c. Finally cellulose portion is destroyed. The degraded cellulose is then removed at 120°C and polyester may be burnt out during washing. After carbonising the fabric wash thoroughly & then bleached with H_2O_2 to remove brownish tint. Finally the fabric is washed and dried.

AZOIC STYLE OF PRINTING

Azoic style of printing are widely used for printing. First the given fabric is treated with naphthol solution (Patterned with naphthalization.) This process is called naphthalization. After naphthalization the whole fabric treated with base solution. Where naphthalated locally, the base solution react and develop the colour.

* The fabric for discharge printing must be fully dyed and sewer chemically reaction is required to color the ground colour in order to obtain white pattern.

* The cost of printing is higher (chemical required more).

* This method is applicable only to those colours which can be discharged.

* In discharge style of printing the % of rejection is higher due to stain and sewer chemical reaction.

* In this method of printing very severe mechanical ^{operation} of chemical reaction. Hence strength of the fabric is less.

-4-

Give classification of Thickness



* Take ground - i.e. first first the fabric is not dyed and then coated with wax. with a pattern or tied with polyester thread finally dyeing to be taken.

* Cost of printing is lower (chemical required is less).

* In this method call most call edges can be used in order to get print style of print.

* Here the % of rejection is very low due to subdued effect and no sharp of printing.

* In this style of printing. There is no such chemical or mechanical reactions. Hence the strength of the fabric is more or less same.

in order to in this way ^{to give} style of pattern can be done printing

Give comparison b/w Discharge and Reverts style of printing

Discharge

* Discharge method is obtained in revert style. gives a fully dyed fabric. pattern is done on fabric and then it is dyed which destroy the shade.

* Discharge destroy the in revert style. present and produce or given is applied dyeing leaving pattern white.

* Whole fabric is dyed in revert style then printed with paste of printing. fade into various shades with ^{and} designs. Can be produced.

* Printed cloth is more fabric a white paste is coated with pattern is opened. ^{the} get white dye of pattern is obtained. No sharpness in shade.

Discharge

* In this printing always sharp outlines and bright appearance gives a Sparkling white of the background fabric (Pattern effect).
In revert style printing care of ^{the} ^{white} ^{background} is taken. ^{the} ^{background} is subdued under bright colours or bright outline of printed design which ^{is} ^{very} ^{characteristic}.

Reverts

→ Plants :- Extrudates Gum

Tragacanth Gum

Arabic Gum

Synthetic

→ Acrylic: poly
polyacrylic and

→ Cereals :- Starch
(Maize, wheat & etc)

* Vinyle :- poly
alcohol

→ Sea weeds :- Sodium

Alginate

Modified Natural Starch

Starch :- British gum

Cellulose :- Derivatives of Carboxylic with
Hydroxyethyl cellulose

Gum derivatives :- Gypso gum, Indulcer

Give the function of Thickeners and their properties.

→ The main function of Thickeners in
printing paste is to avoid spreading
Colour maintain design of outline
under high pressure because of its
"Viscosity of Paste".

Properties of thickeners

* Thickeners have high molecular weight
stickiness and plasticity properties
→ Thickeners have high viscosity of
paste

→ Thickeners prevent migration of Colour
→ Viscosity should not change by
addition of colors and chemicals
→ The thickener film must not be
brittled and flake until its fixation
carried out.

→ Thicker can be easily removed off during fixation.

→ Thinner should not react with ^{edge} 13/10/29 (s) Explain with a neat sketch roller printing m/c or Explain with neat sketch engraved roller printing m/c.

1. Central pressure bond

2. Suitable of cloth (gauge cushioning effect)

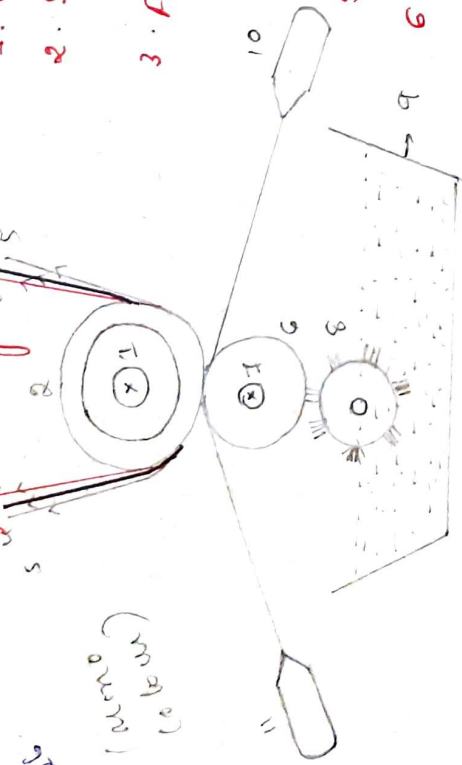
3. Around which Endless wooden blanket

4. Black ~~grey~~ Grey

5. Cloth to be printed

6. Engraved roller

7. mounted on steel shaft (mandril)



8. Furnishing roller

9. colour box

10. colour doctor blade

11. tint doctor blade

The engraved roller printing m/c is most economical and fastest way of printing upto 16 colour may be printed by using above machine without any problem

The essential part of this m/c consists of a large central cylinder [1] wrapped with a layer of cloth called wrapping roller [2] around which an endless wooden blanket [3] a back grey [4] call these layers for cushioning effect & finally cloth to be printed [5]. All these core contact each other colour printing. engraved roller each of which [6] is mounted on a steel shaft or mandril [7]. These rollers revolve in contact with each other. Each roller contribute one colour. [8] one colour printing [9]

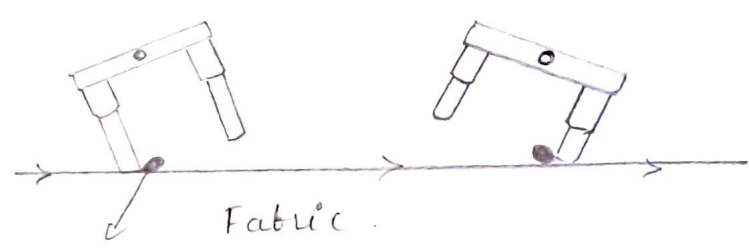
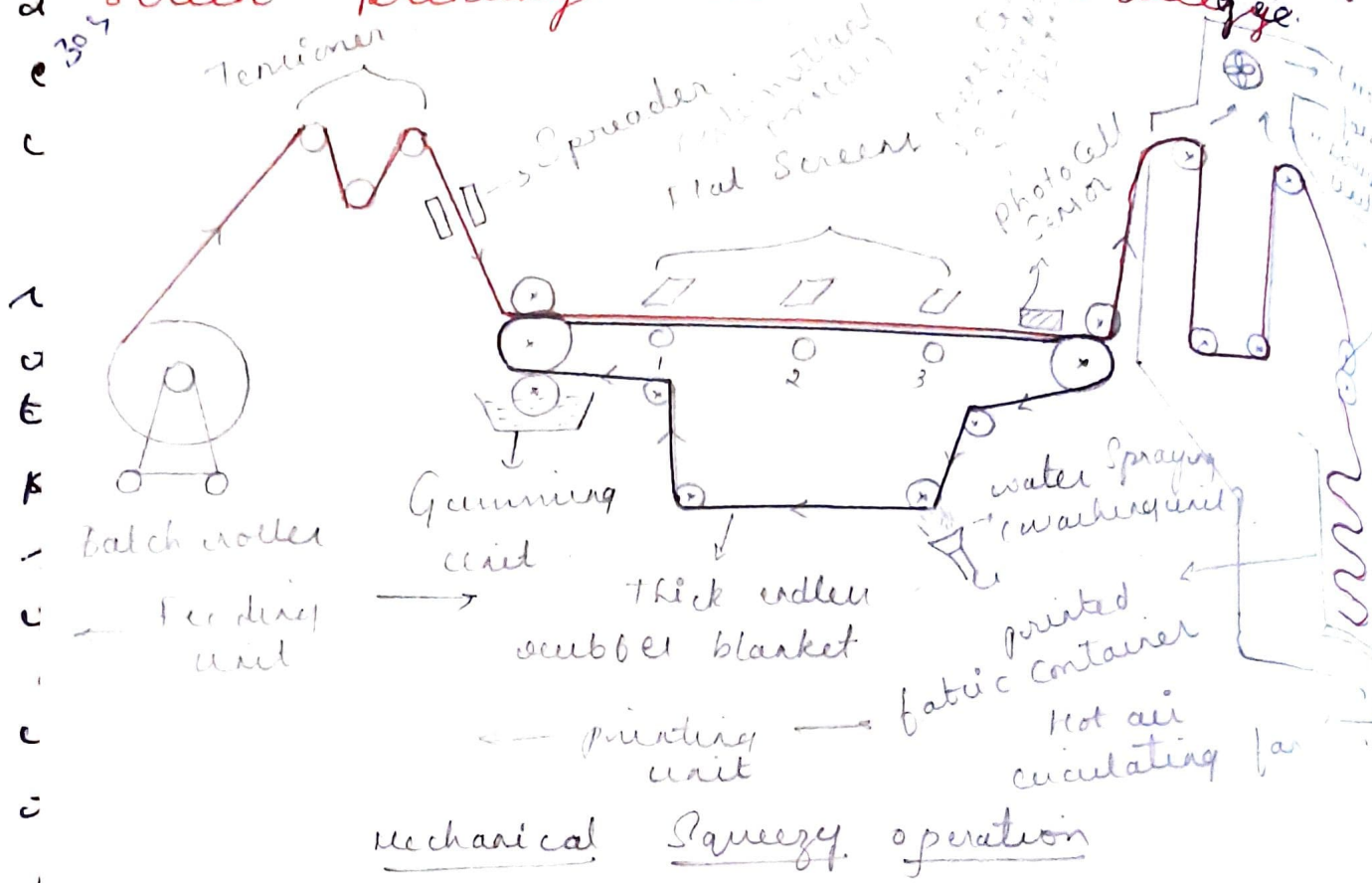
• Furnishing roller [8] which rotates in small submerged colour box [9] containing the printing paste. A large fine sharp edge steel blade called colour doctor [10] and another blade called hint doctor [11]

WORKING:- The engraved roller is furnished with a printing paste through the furnishing roller which supplied the paste to the engraved roller. The paste is deposited on the engraved roller surface. When the engraved roller rotates it comes in contact with the colour doctor blade which removes excess of the paste from the smooth surface the engraved roller and allow the paste uniformly deposited over the engraved roller. Subsequently, it comes in impression by depositing the paste in contact to the engraved roller. Hence one colour print will be taken place. Further rotation of the engraved roller it needs the hint doctor. The function of hint doctor before printing of every loose ends or hint present on the surface of the fabric that can be removed by hint doctor. The engraving roller continuous to its rotation, picking the paste apply on to the fresh fabric and this cycle will be repeated for periodically printing.

Explain with a neat sketch 6 colour multi-colour motif design from the engraved roller printing.

FLAT BED SCREEN PRINTING

12. Explain with a neat sketch flat bed screen printing and its Squeegee.



The flat bed screen printing machine is an automatic hydrotex flat bed screen printing machine which consists of 3 major units they are

- 1) Fabric feeding unit
- 2) Printing unit
- 3) Drying unit

At the final printed fabric passes through a dryer where dries the fabric then through plaiter and stores printed fabric in a container as shown in the figure

1. Fabric feeding unit :- The cloth withdrawn from batch roller through a guide rollers on to the tensioners and subsequently spreader is provided in order to get free from the wrinkles of the feeding fabric.

2. Printing Unit :- It consists of an ^{infinite} synthetic rubber blanket which supports the fabric during printing acts as cushioning effect. The forward movement of blanket is controlled by series of electromagnetic grippers placed at both sides of the blanket to prevent creases or wrinkles at the time of printing. The printing unit consists of number of flat screens and individual colour boxes and individual squeegee systems are provided which operates automatically.

3. WASHING :- This washing unit has a series of spray nozzles, brush rollers & rubber scrapers are provided to clean the rubber blanket if any stains before printing fresh fabric.

4. Gumming :- Adhesive is applied to the endless blanket. The Gumming is very essential to hold the fabric firmly on the surface of the blanket.

5. Printing Section :- According to the capacity of the m/c 8-16 colours can be available in this m/c.

6. Drying unit :- This unit consists of several rollers over & under the fabric passes in the chamber i.e. hot air circulation takes place to dry the cloth. The drying of the cloth can be synchronized.

with the Speed of printing and drawn of the cloth.

- 2. **SQUEEZY MECHANISM**: Mechanical type of Squeazy which having rectangular are at the side of rectangular to hold the synthetic rubber which gives movement is forward and backward. At the forward movement the right side downward and Squeez the part at the same time backward lifted in this way Squeazy operated when the backward right side lifting up stroke will be completed.

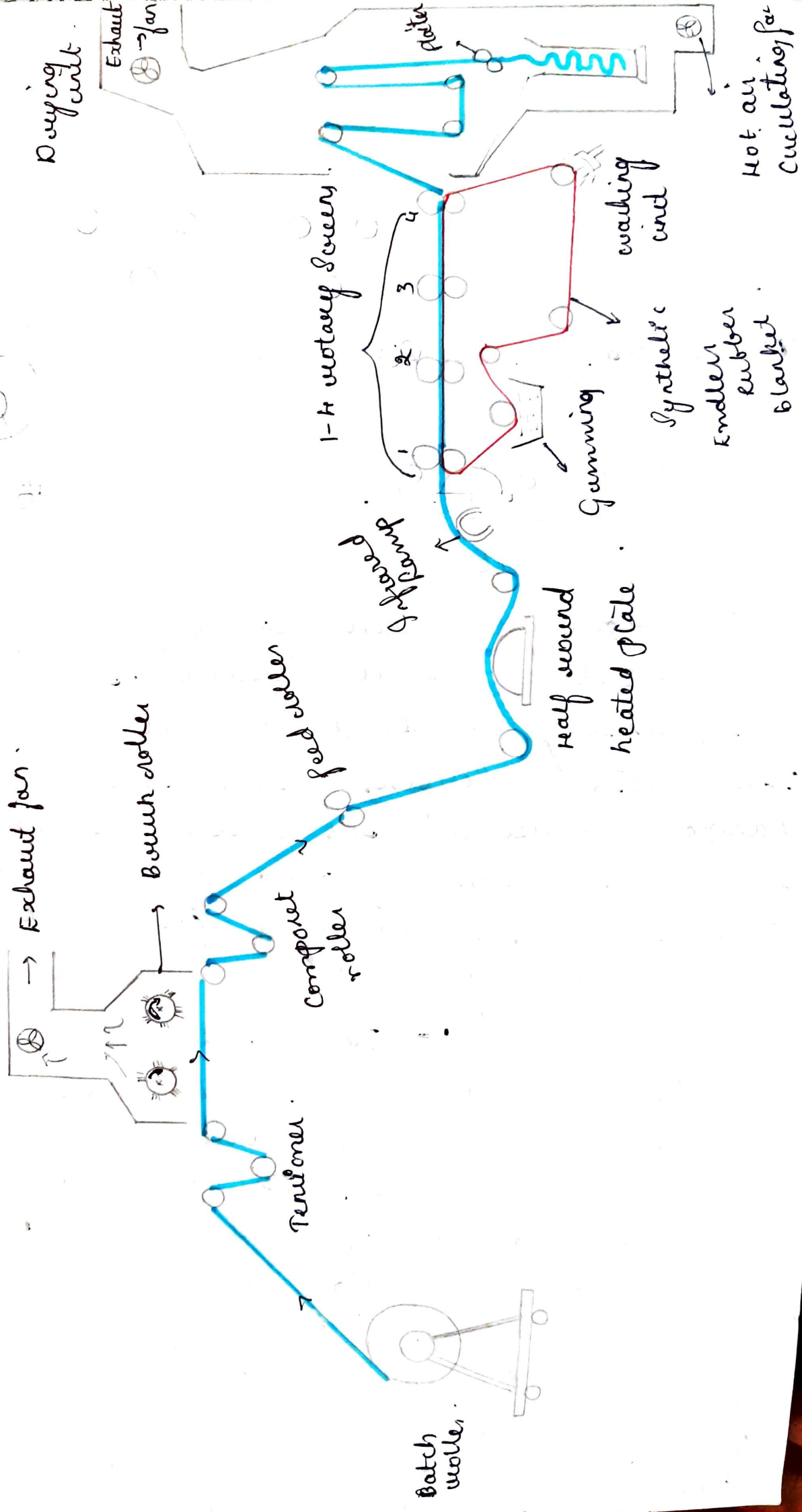
- 3. **WORKING**: The required design repeat set and verified by measuring the movement of blanket. The cloth gets printed at various unit and finally beautiful 3 colour is obtained (as shown above figure) and then passed to the drying unit & stored in the can.

PRINTING CYCLE

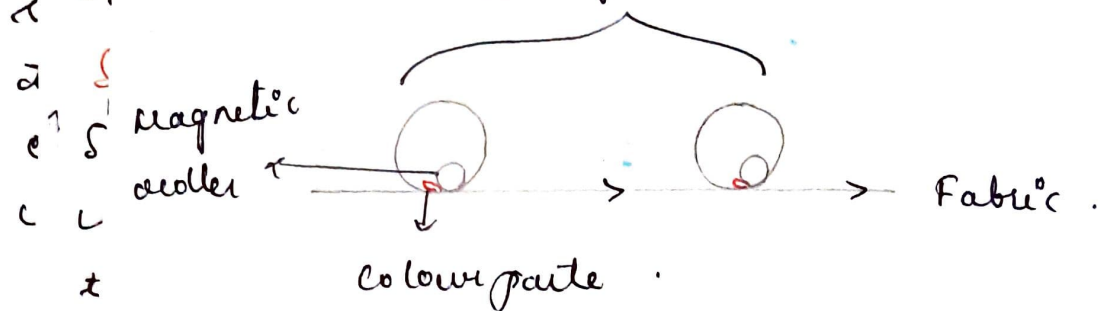
- Printing station up, forward blanket movement.
- Blanket stops, printing station down.
- Printing stroke, then the cycle will continue.
- The blanket motion is called intermittent motion.

20/10/2019

Explain with a neat sketch rotary screen printing m/c.



Rotary Screens.



The rotary screen printing m/c consists of :-

- Feeding unit.
- printing unit &
- drying unit.

In rotary screen printing, Perforated cylindrical metal screens are used for printing instead of flat screens. The rotary screens assemblies are known as "Rangoli rollers" as used in older days, in some areas which have been still used in villages for quick production of artistic rangoli patterns.

FEEDING UNIT :- The feeding unit consists of Tensioners, Brush rollers, Compensators, Guides and curved plate heater is provided. The main function of brush rollers is to vary idler and loose ends that can be removed through suction [Exhaust fan]. The fabric passed through feed roller then fabric heater unit which is heated by electrical coil. This makes wrinkle free and smooth fabric.

moves on to the printing unit.

PRINTING UNIT :- The printing unit consists of thick endless rubber blanket, Squeegee ~~supporting~~, colour feeding pumps into the individual rotary Screens. Auto levellers, Peel marker unit, Gumming unit, IR lamps (Infrared) and also optical sensors. Both blanket and Screen driven by motor with an uniform Screen. Rubber blanket after printing with high pressure water sprayer which marks rubber blanket. After marking and drying then Gumming uniformly on the surface of the blanket. This helps fabric firmly held by the blanket surface.

WORKING :- The respective Screens are mounted on the rotary heads, selected automatic, Squeegee are inserted and connecture to the respective pump. The fabric to be printed over the endless blanket with a Continuous process. Production is very high compare to flat bed Screen printing i.e. intermittent process.

DRYING UNIT :- The printed fabric comes to the drying unit where the fabric completely dries up with hot air is provided in the chamber. After drying the fabric is stored in.