(Apparel manufacturing I) LABORATORY (TE- 232) - LAB MANUAL

LEVEL-TERM L2-T3

List of Experiments

No.	Experiment Name
1	**Layout Plan of Apparel Manufacturing I Laboratory**
2	**Draw and Identify Different Components of a Shirt.**
3	**Draw and Identify Different Components of Trousers.**
4	**Study on Principle of pattern making for shirt**
5	**Study on Principle of pattern making for trousers**
6	**Study on marker efficiency**
7	**Study on Straight knife cutting machine**
8	**Study on Continuous fusing press machine**

Daffodil International University
Department of Textile Engineering
Course Code: TE 232
Course Title: Apparel Manufacturing I (Lab)

Experiment No: 01

Name of the experiment: Layout Plan of Apparel Manufacturing I Laboratory

Guiding Principles for Laboratory Floor Plan Design

Laboratory space should be:

- Adequate in size for testing
- sample reception
- sample preparation
- testing
- results production
- results validation and release
- Reagent and consumable storage.

Equipment should:

- be placed to facilitate smooth and efficient workflow.
- have sufficient operational area.
- be safely positioned.
- avoid placement in high traffic area.
- avoid placement that requires frequent moving for cleaning and maintenance.
- avoid direct placement under air conditioners.
- avoid nearness to sinks and wet benches.
- avoid direct proximity to heat source (instrument or sunlight)
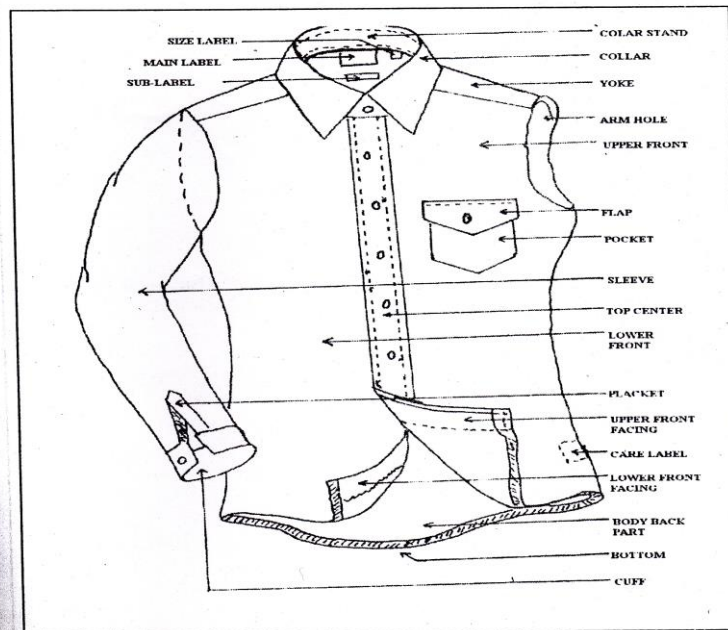- allow adequate space between instrument back and wall Supplies.

Daffodil International University
Department of Textile Engineering
Course Code: TE 332

Course Title: Apparel Manufacturing II (Lab)

Experiment No: 02

Name of the experiment: **Draw and Identify Different Components of a Shirt.**

SIZE LABEL
MAIN LABEL
SUB-LABEL
COLAR STAND
COLLAR
YOKE
ARM HOLE
UPPER FRONT
FLAP
POCKET
SLEEVE
TOP CENTER
LOWER FRONT
PLACKET
UPPER FRONT FACING
CARE LABEL
LOWER FRONT FACING
BODY BACK PART
BOTTOM
CUFF

83
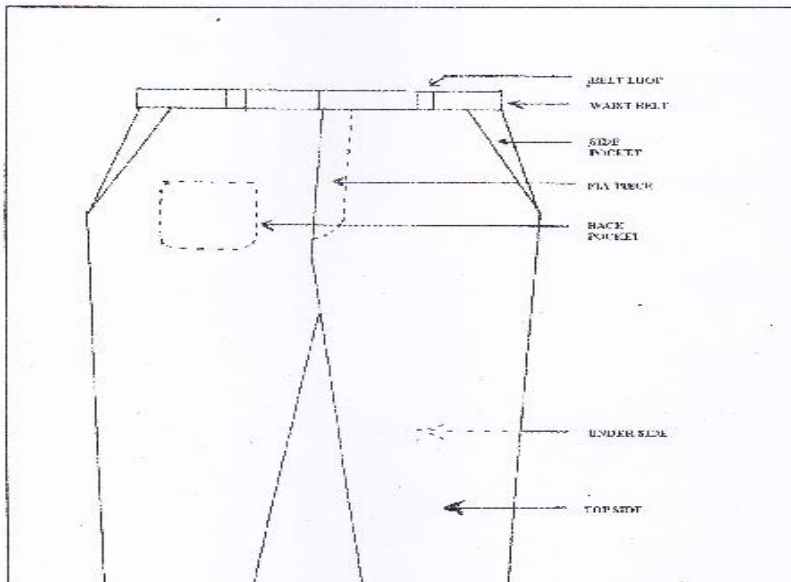
Daffodil International University
Department of Textile Engineering
Course Code: TE 332

Course Title: Apparel Manufacturing II (Lab)

Experiment No: 03

Name of the experiment: Draw and Identify Different Components of Trousers.

২.৪ একটি প্যান্টের ছবি ও তার বিভিন্ন অংশের নাম ঃ
Components of a pant (trouser)

BELT LOOP
WAIST BELT
SIDE POCKET
FLA PIECE
BACK POCKET
UNDER SIDE
TOP SIDE

Daffodil International University
Department of Textile Engineering
Course Code: TE 232
Course Title: Apparel Manufacturing I (Lab)

Experiment No: 04

**Name of the experiment:** **Study on Principle of pattern making for shirt**

Principle of Pattern Making for a Shirt

According to the Standard Measurement, 40cm Neck and 100cm Chest for a body the principle pattern making of a shirt is given below:

To make the pattern the necessary measurements are given below:

Neck Size   **: 40cm**

Chest   **: 100cm**

Scye Depth   **: 24.4cm**

Natural Waist Length   **: 44.6cm**

Half Back   **: 20cm**

Sleeve Length   **: 80cm**

Cuff Size   **: 23cm**

Cuff Depth   **: 7cm**

Shirt Length   **: 81cm**

Body Section:
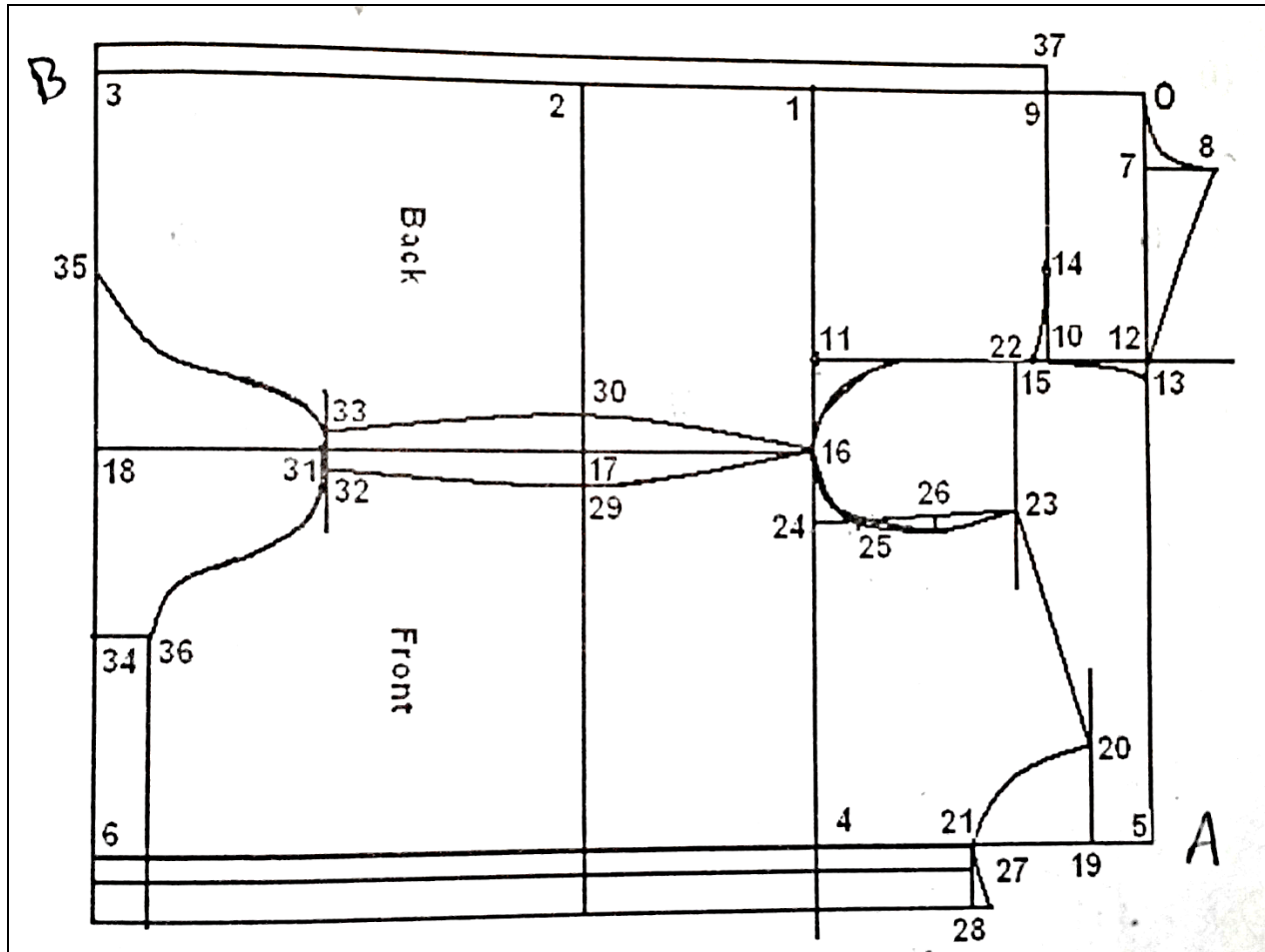
Figure 1:Body Section

At first indicating "0" point at a corner of the graph paper, then from "0", the line is extended (0-A) and from '0' drawn a straight line (0-B) at a right angle with (0-A). Then:

(0-1) : Scye Depth + 4cm. Then from 1 drawn a straight line in right angle with (0-1) line at right side.

(0-2) : Natural Waist + 3cm. Then from 2 drawn a straight line in right angle with (0-2) line at right side.

(0-3) : Shirt Length + 8cm. Then from 3 drawn a straight line in right angle with (0-3) line at right side.

(1-4) : Half Chest + 12cm. Then extended 4 to 5 in the line up and 6 in down at right angles with (1-4).

(0-7) : One fifth of neck size–0.5cm. Then from 7drawn a straight line in the up right angle.

(7-8) : 4.5cm. Then drawn the neck curve according to figure.

(0-9) : One fifth of (0-1) + 2cm. Then from 9drawn a straight line in right angle with (0-9) line at right side.

(9-10) : Half Back + 4cm. Then from 10 drawn a straight line in right angle with (9-10) line at upper and lower side and indicates 12 & 11 respectively.

(12-13): 0.75cm. then added 8 to 13 by slightly curved.

(10-14): 10cm.

(10-15): 0.75cm. Then added 14 to 15 by slightly curved.

(1-16) : Half measurement of (1-4) + 0.5cm. Then from 16 drawn a straight line in right angle with (1-16) so that got 17 & 18 points.

(5-19) : 4.5cm. Then from 19drawn a straight line in right angle with (5-19 line according to figure.

(19-20): One fifth of neck size – 1cm.

(19-21): One fifth of neck size – 2.5cm. Then drawn a neck curve.

(10-22): 1.5cm. Then from 22drawn a straight line in right angle with (22-11) line at right side.

(20-23): Measurement of (8-13) + 0.5cm. Then added (20-23) by slightly curved.

(1-24) : One third of chest + 4.5cm.

(24-25): From 24drawn a vertical line of 3cm with (1-24) at right angle in the upper and then added 23 to 25.

(23-26): Half of (23-25). Then added 13, 10, 16, 25 & 23 and from 26, made armhole by drawn a curve in the inside of 1.0cm.

(21-27): 1.5cm button stand. Then from 27 drawn a horizontal line with (27-6) in downwards.

(27-28): 3.5cm for facing. Then from 28drawn a horizontal line with (21-6) in downwards and made a curve from 28 at upper by equalized with neck curve.

(17-29): 2.0cm.

(17-30): 2.0cm.

(18-31): 20cm. Then from 31 drawn two straight line at negative direction to each other in right angle with (18-31) line.

(31-32): 1cm.

(31-33): 1cm, then drawn two curves of 16, 30, 33, and 16, 29, 32 and made side seam lines.

34   : Drawn a midpoint of (6-18) and made a vertical line from 34 with (6-18)

35   : Drawn a midpoint of (3-18)

(34-36): 4cm. Then from 36 drawn a horizontal line in right angle with (6-18) line at right side.

Then drawn the curves of (33-35) and (32-36) according to fig. 1.1. If it is needed to keep pleat in the back of shirt then drawn a horizontal line with (9-37) i.e. 2cm from 37 to (9-3) line. In this way the half of face and back side of a shirt can be made.

Sleeve Section:
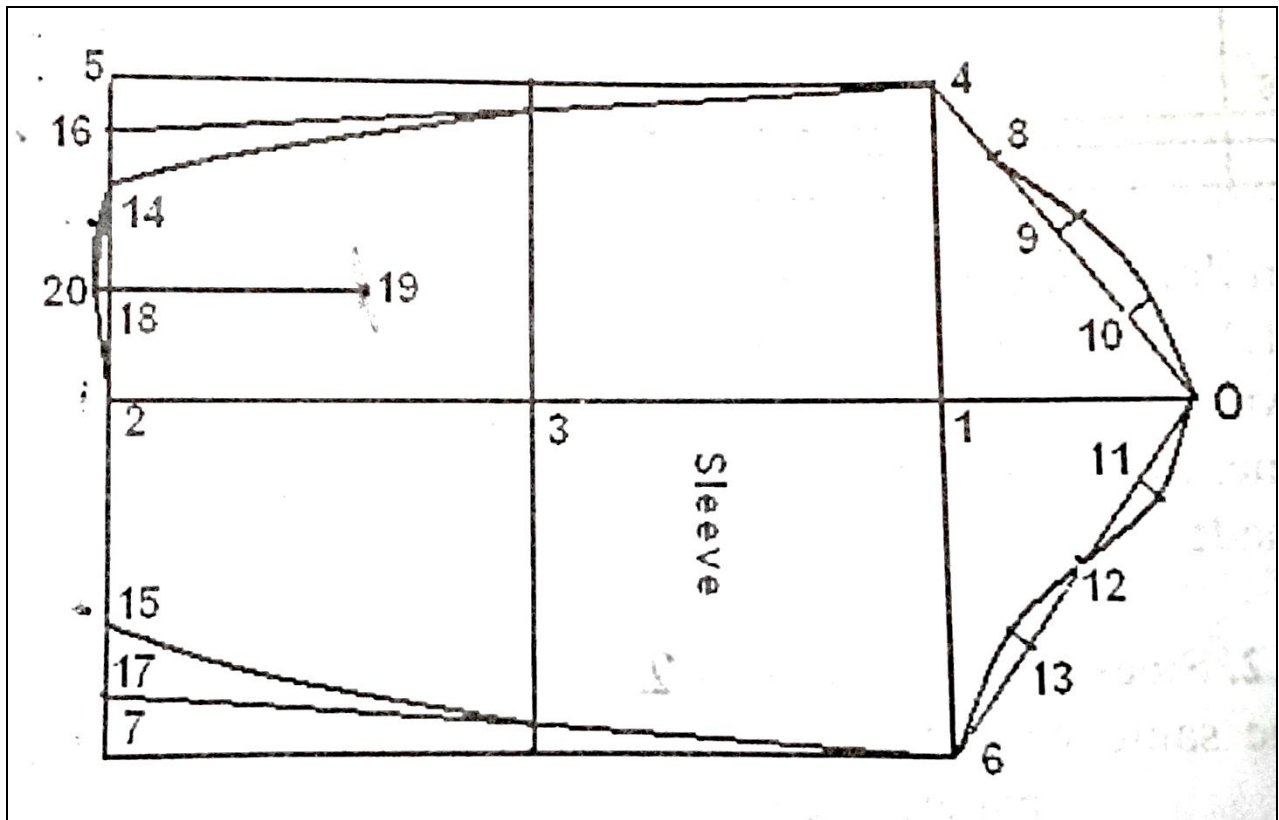
Figure 2: Sleeve Section

In the same way starting point '0' is indicating in the graph paper. Then:

(0-1)   : One fourth of Arm Scye Measurement (In fig Body Section, 13, 16, 23 curve is called Arm Scye Measurement). Then from 1, extend a straight line in both sides with (0-1) line at right side at right angle.

(0-2)   : Sleeve Length + 3cm – {Cuff Width + Half of Yoke Length (0-13)}.

3   : Midpoint of (1-2), then from 3, extend the straight line in both sides with (1-2) at right angle.

(0-4)   : Half of Scye Measurement. Then from 6 drawn a straight line (6-7) in right angle with (1-6) line at downwards.

Then divided the lines (0-4) & (0-6) into four equal parts and indicates the points 8, 9, 10 & 11, 12, 13 respectively. Then drawn the sleeve head by increasing (4-8) & (8-9) 1cm and 2cm from 10 in upwards. Then by '0' point 1cm increased from 11 in upwards and by '12' point, curve is drawn from 13 in 1cm downwards until the point 6 is found.

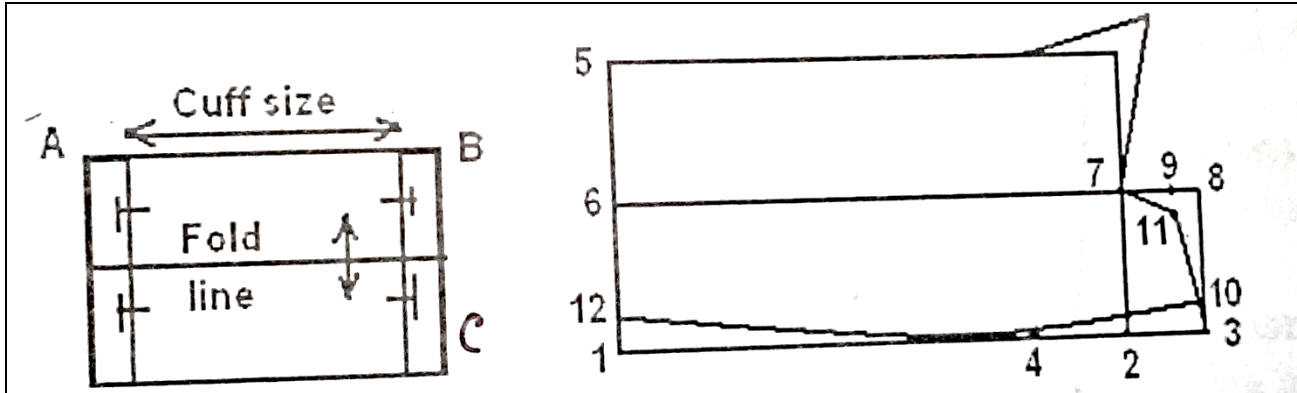(5-14) : One third of (2-5)

(7-15) : One third of (2-7)

16   : Midpoint of ((5-14). Then added (4-16)

17   : Midpoint of (7-15). Then added (6-17). After that made under arm seam line by drawn the curves (4-14) & (6-15).

18   : Midpoint of (2-14). Then from 18 drawn two straight lines (18-20) and (18-19)at negative direction to each other in right angle with (2-14) line.

(18-19): 12cm

(18-20): 1cm. Then drawn a curve with 2, 20, 14.

Figure 3: Cuff & Collar Section

Cuff Section:

(A-B) : Cuff Size + 4cm

(B-C) : (Cuff Depth X 2) + 2cm.

If is needed to make two patterns for two cuffs.

Collar Section:

(1-2)   : Half Neck.

(2-3)   : Button Stand + 1.25cm.

(1-4)   : Three fourth of (1-2). Then drawn three vertical lines on the straight line (1-3) from 1, 2 & 3.

(1-5)   : Width of Collar and Stand (generally 8cm) + 2cm. Then from 5 drawn a horizontal line with (1-2).

(1-6)   : Half of (1-5). Then from 6 drawn a vertical line in right angle with (1-5) line so that indicates the points 7 & 8.

(8-9)   : 1cm. Then from (3-9) drawn a straight line of 0.75cm from (9-11) & (3-10).

(1-12) : 0.5cm.

(5-7)   : Drawn the Style Line.

Then added the points 12, 4, 10, 11, 7 & 5 and made half pattern of collar and then full collar is made from half collar. It can be made different way according to style.

Daffodil International University
Department of Textile Engineering
Course Code: TE 332
Course Title: Apparel Manufacturing II (Lab)

Experiment No: 05

## Name of the experiment: Study on Principle of pattern making for trousers

Principle of Pattern Making for a Pant

According to the standard measurement, pattern making of a trouser is given below for 102cm seat measurement:

To make the pattern the necessary measurements are given below:

Seat	**: 102cm**
Waist	**: 82cm**
Body Size	**: 28cm**
Inside Leg Measurement	**: 81cm**
Trouser Bottom Width	**: 25cm**
Waist Band Depth	**: 4cm**

Top Side Section:
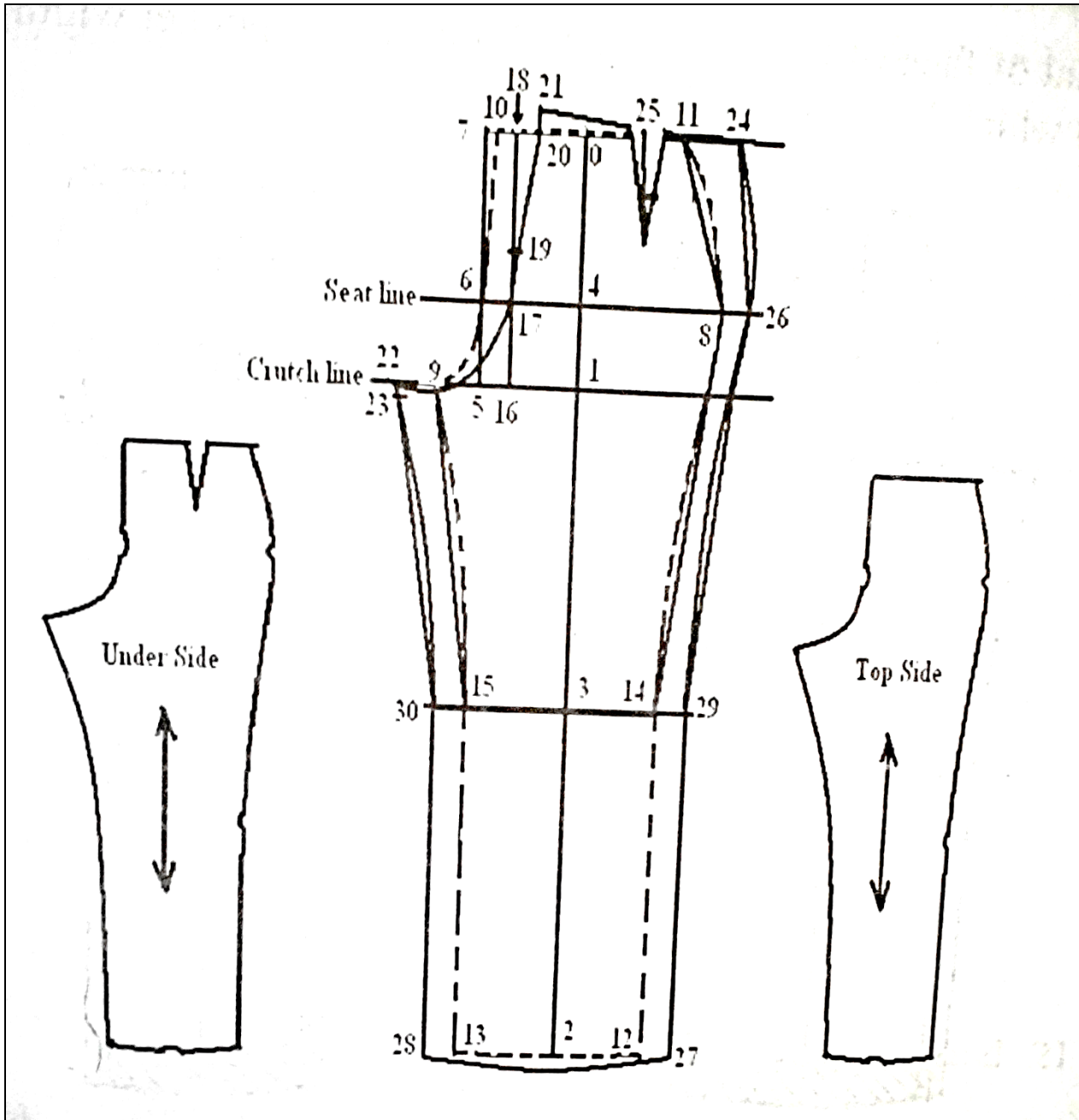
Figure 1: Top & Under Side of Pant

At first indicate'0' point from the left side of pattern paper at 24cm, then from "0", drawn three straight lines at right angle in downside, left and right side. Then:

(0-1)   : Body Rise + 1cm – Waist Band Depth. Then from 0drawn a perpendicular line in right angle with (0-1) line at right side and extended on both sides.

(1-2)   : Inside Leg Measurement. Then from 2 drawn a perpendicular line in right angle with (1-2) line at right side and extended on both sides.

(2-3)   : Half Measurement of (1-2) + 5cm. Then from 3 drawn a perpendicular line in right angle with (1-2) line at right side and extended on both sides.

(1-4)   : One fourth measurement of Body Rise. Then from 4drawn a perpendicular line in right angle with (0-1) line at right side and extended on both sides.

(1-5)   : One twelfth measurement of Seat + 1.5cm. Then from 5drawn a perpendicular line in right angle with (1-5) line at right side, which indicates the point 6 and 7.

(6-8)   : One fourth of Seat Measurement + 2cm.

(5-9)   : One sixteenth of Seat Measurement + 0.5cm.

(7-10) : 1cm.

       Then drawn a front curve by adding 6, 9 and 10 according to figure.

(10-11): One Fourth of Waist Measurement + 2.5cm.

(2-12) : Half of Bottom Width.

(2-13) : Half of Bottom Width.

(0-1)   : Body Rise + 1cm – Waist Band Depth. Then from 0 drawn a perpendicular line in right angle with (0-1) line at right side and extended on both sides.

Then added by straight lines from 12-14 and 13-15. Then drawn curve from 11-8 and extended 0.5cm outside the curve. Again drawn a curve from 8-14 and extended 0.5cm inside the curve.

Now, the line caused by the points 11, 8, 14, 12 indicates the side seam.

After that, drawn a curve from 9-15 and squeezed 1cm inside the curve. Now, the line caused by 9, 15, 13 points indicates the inside leg.

Underside Pattern:

(5-16) : One fourth of (1-5). Then from 16 drawn a perpendicular line in right angle with (1-16) line at right side which indicates the points 17 and 18.

19   : Midpoint of (16-18).

(18-20): 2cm.

(20-21): 1cm.

(9-22) : Half of (5-9) + 0.5cm.

(22-23): 0.5cm.

Then drawn back fork by adding 23, 19 and 21 according to figure.

(21-24): One fourth of Waist + 4.5cm.

25   : Midpoint of (21-24). Then drawn a line with 12cm long and dart of width 2.5cm at right angles from 25 with (21-24) in downside.

(17-26): One Fourth of Seat Measurement + 3cm.

(0-1)   : Body Rise + 1cm – Waist Band Depth. Then from 0 drawn a perpendicular line in right angle with (0-1) line at right side and extended on both sides.

(12-27): 2cm.

(13-28): 2cm.

(14-29): 2cm.

(15-30): 2cm.

Then according to figure drawn side seam by adding the points of 24, 26, 29, 27 and inside leg by adding points 23, 30, 28.

Then indicated the point 'D' at 6cm far away from the point 25 by coping underside. Then 'D' is the middle point of face of back pocket and the face of pocket width is 14cm which is shown in figure: 1.

After that copied the top side of trouser figure: 2 and indicated point 'A' on the side seam.

(A-B) : 5cm.

(B-C) : 19cm.

Then displaced top side by cutting along with B-C and added 5cm allowances. After that added 5cm hem allowances with the top side and bottom side of trouser at down.
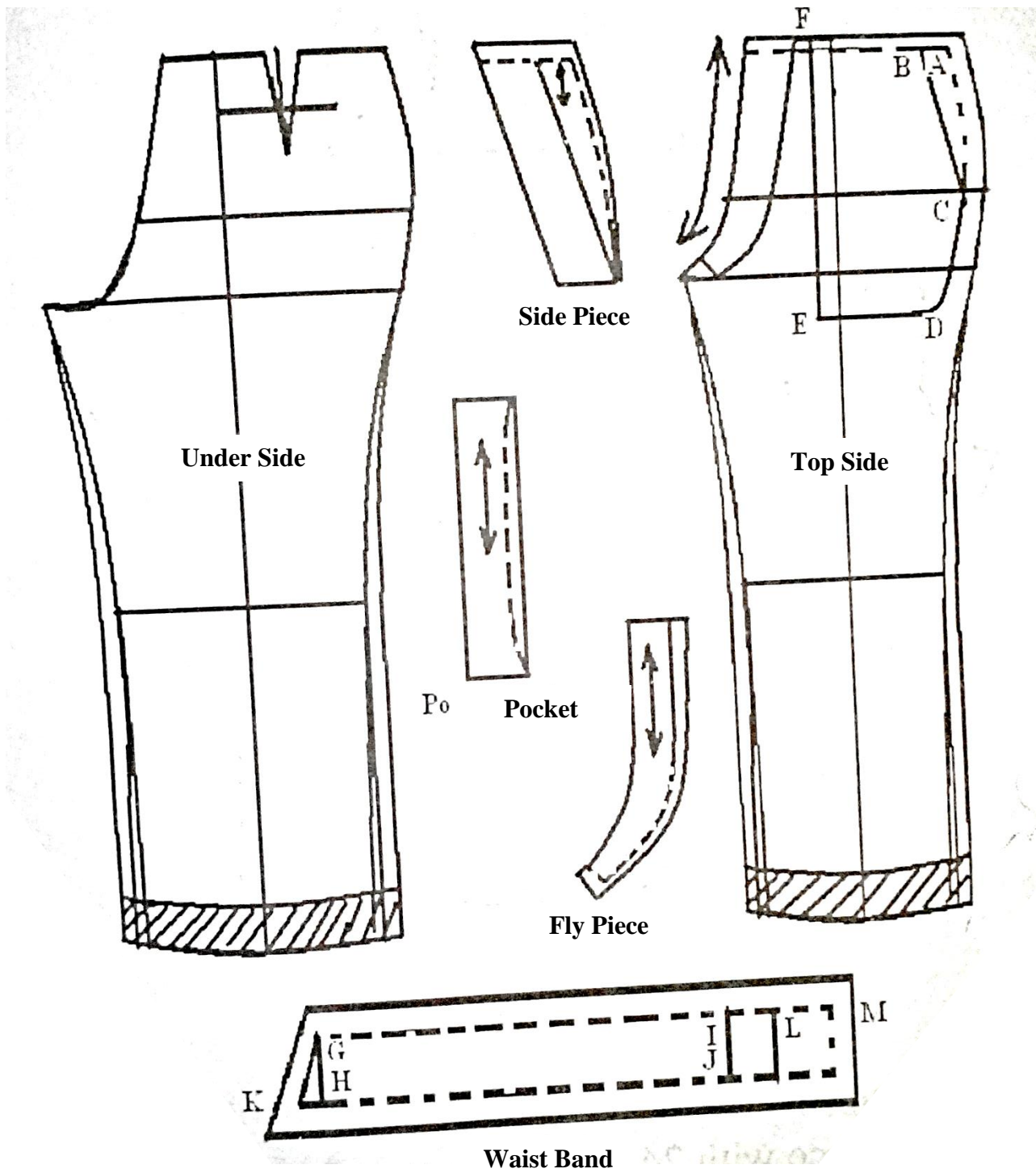
Figure 2: Fly Piece, Pocket Facing, Pocket Bag, Waist Band

Fly Piece:

Drawn a fly piece with 24cm and 5cm board on the front fork of top side trouser and copied it. Then added the seam allowances as required with the fly piece.

Pocket Facing:

Length: Same Length of B-C + 2cm.
Width: 6cm

Pocket Bag:

In figure: 2, pocket bag is shown by A, C, D, E, F points for the side pocket of trouser which is 32cm long and 17cm broad.

Waist Band:

(G-H) : 4cm.
(G-I)   : Half of Waist, drawn a perpendicular line (I-J) and (J-H) on the lines (G-I) and (G-H) respectively.
(H-K) : 0.5cm. Then added from (G-K).
(G-K) : Centre Back Line.
(I-L)   : 4cm.
(I-M) : 9cm.
(G-L) : Right Waist Band, which is made with extended fly.
(G-M) : Left Waist Band, which is made with front button stand.

At last added seam allowances around the waist band.

Daffodil International University
Department of Textile Engineering
Course Code: TE 332
Course Title: Apparel Manufacturing I (Lab)

Experiment No: 06

<u>Name of the experiment</u>:   **Study on marker efficiency.**

A marker is a diagram of a precise arrangement of pattern pieces for a specific style and the sizes to be cut from a single spread. On another word, Marker making is the process of determining the most efficient layout of pattern pieces for a specified style, fabric and distribution of sizes.

A marker is a mixing of many pattern sizes drawn on to a thin paper prior to cutting. Having a marker made it means that the design you will have the best utilization of fabrics saving money.

Points to be considered before marker making:
- Fabric width must be higher than marker width (1/2 inch)
- Fabric length must be higher than marker length
- Length of the cutting table
- Production planning
- When pattern pieces are laid down on the piece of cloth, the grain line should be parallel to the line of the warp in the woven fabric and wale in the knitted fabric

 Calculation of Marker Efficiency:

   Marker efficiency is determined by the fabric utilization, the percentage of the total fabric that is actually used in garment parts. The area not used in garment parts is waste. Marker efficiency depends on how tightly the pattern pieces fit together within the marker.

$$\text{Marker efficiency} = \frac{\text{Area of pattern in the marker}}{\text{Total area of the marker plan}} \times 100\%$$

Daffodil International University
Department of Textile Engineering
Course Code: TE 332
Course Title: Apparel Manufacturing II (Lab)

Experiment No: 07

<u>Name of the experiment:</u> Study on Straight knife cutting machine.

Fabric cutting means to cut out the garment pieces from the lays of fabric with the help of cutting template or marker. In other word, cutting is the process of separating garment parts from the fabric lay in precise size and shape.

Straight Knife Cutting Machine: widely used cutting machine which cut fabrics in bulk with high precision.

Features:

- Cutting knife is straight in shape.
    Blade length= 08''-13''
    Blade width= (1 ½ -3) cm.
    Blade thickness= ½ mm.
- Knife is driven by electric power.
- Grinding wheel is present to sharp the knife during cutting.
- The machine consists of base plate, electric motor, handle, knife, knife guard, stand, roller wheel.
- Base plate usually on roller wheel.
- Handle for the cutter to direct the blade.
- Most commonly (99%) used in garment industry of Bangladesh.

Machine description:

1. An Electric motor.
2. Base plate: Usually in rollers for ease movement.
3. Handle: to direct the blade.
4. Knife: reciprocating motion
5. Knife guard
6. Grinding wheel: To sharp the knife during cutting
7. Stand.

8. Roller wheel: To move the machine over cutting table easily

Working principle:

Two kind of power are required to operate a straight knife.

- Motor power drives the reciprocating blade.
- Operator power drives the knife through the lay.

The motor power needed is determined by:

- The height of the ply.
- The construction of the fabric.
- The curvature of the line being cut.
- The stroke of the blade.

The greater the power of the motor, the heavier will be the machine. If the blade movement is faster, it cuts the fabric better. Operator effort is affected by the weight of the motor, the shape of the standard, handle weight, stroke, and sharpness of the blade and effect of the base plate rollers on the table surface.

Precaution to avoid blade deflection:
- ➢ Reducing the lay height.
- ➢ The weight of the motor should be light.
- ➢ The operator should be skilled and conscious.
- ➢ Speed of the machine may be reduced.

Daffodil International University
Department of Textile Engineering
Course Code: TE 332
**Course Title: Apparel Manufacturing II (Lab)**

Experiment No: 08

Name of the experiment: Study on Continuous fusing press machine.

Continuous fusing press machine:

Features:

- ❖ The machine consists of a fusing chamber with continuous belt or feed sheet.
- ❖ The heating chamber is controlled by a switch.
- ❖ Two pressure rollers are in the fusing chamber and roller pressure are produced by spring or pneumatic power and have condition to increase or decrease of required heat.

Figure: Continuos press fusing machine
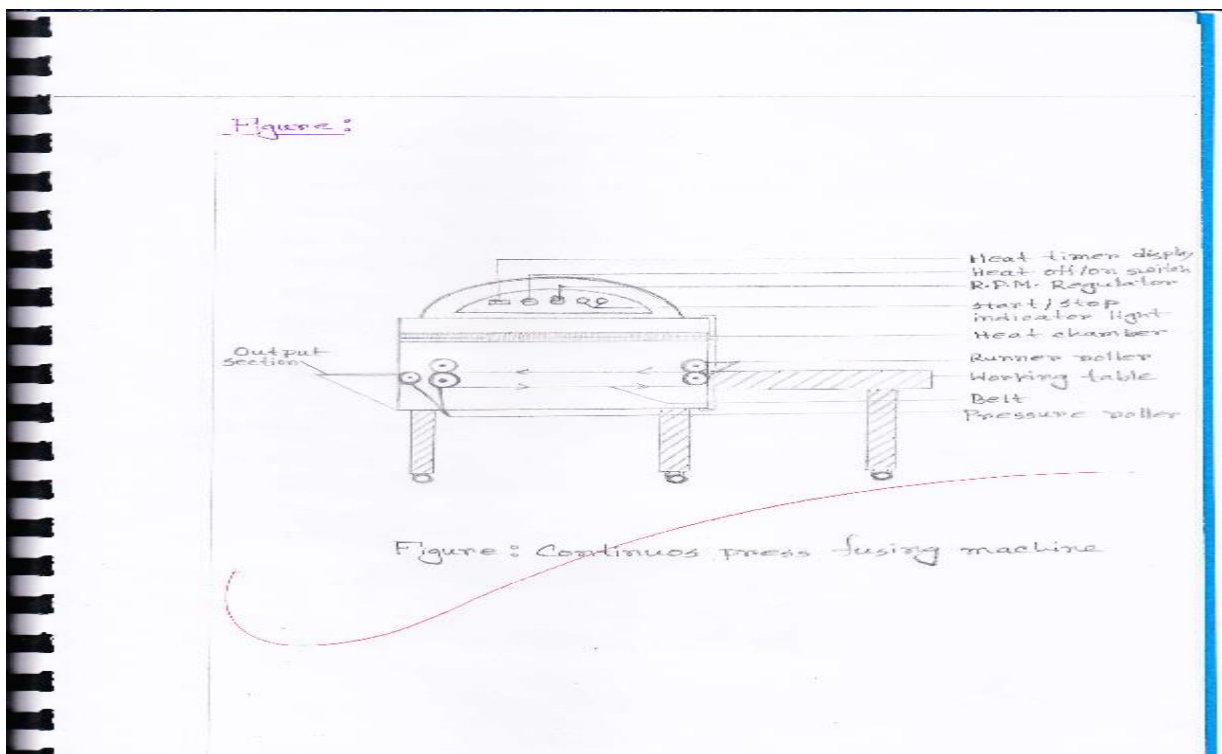
Working principle:

- ❖ In this machine, interlining is placed between two layers of the fabric and passed to the fusing chamber.
- ❖ In fusing chamber, the required heat and pressures are applied.
- ❖ Direct heating or indirect heating are applied for heating the interlining.
- ❖ After heating, required pressure are applied by two pressure rollers.
- ❖ The fusing time is cotrolled by controlling the speed of feed sheet.
- ❖ Then the fabric is taken out from the fusing chamber.

Advantages:

- ❖ Mostly used in country.
- ❖ Higher production.
- ❖ Good quality fusing.
- ❖ Very suitable for pile fabric using.
- ❖ No possibility of fabric shrinkage.

Disadvantages:

- ❖ High cost.
- ❖ Large space required.
- ❖ Different bond strength of fused parts.

Daffodil International University
Department of Textile Engineering
Course Code:
Course Title:

Experiment No: 09

Name of the experiment: experiment name

Daffodil International University
Department of Textile Engineering
Course Code:
Course Title:

Experiment No: 10

Name of the experiment: experiment name