

RRB ALP/Technician Stage-II

Engineering Drawing

&

Basic Science

Chapter wise

Study Material & Previous Years Questions

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RRB ALP/Technician Online Exam Syllabus

Second Stage (CBT)

Short listing of Candidates for the Second Stage CBT exam shall be based on the normalized marks obtained by them in the First Stage CBT Exam.

Total number of candidates to be shortlisted for second stage shall be 15 times the community wise total vacancy of ALP and Technician Posts notified against the RRB as per their merit in First Stage CBT. However, Railways reserve the right to increase/decrease this limit in total or for any specific trade (s) as required to ensure availability of adequate candidates for all the notified posts.

Total Duration: 2 hours and 30 minutes (for Part A and Part B together)

The Second Stage CBT shall have two parts viz Part A and Part B as detailed below-

PART A

Duration: 90 Min.

No. of Questions: 100

Minimum percentage of marks for eligibility in various categories: UR-40%, OBC-30%, SC-30%, ST-25%. These percentages of marks for eligibility may be relaxed by 2% for PWD candidates in case of shortage of PWD candidates against vacancies reserved for them.

The marks scored in Part A alone shall be used for short listing of candidates for further stages of recruitment process subject to the condition that the candidate is securing qualifying mark in Part B.

(A) Mathematics

Number system, BODMAS, Decimals, Fractions, LCM, HCF, Ratio and Proportion, Percentages, Mensuration, Time and Work; Time and Distance, Simple and Compound Interest, Profit and Loss, Algebra, Geometry and Trigonometry, Elementary Statistics, Square Root, Age Calculations, Calendar & Clock, Pipes & Cistern etc.

(B) General Intelligence and Reasoning

Analogies, Alphabetical and Number Series, Coding and Decoding, Mathematical operations, Relationships, Syllogism, Jumbling, Venn Diagram, Data Interpretation and Sufficiency, Conclusions and Decision Making, Similarities and Differences, Analytical reasoning, Classification, Directions, Statement– Arguments and Assumptions etc.

(C) Basic Science and Engineering

The board topics that are covered under this shall be Engineering Drawing (Projections, Views, Drawing Instruments, Lines, Geometric figures, Symbolic Representation), Units, Measurements, Mass Weight and Density, Work Power and Energy, Speed and Velocity,

Heat and Temperature, Basic Electricity, Levers and Simple Machines, Occupational Safety and Health, Environment Education, IT Literacy etc.

General awareness on current affairs in Science & Technology, Sports, Culture, Personalities, Economics, Politics and other subjects of importance.

PART B

Duration: 60 Min.

No. of Questions: 75

Qualifying Marks: 35% (This is applicable to all candidates and no relaxation is permissible)

This part is qualifying in nature and shall have questions from the trade syllabus prescribed by Director General of Employment & Training (DGET). Candidates with ITI/Trade Apprenticeship qualification will be required to appear in the section having questions from the relevant trade. Candidates holding Degree, Diploma and HSC (10+2) having eligibility for the posts of ALP have to select relevant trade from the list of trades listed against their engineering discipline/HSC (10+2). The trade syllabus can be obtained from the **DGET website**. The relevant trades for various engineering discipline/HSC (10+2) for appearing in the qualifying test is as below:

Sl. No.	Engineering Discipline (Diploma/Degree)	Relevant trade for PART B Qualifying Test to be selected from
1.	Electrical Engineering and combination of various streams of Electrical Engineering	Electrician/Instrument Mechanic/Wiremen/Winder (Armature)/Refrigeration and Air Conditioning Mechanic
2.	Electronics Engineering and combination of various streams of Electronics Engineering	Electronics Mechanic/Mechanic Radio &TV
3.	Mechanical Engineering and combination of various Engineering	Fitter/Mechanic Motor Vehicle/Tractor Mechanic/Mechanic Diesel/Turner/Machinist/Refrigeration and Air Conditioning Mechanic/Heat Engine/Millwright Maintenance Mechanic
4.	Automobile Engineering and combination of various streams of Automobile Engineering	Mechanic Motor Vehicle /Tractor Mechanic/Machanic Diesel/Heat Engine/Refrigeration and Air Conditioning Mechanic
5.	HSC (10+2) with Physics and Maths	Electrician/Electronics Mechanic/Wireman

1.

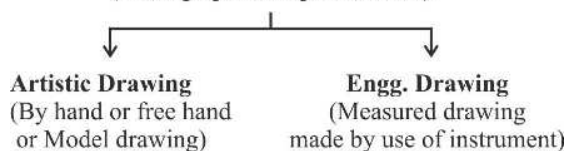
Drawing Instruments & Accessories

◆ Basics of Engineering Drawing

- Language of an engineer by which he/she can represents his/her imagination on paper with proper dimensioning and accuracy.
- It is the graphical representation of an object containing all necessary information like actual shape, size etc. required for the manufacturing of an engineering component.

Drawing :

(It is a graphical representation)



Classification of Engg. Drawing

1. Geometrical Engg. Drawing	• Art of representation of geometrical objects on paper e.g. rectangle, cube, cylinder, sphere etc. • It is two types– i. Plain G.D.–Art of representation of 2D objects on paper. Ex. square, hexagon, rectangle etc. ii. Solid G.D.–Art of representation of 3D objects on paper. Ex. sphere, cone, cylinder, pyramid etc.
2. Mechanical Engg. Drawing	• Art of the representation of mechanical engg. parts or machine parts and machine tool parts on paper. e.g. drawing of tool parts, IC engine parts, automobile parts etc. (Also called Machine drawing)
3. Civil Engg. Drawing	• Art of the representation of civil engg. objects on paper. e.g. drawing of buildings, road, bridges etc. (or structure)
4. Electrical Engg. Drawing	• Art of the representation of electrical engg. parts on paper. e.g. drawing of circuits, motors, generators, transformers etc.
5. Electronics Engg. Drawing	• Art of the representation of electronics engg. objects on paper. e.g. drawing of electronic circuit, T.V. circuits, computers etc.

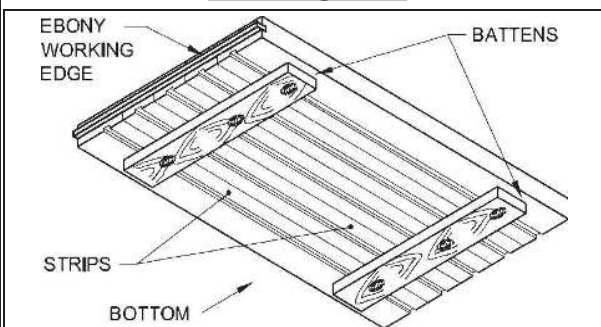
- ☛ 2D ⇒ Two-Dimensional, 3D ⇒ Three-Dimensional
- ☛ Hence, Engineering drawing is also known as the universal language of engineers or engineer's language.

Drawing Instruments and Accessories

- It is used to prepare drawing easily and accurately.
- ★ Mainly the following instruments are used in engineering drawing-

1. Drawing Board	2. T-Square
3. Mini-Drafter (MD)	4. Protractor
5. Pencil	6. Set square
7. Scale	8. French curve
9. Drawing Sheet	10. Eraser (Rubber)
11. Divider	12. Compass
13. Drawing board pins, Clips or Cello tapes	14. Clinograph
15. Drawing Templates	16. Pencil cutter and sand paper
17. Duster	18. Roll-N-Draw
19. Drawing Instruments Box	

1. Drawing Board



DRAWING BOARD

- It is rectangular in shape and made of strips of well-seasoned soft wood.
- One of the edges of the board is used as working edge, on which the T-square is made to slide.
- It is used to provide support to the drawing sheets or papers.
- ☛ Top working surface of the board should be smooth in order to prepare quality drawings.
- ☛ Drawing boards are made in various sizes.
- ☛ Its selection depends upon the size of the drawing sheet to be used.

★ **Sizes of drawing board–**

- According to IS : 1944-1989, drawing board is represented by 'D'.
- According to IS : 46-1988, drawing board is represented by 'B'.

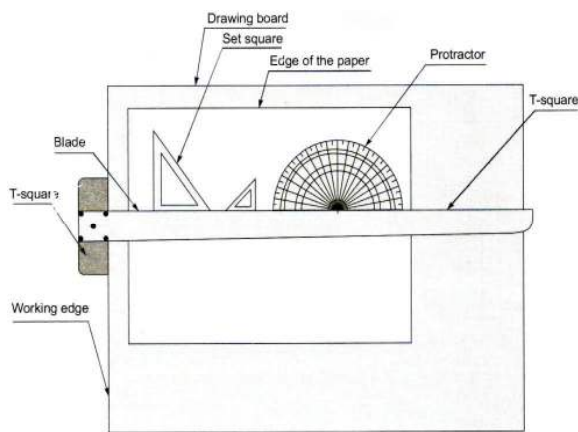
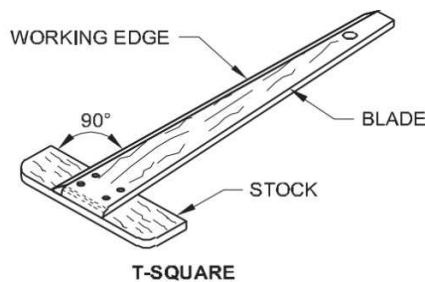
★ **Standard size of drawing board according to IS : 1944 -1989**

Designation	To be used with sheet size	Size (in mm) : (Length × Width × Thickness)	Name
D ₀	A ₀	1500×1000×25	Antiquarian
D ₁	A ₁	1000×700×25	Double Elephant
D ₂	A ₂	700×500×15	Imperial
D ₃	A ₃	500×350×15	Half Imperial
D ₄	A ₄	350×250×15	Quarter Imperial

- Mostly imperial size (D₂) drawing board is used in engineering drawing.

2. T- Square

- It is made of hard-quality wood such as teak or mahogany etc.
- Consists of two parts** → (1) Stock (2) Blade
- Stock and blade joined together at right angle (90°) by means of screw and pins.
- Used for** → Drawing horizontal and parallel lines.



- It can also be used as a base for drawing the various angles with the help of set squares.

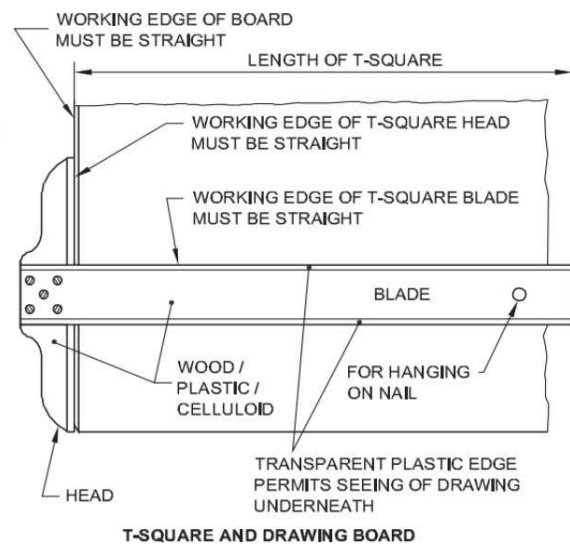
- The stock (or head) is placed adjoining the working edge of the board and is made to slides on it as and when required.

- ✎ Length of the blade is selected so as to suit the size of the drawing board.

★ **Length of blade-**

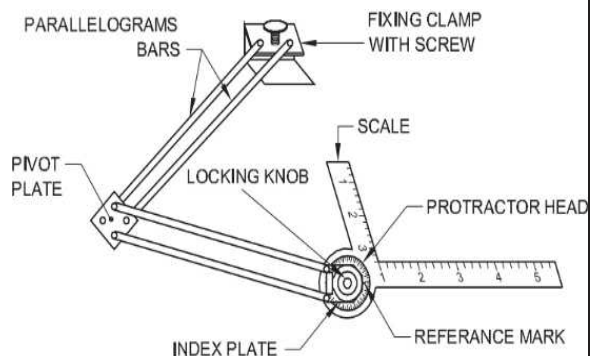
Designation	Length of blade (in mm)
T ₀	1500
T ₁	1000
T ₂	700
T ₃	500

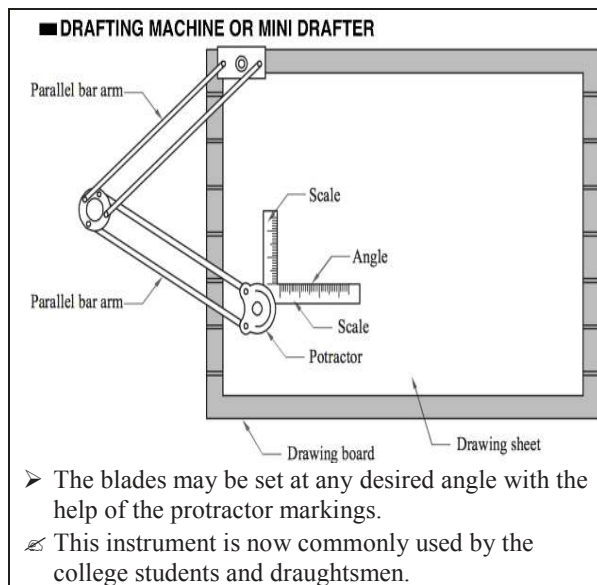
- T-square is not used to draw inclined lines.



3. Mini-Drafter or Drafting Machine

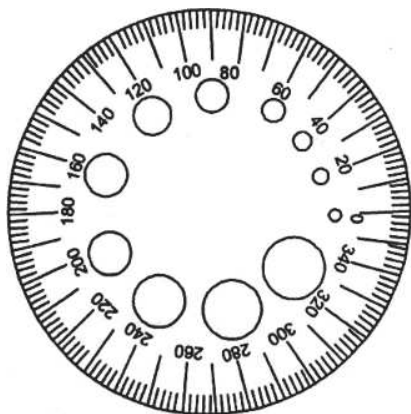
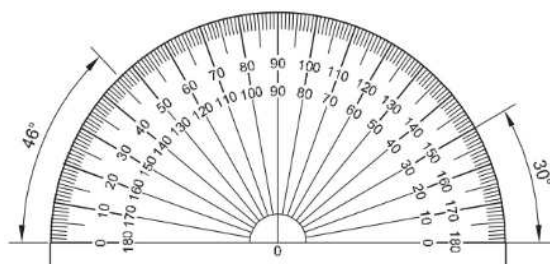
- The advantages of T-square, set-square, scale and the protractor are combined in mini-drafter.
- Mini-drafter can be used to draw horizontal, vertical and inclined parallel lines on the sheet with saving of time.





4. Protractors

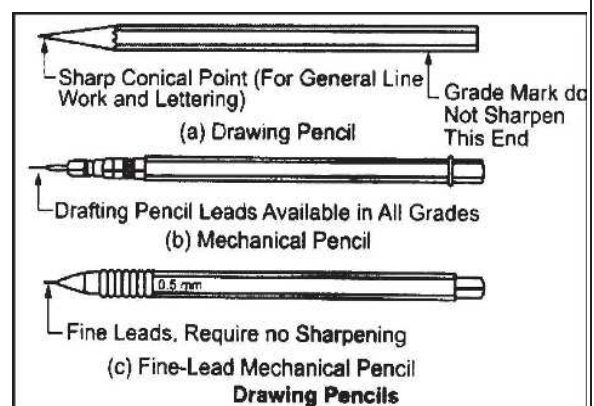
- They are made of wood, transparent celluloid or plastic materials.
- They are circular (Circle master), semi-circular or flat in shape.
- Used to measure angles and to draw angles with L.C. = 1°.



- The diameter of semi-circular protractor is generally 100 mm and its circumferential edge is graduated to 1° division. (Angle ⇒ 0° to 180°)
- Circular protractor is called as circle master. (Angle ⇒ 0° to 360°)

5. Pencils

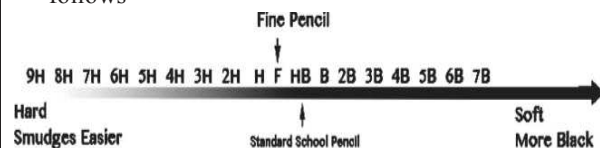
- These are the primary tools in engg. drawing used by engineers to communicate their ideas through test or drawing.



- Lead of pencil is made of **graphite** or **kaolin** or **clay**.
- ✎ The grade of a pencil lead is usually shown by alphabets and letters marked at one of its end.

★ Grades of pencil-

- Various grades of pencils available today are as follows—



Grade	Uses
Hard grade (9H, 8H, 7H, 6H, 5H, 4H)	Used to draw light and fine lines
Medium grade (3H, 2H, H, HB, B)	Used for lettering and dimensioning
Soft grade (2B, 3B, 4B, 5B, 6B, 7B)	Used to draw thick and shiny lines

★ Important Points—

- HB denotes ⇒ Medium, soft • Grade H ⇒ Harder than F, HB etc.
- Grade B ⇒ Soft than HB
- ✎ Generally in Engg. drawing mostly HB, H, 2H, and 4H pencils are used.

- ✍ H and HB pencils are used in free hand drawings and lettering works.
- ✍ **2H & 3H Pencils** ⇒ Used for drawing dimension lines, centre lines and projection lines.
- ✍ H ⇒ Used for drawing dimension, hatching, lettering, circle curves.
- ✍ Lead of hard pencil has small diameter where as lead of soft pencil has comparatively greater diameter.
- ★ Neat clean, and precision drawing depends on pencils.
- ★ Generally 18 grades of pencils are used in Engg. drawing.
- ➡ The lead of pencils may be sharpened to two different forms–i. Conical point ii. Chisel edge



(i) Conical point



(ii) Chisel edge

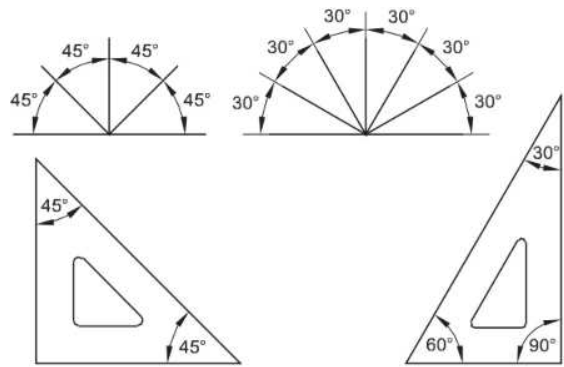
- ★ **Conical point** ⇒ Used in sketch work and for lettering.
- ✍ For making conical end, the pencil should be rotated between the thumb and fingers, while rubbing the lead.
- ★ **Chisel edge** ⇒ Used for drawing long thin lines of uniform thickness.
- ✍ This edge is prepared by rubbing the lead on a sand paper block.

☛ Remember–

- ➡ Pencil lead is made of the composition of **graphite** and **clay** content.
- 9H** → Very hard grade pencil (Clay content ↑)
- 7B** → Very soft grade pencil (Graphite content ↑)
- ✍ When clay content ↑ ⇒ Pencil lead becomes light and hardness ↑
- ✍ When Graphite content ↑ ⇒ Pencil lead becomes dark and softness ↑
- ➡ Pencils are made by various companies. e.g. Vinus Short hand, Kutubminar, Artiste, Kohinoor, Nataraj, Apsara etc.
- ➡ Now a days mechanical pencils or clutch pencils are mostly used.

6. Set-Square

- Triangular in shape & are made of celluloid or plastic materials.
- Used for drawing all straight lines except the horizontal lines which are usually drawn with the T-square.
- Vertical lines can be drawn with the T-square and the set-square.
- They are – (i) 30° - 60° - 90° set square
(ii) 45° - 45° - 90° set square



(a) 45° SET SQUARE

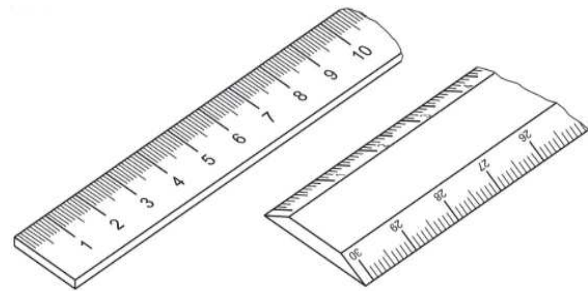
(b) 30° - 60° SET SQUARE

- ➡ Length of 30°-60°-90° set square ⇒ 250 mm
- ➡ Length of 45°-45°-90° set square ⇒ 200 mm

- ☛ The two set squares are used simultaneously along with the T-square will produce lines making angles of 15°, 75°, 105° etc. (≠ Multiple of 15°)

7. Ruler or Scale

- Made of wood, steel, celluloid or plastic.
- Edges of the scale are marked with division of centimeters which are sub-divided into millimeters.



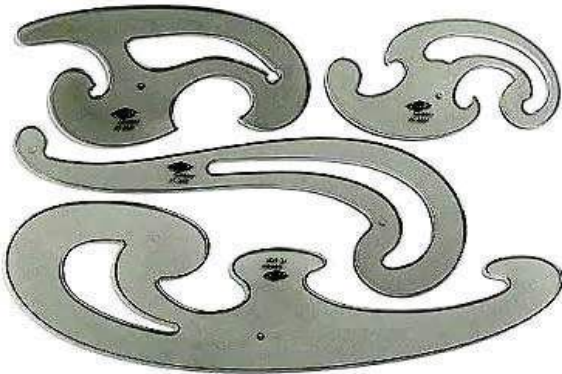
STEEL RULE

WOODEN SCALE

- Rustless steel scales are more durable.
- Scales may be flat or of triangular cross section.
- 15 cm long and 2 cm wide or 30 cm long and 3 cm wide flat scales are in common use.
- ✍ Both the longer edges of the scales are marked with divisions of centimeters, which are sub-divided into millimeters.
- ✍ Scales are used to transfer the true or relative dimensions of an object to the drawing.

8. French Curve

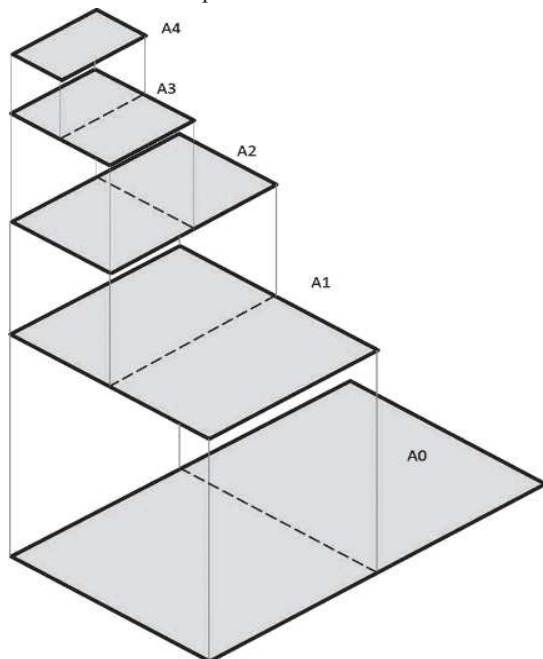
- Used to draw curve which cannot be drawn with compass or for irregular curves.



- Made of wood, plastic or celluloid.
- They are made in various shapes.
- ✍ A continuous smooth curve required through a set of points that do not lie on a straight line or on a circle can be drawn with the help of French curves.

9. Drawing Sheet

- Drawing sheet is a white paper on which an object is drawn which is available in various sizes.
- The successive sheet sizes are obtained in the same ratio by halving the length dimension such that its area is half of area of previous sheet.



- ★ Standard sizes of trimmed drawing sheets are commended by IS 10711 : 2001

★ Required property of drawing sheets–

- ★ It should be of good quality.
- ★ It should be white in cooler with uniform thickness with must resist the easy torn of paper.

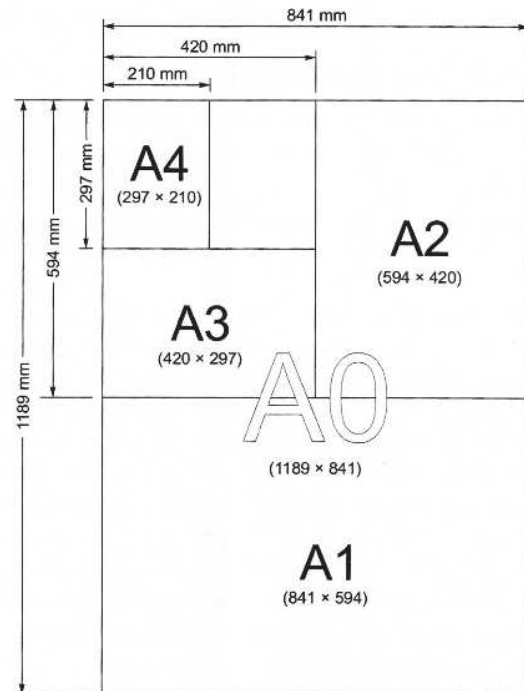
- ★ The surface of sheet must be smooth.

- Size of drawing sheet is represented by ratio of length and width of the sheet.

$$x : y = 1 : \sqrt{2}$$

Where, x → Length of sheet
y → Width of sheet

- Standard size of the drawing sheet according to IS : 10811 : 1983



Designation	Trimmed size (in mm)	Untrimmed size (in mm)
A ₀	841×1189	880×1230
A ₁	594×841	625×880
A ₂	420×594	450×625
A ₃	297×420	330×450
A ₄	210×297	240×330
A ₅	148×210	165×240

- A₂ size drawing sheet is mostly used by engineering drawing students.

- Area of A₀ drawing sheet is 1 m².

10. Rubber or Eraser

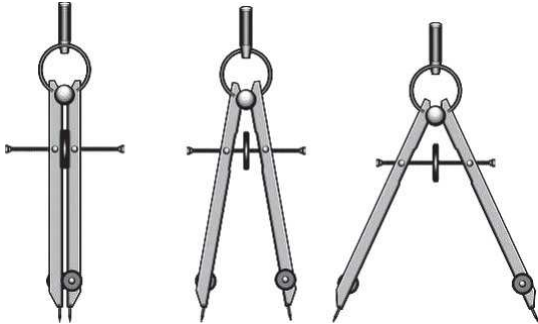
- Made of rubber
- Used to erase extra or wrong pencil work.



- ✍ It should be of good quality and soft.
- ✍ It should not damage the paper while erasing.
- ✍ Soft India rubber is the most suitable kind of eraser for pencil drawings.

11. Divider

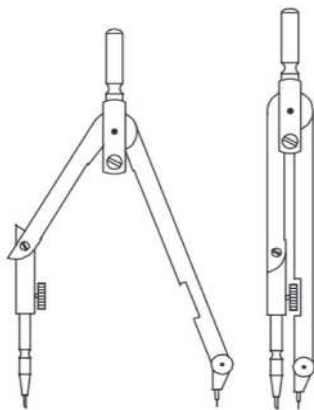
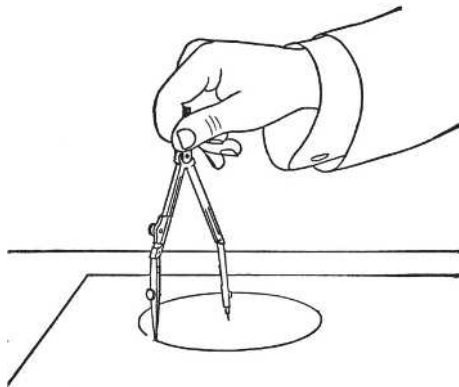
- Used to divide straight or curved lines into desired number of equal parts.



- ✍ It looks like a compass, but the difference is the two legs of divider are provided with needles.
- ✍ It is also used to check the measurements.

12. Compass

- Used for drawing circles and arcs of circles of required diameter.



- ★ It is generally made of steel and consists two legs–
 1. One leg contains needle at the bottom
 2. Other leg contains a ring in which a pencil is placed.
- ✍ The needle tip is placed at the respected point and pencil tip is adjusted to the height at least 1 mm just above the tip of the needle.

13. Drawing clips or drawing pins

- They are used to fix the drawing sheet firmly in position to the drawing board.



- ✍ Care should be taken while removing the clips or tapes otherwise the sheet may tore.

14. Clinograph-

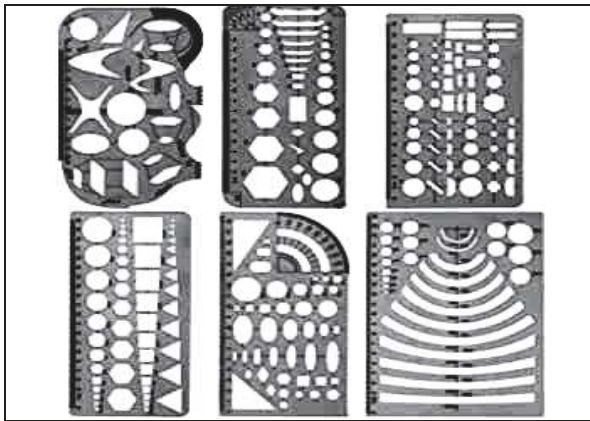
- It is adjustable set-square
- Made of wood or plastic
- Used to draw parallel lines to the inclined lines.



- ✍ It contains one adjustable wing or strip which can be adjusted to required angle.

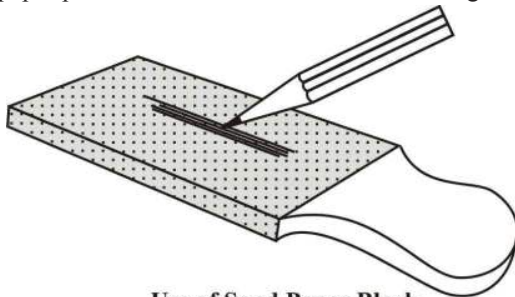
15. Drawing templates-

- These are made of plastic or wooden boards, which contains spaces of several shapes or letters.
- Non-dimensional shapes or variety font letters are drawn by these which makes drawing easier and perfect.



16. Pencil Cutter and Sand Paper

- Pencil cutters or sharpeners are generally made of plastic or Aluminium in which a cutter blade is fitted by a screw.
- These are used for removing the cover of pencil lead and sharpening the lead of pencil fastly.
- ✎ For drawing work mostly table pencil cutters are used.
- ✎ To make the sharp lead and chisel edge lead of pencil, zero no. or double zero no. and paper blocks are used.
- Sand paper block consists of a wooden block about 150 mm × 50 mm × 12 mm thick with a piece of sand paper pasted or nailed on about half of its length.



Use of Sand Paper Block



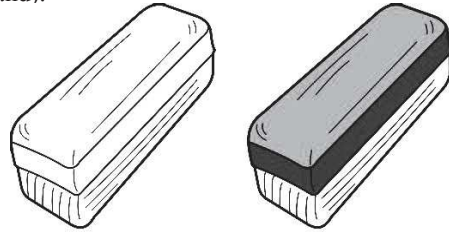
Use of Sharpener

- The sand paper, should be replaced by another, when it becomes dirty or worn out.
- This block should always be kept within easy reach for sharpening the pencil lead every few minutes.

17. Duster

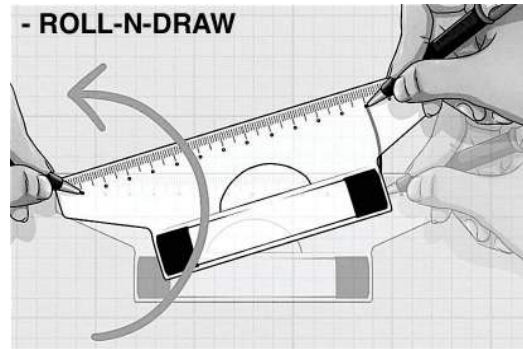
- It should preferably be of towel cloth of convenient size.
- Before starting work, all the instruments and materials should be thoroughly cleaned with the duster.

- ✎ The rubber crumbs formed after the use of the rubber should be swept away by the duster (not by hand).



18. Roll-N-Draw-

- It is used to draw vertical lines, parallel lines, charts, horizontal lines, 3-D drawings, Engg. drawings, angles, circles, graphs, musical lines and many other technical drawings.
- It is a multipurpose or universal drawing instrument that lets us measure in cm.



19. Drawing instrument box-

- The drawing instrument box contains following instruments they are—
 - (i) Lengthening bar
 - (ii) Small bow compass
 - (iii) Large size divider
 - (iv) Small bow divider
 - (v) Small bow ink-pen
 - (vi) Inking pen
 - (vii) Crockle pen
 - (viii) Lead case
 - (ix) A small screw driver



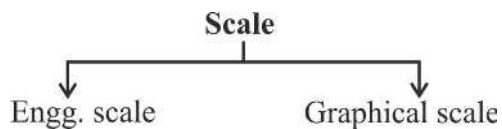
★ Some important points–

- ★ **Large size compass** ⇒ For drawing more than 150 mm radius of circle
- ★ **Lenghthening bar** ⇒ For drawing more than 150 mm radius of circle
- ★ **Small size compass** ⇒ For drawing 25 to 50 mm diameter of circle
- ★ **Large size divider** ⇒ 150 mm long
- ★ **Small size divider** ⇒ 95 mm long
- ★ **Small size ink-bar compass** ⇒ 95 mm long
- ★ **Small size pencil bar compass** ⇒ 95 mm long
- ★ **Inking pen** ⇒ Used for drawing straight lines and non circular arcs in ink.

☛ For drawing large circles and circular arcs, inking attachment should be fitted in place of the pencil leg in the compass.

Scales

- The proportion by which we either reduce or increase the actual size of the object on drawing is called scale.



☛ The scales can be expressed in the following ways–

Engineering scale	• The relation between the dimension on the drawing and the actual dimension of the object is mentioned numerically in the style as 10 mm = 5 m etc. • It is not possible or convenient to draw drawings of an object to its actual size. • For instance, drawings of very big objects like buildings, machines etc. cannot be prepared in full size on the drawing sheet. • Drawings of very small objects like precision instruments e.g. watch parts, electronic devices parts, insects, micro processors etc. also cannot be prepared in full size because they would be too small to draw and to read. • Hence the different types of Engg. scales are used so that object can be accommodated on drawing sheet and can comfortably be drawn and read.
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★ Representative fraction

- The ratio of the length of the drawing to the actual length of the object represented is called the Representative Fraction.

$$R.F. = \frac{\text{Length of drawing}}{\text{Actual length of object}}$$

★ Classification of Engineering Scale

- ★ Scales are classified in different ways so that object can be accommodated on drawing sheet and can comfortably be drawn and read. They are follows–

(A) According to the size–

(i) Enlarging scale	• Used for drawing small or very small object in enlarged size. - Ex.– Resisters, screws, bacteria's, insects, small electrical parts etc. • R.F. > 1
(ii) Full scale	• Used for drawing that parts which are drawn easily on the sheet with their actual size. - Ex.– Spanner, pen, nut-bolt etc. • R.F. = 1
(iii) Reducing scale	• Used for drawing huge objects in reduced size. - Ex.– Buildings, bridges, boilers, ships, aeroplanes etc. • R.F. < 1

☛ (i) Representative Fraction (R.F.)

$$= \frac{\text{Length of object in drawing}}{\text{Actual length of object}} \quad (\text{In terms of length})$$

$$R.F. = \sqrt[2]{\frac{\text{Area of object in drawing}}{\text{Actual area of object}}}$$

(In terms of area)

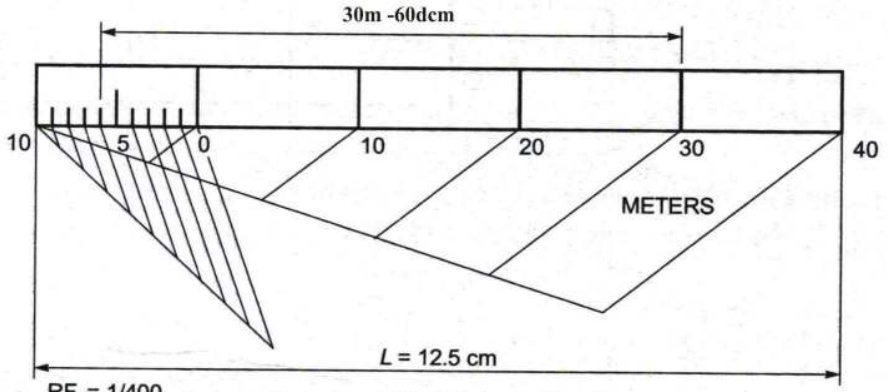
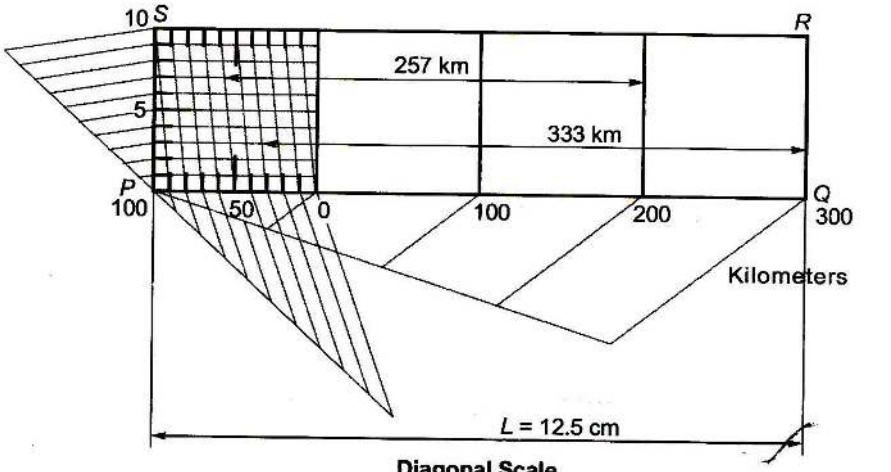
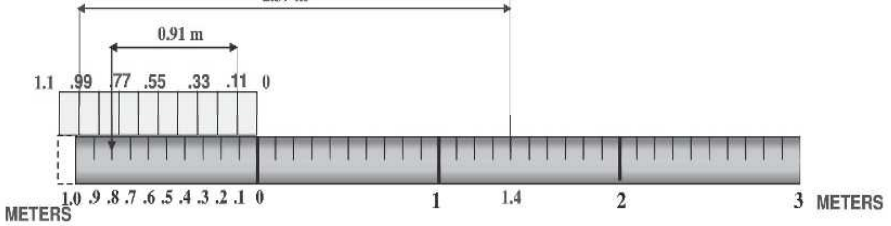
$$\approx R.F. = \sqrt[3]{\frac{\text{Volume of object in drawing}}{\text{Actual volume of object}}}$$

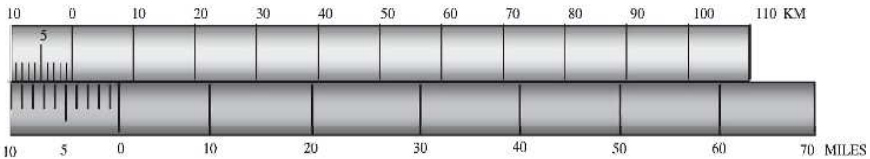
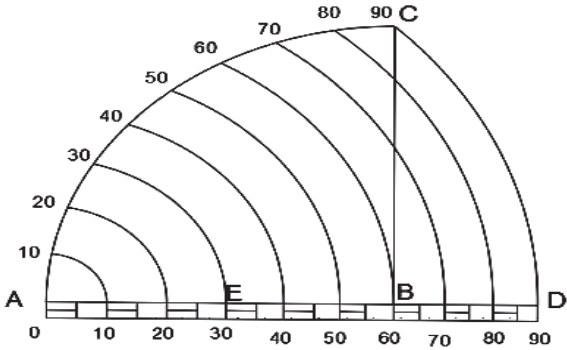
(In terms of volume)

✍ R.F. is unitless.

(ii) Length of scale = R.F. × Max. length to be measured

(B) According to type

i. Plain scale	 - It can measure two consecutive division or unit. - Ex. m – dcm, dcm – cm, yard – feet - It is divided into two subdivision, Ex. 30 m – 60dcm.
ii. Diagonal scale	 - It can measure three consecutive division or units. - Ex. m – dcm – cm, yard – feet – inch. - It is divided into three subdivision - Ex. 257km (or 200 km-500hm-700dam).
iii. Vernier scale	 - These scales, like diagonal scale, are used to read to a very small unit with great accuracy. - It consists in two parts– ➤ Primary scale ➤ Vernier scale - In forward V.S., n divisions on V.S. is equal to (n–1) division on M.S. - In backward V.S., n divisions on V.S. is equal to (n + 1) division on M.S.

iv. Comparative scale	 R.F. = 1 / 804500 COMPARATIVE SCALE SHOWING MILES AND KILOMETERS It is a plain scale having same R.F. but calibrated to read diff. units. Ex. km – mile, km – minute etc.
v. Scale of chords	A Scales of chord showing 5° divisions  It is used to measure or draw angles in absence of protractor.

◆ Conversion factors–

✱ Length conversion factors–

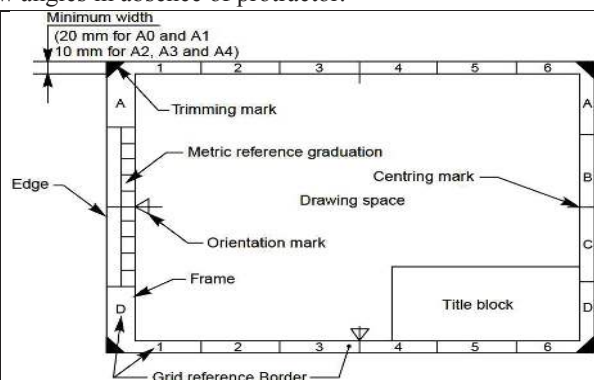
- 10 mm = 1 cm
- 10 cm = 1 dm (decimeter)
- 10 dm = 1 m
- 10 m = 1 dam (decameter)
- 10 dam = 1 hm (hectometer)
- 10 hm = 1 km
- 2.54 cm = 1 inch
- 12 inch = 1 foot
- 3 feet = 1 yard
- 220 yard = 1 furlong
- 8 furlong = 1 mile
- 1 mile = 1.61 km
- 1 Nautical mile = 1.85 km

◆ Scales on Drawings–

- When an unusual scale is used, it is constructed on the drawing sheet.
- ☞ To construct a scale, the following information is required–
 - The RF of the scale
 - The units which is must represent, e.g. mm and cm or feet and inches etc.
 - The maximum length which it must show.

◆ Layout of drawing sheets–

It is defined by choosing suitable scale, providing proper margins, along title block, parts list, etc. on the drawing sheet.



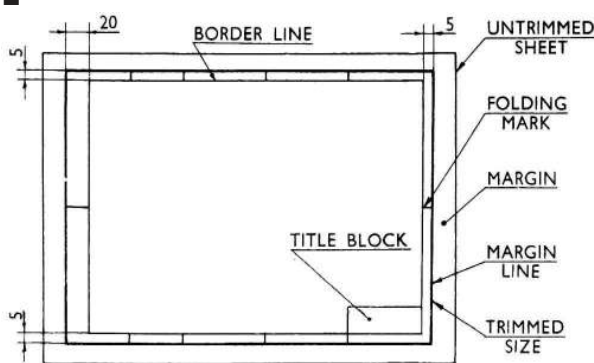
Borders and Frames

- It is the space left all around and in between the trimmed edges of the drawing sheets and the frame.
- More space is kept on the left-hand side for the purpose of filing or binding if necessary.
Left side $\Rightarrow$ 20 mm to 30 mm (for A₀ and A₁) and 10 mm (for A₂, A₃ and A₄) and other 3 sides, $\Rightarrow$ 5 mm
- Frame shows the clear space available for the drawing purpose.

Filling margin

- Margin is provided in the drawing sheet by drawing margin lines.
- It is provided for taking performance for the purpose of filling the drawing sheets.

Title Block	- The position of this block should be within the drawing space such that the portion of the title block containing the identification or information of the drawing is situated in the bottom right hand corner of the drawing space. - It contains the details of drawing, here we include the names of the persons who have designed and drawn.
Grid references	- The provision of grid reference system is recommended for all sizes in order to permit easy location on the drawing of details, additions, modification etc. - The number of divisions should be divisible by two and be chosen in relation to the complexity of the drawing. - It is also called a zone system as the grids divide the sheets into zones. - The grid reference systems along the width are referred by alphabets A,B, C, D..... - The grid reference systems along the length are referred by numerals 1,2, 3,4.....
Revisions of drawing	- For locating a portion of the drawing for the purpose of revision etc., the sides of the three larger sizes of the drawing sheets viz. A₀, A₁ and A₂ are divided into a number of equal zones. - A revision panel is drawn either attached to the title block above it or in the top right-hand corner of the sheet. - The revisions are recorded in it giving the revision number, date, zone etc. and also the initials of the approving authority.
Folding marks	- Folding marks are made in the drawing sheet. - They are helpful in folding of prints in proper and easy manner.

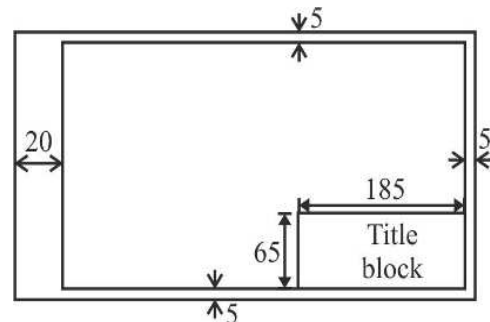


✍ Nine folds are allowed to A₀ sized drawing sheet when they are filed.

★ General suggestions for drawing on sheet:-

- Cleaning the Instrument:-** Clean all the instruments and materials and place them on a neat piece of paper by the side of the board.
- Pinning the paper to the drawing board :-** Place the drawing sheet at about a suitable distance from the edges of drawing board and fix firmly by using of pins or cello tapes etc.
- Draw Border Lines:-** When only one drawing or figure is to be drawn on a sheet, it should be drawn on centre of the working space. For more than one figure, the space should be divided into suitable block and each figure should be drawn in the centre of its respective block.

☛ Remember-



(a) Margins or border lines-

Left side $\Rightarrow$ 20 mm

Other three side $\Rightarrow$ 5 mm

(b) Title block

Location $\Rightarrow$ Right side & lower most

Size = 185 mm $\times$ 65 mm

★ Information's used in title block-

- Name of institute
- Scale
- Projection symbol
- Title of drawing
- Name of designer and date
- Name of invigilator and date
- Name of standard & date
- Name of approver & date of approving
- Drawing no.

Drawing Tools and Equipment Asked in RRB, ALP & Technician Previous Year Questions

1. The ratio of the shorter side of an A4 sheet to the longer side of an A3 sheet is _____. /A4

- (a) 1 : 1 (b) $1 : \sqrt{2}$
(c) 1 : 4 (d) 1 : 2

RRB ALP & Tech. 21.01.2019 Shift-II

Ans. (d) : The ratio of the shorter side of A4 sheet to longer side of an A₃ sheet is 1 : 2.

1. The shorter side of an A4 sheet (S_4) = 210mm and, the longer side of an A3 sheet (L_3) = 420mm Then,

The ratio of shorter size of A₄ sheet to the longer size of A₃ sheet is -

$$\frac{S_4}{L_3} = \frac{210}{420} = \frac{1}{2}$$

$$S_4:L_3 = 1:2$$

2. Which of the following is the approximate ratio of length to width of any standard Engineering drawing sheet ?

- (a) $1 : \sqrt{2}$ (b) $3 : \sqrt{3}$
(c) $1 : \sqrt{3}$ (d) $2 : \sqrt{3}$

RRB ALP & Tech. 22.01.2019 Shift-I

Ans. (a) : The approximate ratio of length to width of any standard drawing sheet is $1 : \sqrt{2}$

For eg. Width of A₀ sheet = 841 mm

length = $841 \times \sqrt{2}$ mm = 1189 mm

$\frac{\text{Width}}{\text{Length}} = \frac{1}{\sqrt{2}}$

3. If the width of a standard engineering drawing sheet is 841 mm, then its length will be ____ mm.

- (a) 1189 (b) 1216
(c) 1000 (d) 1250

RRB ALP & Tech. 23.01.2019 Shift-III

Ans : (a) If the width of a standard engineering drawing sheet is 841 mm, then its length will be 1189 mm.

- It is the size of A0 sheet size being 841×1189 mm
- A0 is the largest sheet size.

4. What is the full form of the abbreviation AC in an engineering drawing?

- (a) Aerial Cut (b) Across Corners
(c) Attached Circle (d) Air Conditioning

RRB ALP & Tech. 23.01.2019 Shift-III

Ans : (b) The full form of the abbreviation AC in an engineering drawing is across corners.

- Followings are the various terms and their respective abbreviations in engineering drawings.

AC	Across Corners
AF	Across Flats
AR	As Required
ASA	American Standard Association

5. In an engineering drawing, the letter LH stands for which of the following?

- (a) Left Hand (b) Limit of Height
(c) Level Hide (d) Low Heat

RRB ALP & Tech. 23.01.2019 Shift-III

Ans : (a) In engineering drawing, the various terms and their respective abbreviations are followings-

LH	Left-Hand
LMC	Least material condition
MFD	Manufactured
OD	Outer diameter
OPP	Opposite

6. 594 mm × 841 mm are the dimensions of _____ size paper.

- (a) A3 (b) A1
(c) A0 (d) A2

RRB ALP & Tech. 08.02.2019 Shift-I

Ans. (b) : 594 mm × 841 mm are the dimensions of A1 sheet size.

- The other sheet sizes are given below-

A0 = 1189 × 841 mm

A3 = 420 × 297 mm

A4 = 297 × 210 mm

A5 = 210 × 148 mm

7. The area of A0 size sheet is _____.

- (a) 1cm² (b) 1000cm²
(c) 10000cm² (d) 100cm²

RRB ALP & Tech 23.01.2019 Shift-II

Ans : (c) The area of A0 size sheet is 10000 cm².

- The area of A0 size sheet = 84.1 cm × 118.9 cm
= 9999.49 cm²
= 10000 cm²

8. The feature provided on the drawing sheet to show the detail, modification and position of the drawing on the drawing sheet of all sizes is called-

RRB Bhopal Section Engineer, 24.11.2002

- (a) Metric reference (b) Grid reference
(c) Title block (d) Frame

Ans : (b) The feature provided on the drawing sheet to show the details, modifications and position of drawing on the drawing sheet of all sizes is called grid reference.

Grid reference system: The provision of the grid reference system (joining is recommended for all sizes) in order to permit easy location on the drawing of details, addition, modifications etc.

9. For binding and filing a drawing sheet, the area left on the left side of the sheet is given by which line ?

RRB Kolkata Chemical & Metallurgical Er., 01.12.2002

- (a) Margin line (b) Border line
(c) Frame (d) Orientation sign

Ans : (b) The area left on the left side of a drawing sheet for binding and filing is given by the border line.

- Border lines are very thick continuous lines used to show the boundary of the drawing or to separate different objects drawn on same sheet.

10. The print of the margin line in the drawing sheet is of _____

RRB Bhopal & Mumbai Apprentice Section Eng. 23.03.2003

- (a) Raw size (b) Accurate size
(c) Both (d) None of these

Ans : (b) The print of the margin line in the drawing sheet is of accurate size.

- The drawing of center marks on all the four sides of the drawing sheet is called 'Origin line'.

11. Which one of the following represents the reducing R.F scale in this?

(NCVT-2012, Carpenter, Plumber, Welder, Sheet Metal)

- (a) 1 : 1 (b) 1 : 20
(c) 50 : 1 (d) 8 : 6

Ans : (b)

R.F. – 1:20 is a reducing scale or reduction scale.

R.F. – 50:1, 8:6 → Enlarging scale

R.F. = 1 : 1 → Full scale.

12. What type of paper is generally used for technical drawings ?

RRB Kolkata Jr. Engineer-II Electrical DRG & Design 11.06.2006

- (a) Cartridge paper (b) Tracing paper
(c) Both of the above (d) None of these

Ans : (c) Technical drawings are generally drawn on the following types of paper.

1. Cartridge Paper: This is the best quality paper for pencil drawings. Its weight is usually 90 GSM. It is made from esparto grass.

2. Tracing Paper: Natural tracing paper is a high quality tracing material that can be purchased in 25 meter rolls. Generally its weight ranges from 38 GSM to 63 GSM and it is often used for tracing technical drawings.

- These are usually measured on the basis of their weight, which are known as grams per square meter (GSM).

13. What are the importance and benefits of free hand drawing ?

RRB Secunderabad Section Engineer (Civil) 29.06.2008

- (a) It is very quick to design and explains the size
(b) The practice of free hand drawing gives to anyone an excellent idea about measurements
(c) It is very useful in generating ideas
(d) All of the above

Ans : (d) The following are the importance and benefits of free hand drawings-

1. It gives very quick explanation about, the design and shape of the devices.
2. It is very useful in generating ideas.
3. The practice of free hand drawing gives to anyone an excellent idea about measurements.

14. What are the medium adopted by the engineer/draftsman to convey his ideas to the artisans ?

RRB Thiruvananthapuram Section Eng (Mechanical) 04.01.2009

- (a) Orally
(b) By writing
(c) In the form of sign or indication or figure/
(d) All of the above

Ans : (d) Engineer/ draughtsman adopts oral form, written form, sign, or indication or figure form to convey his idea to artisans.

15. In an engineering drawing, a list of item gives which of the following informations?

RRB Bangalore Section Engineer (Civil) 01.02.2009

- (a) Company name, drawing title, scale and angle of projection
(b) Item, description, quantity and substance
(c) Distinctive signs, abbreviations, and units of measurements
(d) None of the above

Ans : (b) In an engineering drawing, a list of item gives Item, description, quantity and substance.

16. What do you understand by B.I.S.?

RRB Chandigarh Section Engineer (Electrical), 15.03.2009

- (a) Bureau of Indian standards
(b) Bureau of Indian system
(c) Bureau of Indian instrument
(d) None of these

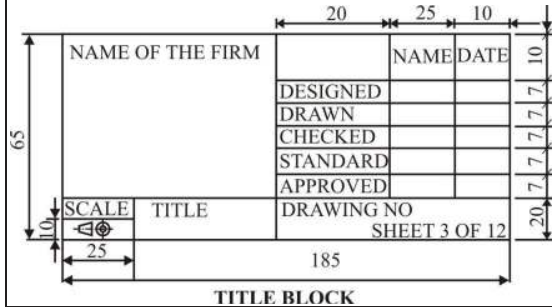
Ans : (a) The full form of B.I.S. is Bureau of Indian standards.

- BIS is the national standard body of India.
- It is a code of practice for general engineering drawing.

17. shown in the title block ?
RRB Chennai Section Engineer, 12.02.2012

- (a) Name of the company
- (b) Title of the drawing
- (c) Scale of drawing
- (d) All of the above

Ans : (d) Name of the company, title of drawing, scale of drawing, type of projection and number of drawing are shown in the title block.



18. An engineering drawing gives different types of information. What is the most important information it gives ?
DMRC Electronics Engineering, 21.09.2014

- (a) Length
- (b) Width
- (c) Height
- (d) Shape

Ans : (d) • The most important information if the shape of the object which is given by the engineering drawing.

- It helps to make more numbers of same object with another object.

19. In what form does engineering drawings originate as an activity ?
RRB Bhopal & Mumbai Apprentice Section Eng. 23.03.2003

- (a) Records
- (b) Type
- (c) Product
- (d) None of these

Ans : (a) Engineering drawing is prevalent everywhere, hence this drawing is called universal language.

- Engineering drawings originate as 'record' as an activity.

20. In Engineering drawing ideas can be expressed in which form ?
RRB Kolkata Jr. Engineer-II Electrical/ DRG & Design 11.06.2006

- (a) Oral
- (b) Written
- (c) Symbolic
- (d) All of these

Ans : (a) Expression of ideas in engineering drawing can be taken in the following form-

(i) Oral (ii) Written (iii) Symbolic

- According to Mechanical point of view, engineering drawing is divided into following parts -

1. Geometrical drawing
2. Mechanical or Machine drawing
3. Electrical drawing
4. Civil drawing
5. Electronics drawing

21. Qualitative drawing sheet is used on which of the following should be kept in the mind ?
RRB Chandigarh Section Engineer (Civil), 26.02.2012

- (a) Neat & clean drawing
- (b) The nature of the ink of pencil
- (c) Both a and b
- (d) None of these

Ans : (c) Some thing should be kept in mind before using a quality drawing sheet.

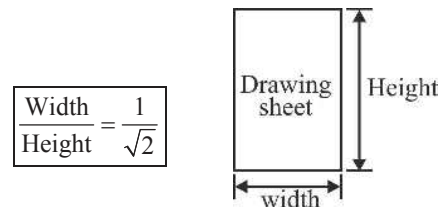
for ex.- neat & clean drawing and the nature of ink of the pencil should be good.

22. The ratio between two adjacent side of a drawing sheet is

ISRO - (VSSC) Draughtsman (Mech.), 21-02-2015

- (a) $1:\sqrt{2}$
- (b) $1:\sqrt{3}$
- (c) 1:0.5
- (d) 1:1

Ans : (a) The ratio between two adjacent side of a drawing sheet is $1:\sqrt{2}$



23. Area of an A₀ size drawing sheet is as closed to.
ISRO - (VSSC) Draughtsman (Mech.), 21-02-2015

- (a) 0.25 m²
- (b) 0.5 m²
- (c) 0.75 m²
- (d) 1.0 m²

Ans : (d) Area of an A₀ size drawing sheet is as close as 1.0 m².

24. Clinometers are used for

ISRO - (VSSC) Draughtsman (Mech.), 21-02-2015

- (a) Temperature measurement
- (b) Linear measurement
- (c) Angular measurement
- (d) Flatness measurement

Ans : (c) Clinometers: This is a measuring instrument in which angles are measured with the help of a spirit level. In addition to measuring angles. Clinometers are used to measure angular surfaces, large cutting tools and milling cutter insert relief angles.

Other angle measuring instrument-

1. Vernier bevel protector
2. Spirit level
3. Sine bar
4. Angle pre-measuring
5. Divider head.

Flatness Measurement:

1. Surface plate
2. Spirit level
3. Auto clinometer
4. Dial indicator
5. Optical divider

Temperature measurement:

1. Resistance thermometers
2. Semi conductor thermometers
3. Thermostats
4. Thermo Couples
5. Bi-metallic thermometers
6. Radiation pyrometer
7. Optical pyrometer

25. Which one is not the size of a standard trimmed drawing sheet?

ISRO - (VSSC) Draughtsman (Mech.),
25-09-2016

- (a) 841×1189 (b) 420×596
(c) 210×297 (d) 297×420

Ans : (b) The above are the standard sizes of drawing sheets. So 420×596 is not a standard size of drawing sheet.

• **Standard size and measurement of BIS based drawing sheet-**

Designation	Size in mm
A ₀	841×1189
A ₁	594×841
A ₂	420×594
A ₃	297×420
A ₄	210×297
A ₅	148×210
A ₆	105×148

- Mostly A₂ drawing sheet is used by engineering drawing students.

26. Clinograph is used for

ISRO - (VSSC) Draughtsman (Mech.),
25-09-2016

- (a) measuring and setting the angles
(b) ink work on drawings
(c) drawing horizontal lines
(d) drawing parallel lines at inclination

Ans : (d) Clinograph is an adjustable set-square and is used to draw parallel lines at any angle.

- The two sides of Clinograph are fixed at 90° and the third side can be adjusted at any desired angle.
- It is adjustable set square made of wood or plastic. It contains one adjustable wing or strip which can be adjusted to required angle.



Clinograph

27. What is the dimension of B₂ drawing board ?

RRB RRB Patna/Allahabad ESM-II, 30.01.2011
RRB Chandigarh Section Engineer (Mech.),
26.02.2012

- (a) $1500 \times 1000 \times 25$ mm (b) $700 \times 500 \times 15$ mm
(c) $1000 \times 700 \times 25$ mm (d) $500 \times 350 \times 15$ mm

Ans : (b) The dimension of B₂ drawing board is $700 \times 500 \times 15$ mm. B₂ size drawing board is called imperial size drawing board.

28. What is the limitation of coloured drawing sheet?

RRB Bhopal & Mumbai Apprentice Section
Eng. 23.03.2003

- (a) It hinders the emergence of lines
(b) It does not allow the sheet to fold
(c) Not available in suitable sizes
(d) None of the above

Ans : (a) There are some limitations of the coloured drawing sheet.

- Mostly white drawing sheet is used in engineering drawing colored drawing sheet are rarely used.
- It hinders the emergence of lines, so its used rarely.

29. What is the dimension of A₂ drawing sheet ?

RRB Jammu Section Eng. (Mech, Elec/
Elect./Telecom), 2013

- (a) 420×594 mm (b) 594×841 mm
(c) 210×297 mm (d) 297×420 mm

Ans : (a) The dimension of A₂ drawing sheet (trimming) is 420×594 mm.

- Without trimming the dimension of A₂ is 420×625 mm.

Standard sizes of drawing sheets

Specified size	Size (After Trimming)	Size (without trimming)
A ₀	841×1189 mm	880×1230 mm
A ₁	594×841 mm	625×880 mm
A ₂	420×594 mm	450×625 mm
A ₃	297×420 mm	330×450 mm
A ₄	210×297 mm	240×330 mm
A ₅	148×210 mm	165×240 mm

30. What is the ratio of the length and width of the drawing sheet ?

RRB Kolkata Jr. Engineer-II Electrical/
DRG & Design 11.06.2006
DRDO Turner 2016

- (a) 1:2 (b) 2:3
(c) $1:\sqrt{2}$ (d) 3:4

Ans : (c) The ratio of the length and width of the drawing sheet is $1:\sqrt{2}$.

Ex.: $841 : 1189 = 1 : \sqrt{2}$
 $594 : 841 = 1 : \sqrt{2}$

31. Match the various instruments used in drawing correctly.

A	Large compass	(i)	To ink the lines
B	Large divider	(ii)	For holding pencil lead
C	Ruling pen	(iii)	To draw a big circle
D	Lead case	(iv)	To divide the line

RRB Thiruvananthapuram Section Eng (Mechanical) 04.01.2009

- (a) A-(i); B-(ii); C-(iii); D-(iv)
 (b) A-(iii); B-(iv); C-(i); D-(ii)
 (c) A-(ii); B-(iii); C-(iv); D-(i)
 (d) A-(iv); B-(i); C-(ii); D-(iii)

Ans : (b)

SN.	Instrument	Uses
1.	Large Compass	To draw a big circle and marking
2.	Large divider	To divide the line
3.	Ruling pen	To ink the line
4.	Lead case	For holding Pencil lead

32. Name of the device which is used for marking and dividing small distances.

RRB Kolkata Jr. Engineer-II Electrical/DRG & Design 11.06.2006

- (a) Small compass (b) Large compass
 (c) Protractor (d) Inking pen

Ans : (a) A small compass is used for marking and dividing small distances.

- Protractor is used to measure angles.
- Large compass is used to draw large circles and also used for marking.

33. For drawing the component of a wrist watch, the scale used is–

RRB Bhubaneswar App. Electrical, 19.08.2001

- (a) Full size scale (b) Enlarged scale
 (c) Reduced scale (d) None of these

Ans : (b) For drawing the component of a wrist watch enlarged scale is used.

- The components of wrist watch are very small. For giving complete information about the element, you have to print it on paper in large form. So, the major or enlarge scale is used for this.
- For this R.F is kept greater than one.

34. To draw smooth curves of any nature, the drafting instrument used is a/an–

RRB Ranchi Signal Maintainer Group-III, 20.11.2005

- (a) Template (b) Eraser shield
 (c) French curve (d) Mini drafter

Ans : (c) To draw smooth curves of any nature, the drafting instrument used is a French curve.

- They are generally made of wood, plastic or celluloids.
- They are made in various shapes.
- They are used to draw curve which cannot be drawn with compass or for irregular curves.

35. Parallel lines can be drawn with the help of–
RRB Allahabad Signal Maintainer-II, 22.01.2006

- (a) T-square/ (b) Mini drafter
 (c) Pair of set-square (d) All of these

Ans : (d) Parallel lines can be drawn with the help of T-square, mini drafter and pair of set-squares.

- The set squares are used for draw all straight lines except the horizontal lines which are usually drawn with T-square.
- The set-squares can also be used for drawing parallel and perpendicular lines to any given line.

36. What do you understand by scale 1 : 2 ?

RRB Kolkata Supervisor (P.Way), 20.02.2000

- (a) Full size (b) Enlarging size
 (c) Reducing size (d) None of these

Ans : (c) 1 : 2 is a reducing size scale because its representative fraction is less than one.

- When a drawing of a very large object is to be made, then this type of scale is used.
- In this, a drawing is made of a smaller size than the actual size of the object.

Ex.: Drawing of building, roads etc.

37. Which scale will you use for drawing watch parts ?

RRB Kolkata Apprentice Supervisors, 14.10.2001

- (a) Full size scale (b) Enlarging size scale
 (c) Reducing size scale (d) All of these

Ans : (b) Enlarging size scale is used for drawing watch parts because the size of watch parts is very small.

- Therefore, to display it, we will make a drawing of slightly larger size than the actual size of the parts.

38. Which objects can be drawn using 1 : 1 scale ?

RRB Bangalore Material Superintendent, 21.11.2004

- (a) Objects of larger size
 (b) Objects of medium size
 (c) Object of smaller size
 (d) both 'a' and 'b'/'

Ans : (b) Drawing of objects of medium size is made from scale 1 : 1.

- The drawings of objects of medium size are made equal to their actual sizes.

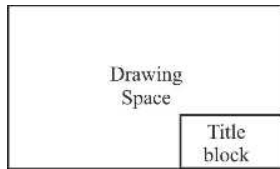
39. Where is the Title block made on the drawing sheet ?

DMRC Station Controller, 09.09.2007

- (a) Lower left corner (b) Upper left corner
 (c) Upper right corner (d) Lower right corner

Ans : (d) The title block is normally located in the lower right corner of the drawing sheet.

- Name of the institute, drawing number, name of the maker of the drawing; type of projection, title of the drawing etc. are presented on the title block of size 185 mm × 65 mm.



- 40. Which size of drawing board you work on ?**
RRB Bangalore Material Superintendent, 21.11.2004
- (a) B₀ (b) B₁
 (c) B₂ (d) B₄

Ans : (c) Drawing boards are available in different sizes, but in engineering drawing only B₂ imperial size is mostly used.

- 41. In free hand drawing..... is used-**
RRB Kolkata Diesel/Electrical Ass., 06.02.2005
- (a) Mini drafter (b) Scale
 (c) Protractor (d) None of these

Ans : (d) Free hand drawing is that drawing in which the parts and lengths of an object are examined by eye and all the lines are drawn without the help of any drawing instrument. Only pencil, eraser and paper are used.

- 42. Which of the following statement is false:**
- (a) For 'A' size sheets, mentioning about the length and width of the sheet is a normal thing.
 (b) Mentioning GSM value for 'A' size sheets is a normal thing
 (c) For 'A' size sheets, it is common to refer to the area of the sheet.
 (d) All of the above

Ans : (d) All statements are incorrect.

a. Often A₀, A₁, A₂, A₃ etc. are mentioned.
 b. GSM tells about the quality of the paper. It has nothing to do 'A' size sheet.
 c. it is often referred to A₀, A₁, A₂, A₃ etc.

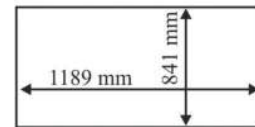
- 43. Which of the following statement is correct ?**
RRB Ranchi Signal Maintainer Group-III, 20.11.2005
- (a) The length of A₄ size sheet is the width of A₃ size sheet.
 (b) If the length of 'A₁' size sheet is P, then its width will be $\sqrt{2}$ P
 (c) The area of 2A₀ size sheet is 2m²
 (d) All of these

Ans : (d) The length of A₄ size sheet is equal to the width of an 'A₃' size sheet.

- If the length of 'A₁' size sheet is P, then its width will

be $\sqrt{2}$ P.

- The area of 2A₀ size sheet is 2m², because area of 'A₀' size sheet is '1m²'. So area of 2A₀ = 2 × 1 = 2m²



Designation	Trimmed size
A0	841 × 1189
A1	594 × 841
A2	420 × 594
A3	297 × 420
A4	210 × 297
A5	148 × 210

• Area of A0 drawing sheet is 1m²

- 44. According to SP 46 : 2003, what types of marks are given on drawing sheet to protect the prints of all sizes of drawing sheets ?**
RRB Allahabad Junior Engineer-II
- (a) Orientation mark (b) Folding mark
 (c) Margin Mark (d) Border Mark

Ans : (b) According to SP 46 : 2003, folding marks are given on drawing sheets to protect the prints of all sizes of the drawing sheets.

- 45. Trimmed size of a drawing sheet is given by which line ?**
RRB Kolkata Jr. Engineer-II Electrical/ DRG & Design, 11.06.2006
- (a) Border (b) Border line
 (c) Margin line (d) Frame

Ans : (c) Trimmed size of a drawing sheet is given by margin line.

- A border line drawn around the inside edge of the paper.

- 46. Name the following scale on the principles of similar triangles-**
RRB Kolkata Chemical & Metallurgical Er., 01.12.2002
- (a) Extended Scale (b) Plain Scale
 (c) Reduced Scale (d) Diagonal Scale

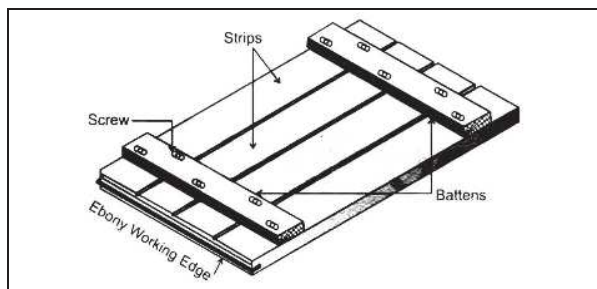
Ans : (d) The diagonal scale is based on the principles of similar triangles.

- In the diagonal scale, three ranges of distance are displayed simultaneously.

- 47. Drawing boards are come in many sizes. Choose the size of the designated drawing board D₀-**
RRB Kolkata Technical-III, 20.08.2006
- (a) 1000×700×25 mm. (b) 500×300×15 mm.
 (c) 700×500×15 mm. (d) 1500×1000×25 mm.

Ans : (d) The size of the D₀ drawing board is equal to 1500×1000×25 mm.

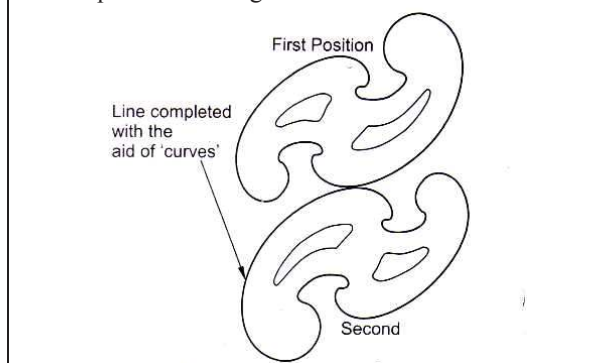
- D₀ is the largest size of the board.



48. French curve is used to draw the-
(COAL India Fitter 2013)
RRB Bangalore Section Eng. (Civil), 01.02.2009
- (a) Curved radius (b) Irregular curves
(c) Ellipse (d) Curved path

Ans : (b) To draw smooth curves of any size

- French curves are mostly use to draw irregular curve.
- They are made of wood, plastic or celluloid.
- They are made in various shapes.
- It is used to draw curve which cannot be drawn with compass or for irregular curves.



49. According to Indian standard institute type of engineering scales are -
RRB Chennai Technical (Eng.), 15.04.2007
- (a) Full scale (b) Small Scale
(c) Large scale (d) All of these

Ans : (d) According to Indian standards institute engineering scales are three types-

1. Full scale, 2. Large scale 3. Small scale.

- When a large size object is drawn on paper in small scale, then it is called small scale, when the parts of small object are drawn in enlarged sizes on paper, then it is called large scale.
- If it is drawn on paper equal to the measurement of the object, then it is called full-scale.

50. According to I.S. specification six different types of trimmed drawing pages are available. What is the measurement of A4 sheet ?

(NCVT -2013 Fitter, Turner, machinist)

- (a) 330 mm. × 450 mm
(b) 297 mm. × 420 mm.
(c) 240 mm. × 330 mm.
(d) 210 mm. × 297 mm.

Ans : (d) A4 trimmed sheet size is 210×297 mm.

Designation	Trimmed size (in mm)
A0	841 × 1189
A1	594 × 841
A2	420 × 594
A3	297 × 420
A4	210 × 297

51. In drawing, what is the name of multipurpose drawing machine?

RRB Bangalore Technical (Eng.), 22.04.2007

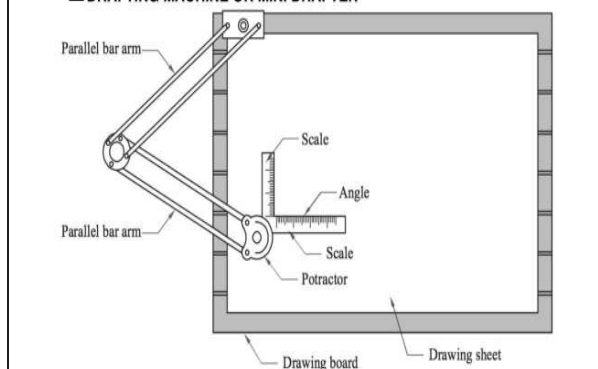
- (a) Try scraper (b) Compass
(c) Drafting machine (d) Instrument box

Ans : (c) Drafting machine is a multipurpose drawing machine.

Drafting machine: It is sometimes called pantograph. It come in different sizes and patterns called "Pantograph type"

- This machine has a mechanism which keeps the two blades always parallel to their respective original position whenever they may be moved on the board.

■ DRAFTING MACHINE OR MINI DRAFTER



52. Which drawing sheet has a surface area of one square meter ?

RRB Secunderabad Technical (Eng.), 20.05.2007

- (a) A₀ (b) A₂
(c) A₃ (d) A₄

Ans : (a)

$$\begin{aligned} A_0 \text{ drawing sheet area} &= 841 \times 1189 \text{ mm}^2 \\ &= 999949 \times 10^{-6} \text{ m}^2 \\ &= 0.999949 \text{ m}^2 \approx 1 \text{ m}^2 \end{aligned}$$

- So, the surface area of the drawing sheet 'A₀' is 1m².

53. What type of scale is the scale 2 : 1 ?

DMRC Secunderabad Section Eng. (Civil),
29.06.2008

- (a) Full scale (b) Reducing scale
(c) Enlarge scale (d) None of these

Ans : (c) 2:1 scale is an enlarging scale because its representative factor is >1.

$$\text{Representative factor} = \frac{\text{Length of the object in the drawing}}{\text{Actual length of object}}$$

For full scale - R.F. = 1:1

For reducing scale - R.F. = 1:2, 1:5, 1:20, 1:50 etc.

For enlarging scale- R.F. = 2:1, 5:1, 20:1, 50:1, 10:1 etc.

54. 2H pencil is used.....

RRB Patna Technical Eng., 27.07.2008

- (a) To draw dark lines
- (b) To draw thick lines
- (c) To draw less visible lines
- (d) None of these

Ans : (c) 2H pencil is used to draw less visible lines. This pencil comes under medium grade pencil.

Lines	Used of Pencil
Initial work and construction lines	H, HB
Outlines, dotted lines, section plane lines, dimension lines arrow heads	2H
Centre lines, section lines	2H or 3H or 4 H

55. The drawing board is made up of the several parts. One part among them is the batten. The purpose of the batten is-

RRB Chandigarh Section Eng. (Electrical), 15.03.2009

- (a) to fasten the strips
- (b) stop warping
- (c) To support the strips
- (d) Both 'b' and 'c'

Ans : (d) Two battens are fixed at the bottom of the drawing board. The purpose of this batten is to prevent warping of the drawing board and to support the strips.

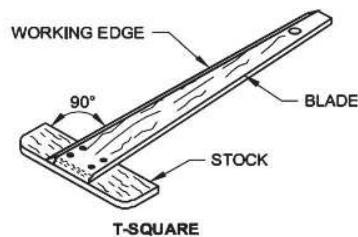
56. Which part of T square is used to draw horizontal parallel lines on drawing sheet ?

RRB Chandigarh Section Eng. (Electrical), 15.03.2009

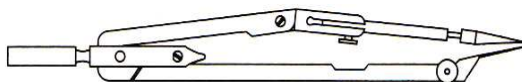
- (a) Blade
- (b) working edge
- (c) Stock
- (d) Scale

Ans : (b) Working edge of T square is used to draw horizontal parallel lines on drawing sheet.

- Horizontal parallel lines are drawn by sliding the stock to the desired position.
- T-square is designated by blade length.
- It is composed by a long strip called blade, which is screwed rigidity at right angle to a shorter piece head or stock.



57. Figure given below shows a ____.



- (a) Large compass
- (b) Bow compass
- (c) Large divider
- (d) Drop compass

RRB Patna/Allahabad ESM-III, 30.01.2011

Ans. (a) : Figure given above shows a large compass.

Large size compass– This compass is used for drawing large circles and arcs of circles.

58. Sketch book is used for.....

RRB Chennai Section Eng., 12.02.2012

- (a) Tracing
- (b) Rough drawing
- (c) Graph
- (d) All of these

Ans : (a) Sketch book is used by artists for tracing, drawing or painting as a part of their creative process.

59. What is the width of the border of the drawing sheet of size A₀ and A₁.....

RRB Chandigarh Section Eng. (Civil), 26.02.2012

- (a) 10 mm
- (b) 25 mm
- (c) 30 mm
- (d) 20 mm

Ans : (d) The width of the border of the drawing sheet of size A₀ and A₁ is 20 mm on the left side and 5 mm on the other three sides.

60. Which of the following set does not occur in the set square ?

RRB Chandigarh Section Eng. (Mech.), 26.02.2012

- (a) 15°, 76°, 90°
- (b) 45°, 45°, 90°
- (c) 30°, 60°, 90°
- (d) None of these

Ans : (a) The set square is generally made of celluloid or plastic. It is triangular and transparent.

- Mainly two types of set squares are used.
- In one set square 30° - 60° - 90° angles are made and in the another set square 45° - 45° - 90° are made.
- No set square has an angle of 15° - 76° - 90°

61. The center marking on all four sides of the drawing sheet is called ?

UPSSSC Tracer (Tech.) 2015

- (a) Margin
- (b) Grid reference
- (c) Orientation mark
- (d) Object reference

Ans : (c) The center marking on all four sides of the drawing sheet is called "Orientation mark".

62. On which of the following paper the drawing made is called blue print ?

SAIL Bokaro Steel Plant 2016

- (a) Tracing paper
- (b) Sand paper
- (c) Ammonia paper
- (d) None of these

Ans : (c) A drawing made on ammonia paper is called a 'blue print' because by placing tracing paper over the already made drawing, that drawing is copied by ink pen.

63. What type of pencil lead is shown in figure.

Vizag Steel Fitter 2015



- (a) Conical lead
- (b) Chisel lead
- (c) Drafting lead
- (d) Fine lead

Ans : (a) The conical lead type pencil is shown in the figure.

- It is used in sketch work and for lettering.

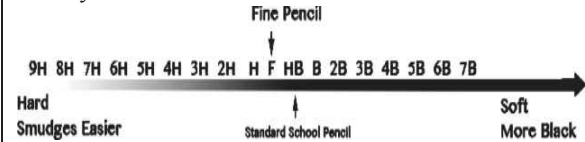
64. Soft grade pencil is used for which of the following ?

(Vizag Steel Fitter-2015)

- (a) To draw thin lines
- (b) To draw thick lines
- (c) To draw section lines
- (d) To draw structural lines

Ans : (b) Soft grade pencils are used for make thick lines.

- 2B, 3B, 4B, 5B, 6B, 7B pencils are soft grade pencil.
- They are used to draw thick and dark lines.



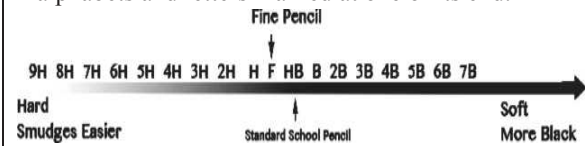
65. What are the main components in the tip of a pencil ?

Vizag Steel Fitter 2015

- (a) Graphite and clay
- (b) Lead and graphite
- (c) Clay and lead
- (d) None of these

Ans : (a) Graphite and clay are used as the main components in the tip of the pencil.

- The lead of the pencil is made of graphite or kaolin or clay.
- The grade of a pencil lead is usually shown by alphabets and letters marked at one of its end.



- 9H → Very hard grade pencil (clay content ↑)
- 9B → Very soft grade pencil (Graphite content ↑)
- When clay content ↑ = Pencil lead becomes light and hardness ↑
- When graphite content ↑ = Pencil lead becomes dark and softness ↑

66. Which of the following is the softest grade of pencil ?

NTPC Fitter 2014

- (a) 2B
- (b) 1B
- (c) HB
- (d) H

Ans : (a) Soft grade pencils are used to draw thick and dot lines.

- Eg. 2B, 3B, 4B, 5B, 6B and 7B.
- 2B is the softest grade of pencil in the given options.

67. With the help of which of the following instruments parallel lines can be drawn?

BHEL Hyderabad Fitter 2014

- (a) Mini drafter
- (b) T-square
- (c) Pair of set square
- (d) All of these

Ans : (d) Parallel lines can be drawn with the help of mini drafter, T-square and pair of set-square.

- Mini drafter is used to draw horizontal, vertical and

inclined parallel lines on the sheet with saving time.

- Set-square is used for drawing all straight lines except the horizontal lines which are usually drawn with the T-square.
- T square is used to draw horizontal lines.

68. Mini drafter fulfills for all the purposes except which of following devices, instead of-

HAL Fitter 2015

- (a) Ruler
- (b) Set square
- (c) Protractor
- (d) Compass

Ans : (d) Mini-Drafter can be used for multiple functions in drawing. Like- drawing horizontal lines, inclined lines at any angles, parallel lines, perpendicular lines etc.

- T-square, set square, and protractor works as can be done by a mini drafter except the compass.
- Compass is not a part of mini drafter.

69. At which angle the two arms of the mini drafter are be joined ?

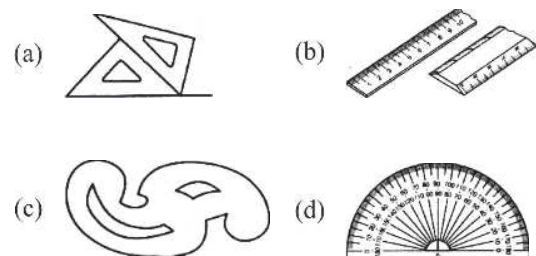
Mazagon Dock Shipbuilders Ltd. Fitter 2013

- (a) At 45°
- (b) At 90°
- (c) At 90°
- (d) At 90°

Ans : (b) The two arms of the mini drafter are joined at 90° on a round protractor.

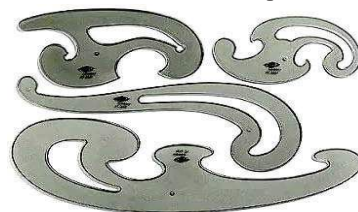
70. Which of the following figure shows a french curve?

MES Fitter Tradesman 2015



Ans : (c) French curves are used for drawing irregular curves.

- A continuous smooth curves required through a set of points that do not lie on a straight line or on a circle can be drawn with the help of French curves.



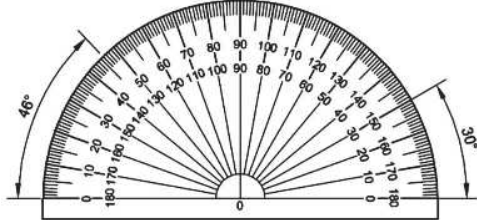
71. Protractor is used to measure.....

(Engineering Drawing 2015)

- (a) Angle in degree
- (b) Angle in radian
- (c) Angle in minute
- (d) Linear measurement

Ans : (a) Protractor is used to measure the angle in degree.

- It is semi circular in shape and is made of a flat celluloid sheet.
- Its circumferential edge is graduated to 1° divisions.



72. With the help of set square and T-square we can draw all other straight lines except.....

(IOF Fitter 2015)

- (a) Curved lines (b) Horizontal lines
(c) Oblique lines (d) None of these

Ans : (a) With the help of set square and T-square we can draw all other straight lines rather than curved lines.

- Set square are also used to draw perpendicular lines, angles and complete shapes such as square, rectangle and triangles.
- T-square is used to draw horizontal and parallel lines.

73. The drawing board is made of different parts, one of them is batten. The purpose of the batten is-

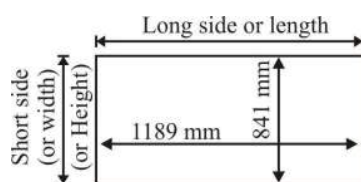
(IOF Fitter 2015)

- (a) Applying bandages
(b) Protect against impurity
(c) To prevent the strips from distortion
(d) Setting on table

Ans : (c) The purpose of the batten is to protect and support the strips from deforming.

- The drawing board is required to provide a flat surface. It is fitted at the back by two battens to prevent warping.
- The surface must be smooth and soft, So that a pencil can easily draw lines.
- It should be free from bumps or holes.

74. Figure shows one of a series drawing sheets. What is the designation of this sheet?



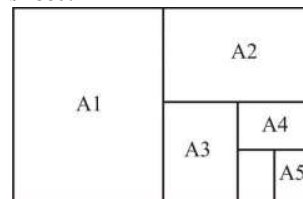
- (a) A1 (b) A4
(c) A0 (d) A2

Ans. (c) : The given figure is the designation of A0 Sheet because its size is $841 \text{ mm} \times 1189 \text{ mm}$.

Designation	Trimmed size
A0	841×1189
A1	594×841
A2	420×594
A3	297×420
A4	210×297
A5	148×210

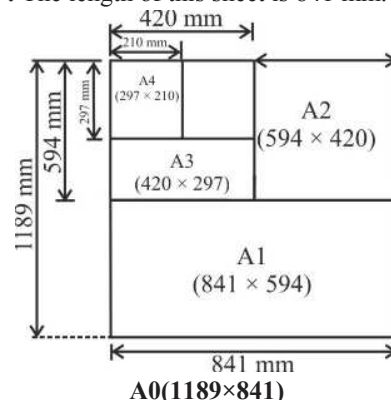
Area of A0 drawing sheet is 1 m^2

75. Figure given below shows one way of representing a series sheets. What is the length of this sheet?



- (a) 841 mm (b) 1189 mm
(c) 1000 mm (d) 500 mm

Ans. (a) : The length of this sheet is 841 mm.



76. Indian standard specified _____ number of A series of drawing papers/sheets.

- (a) 4 (b) 5
(c) 3 (d) 6

Ans. (b) : Indian standard specifies 5 number of A series of drawing paper/sheets.

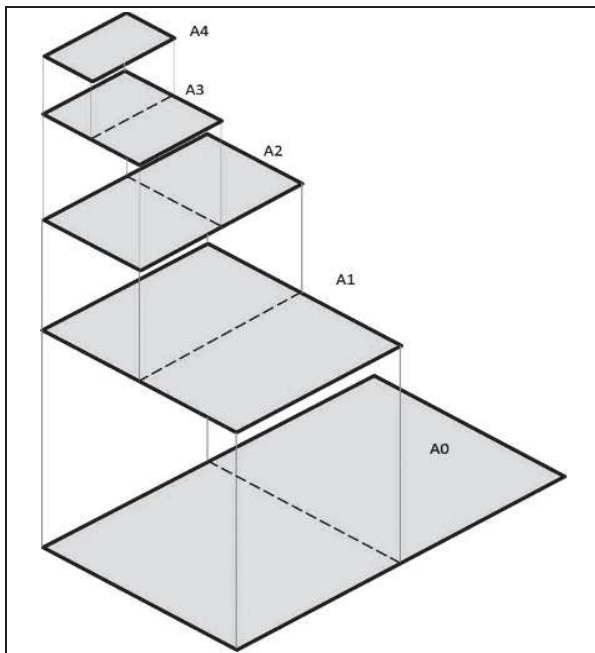
- Surface area of A0 size is one square meter.
- Successive drawing sheet sizes (from A0 to A5) are obtained by halving along the length (or) doubling along the width.

77. The SP 46 : 2003 does not specify the _____ sheet(s)

- (a) A4 (b) A5
(c) A0 (d) b and c both

Ans. (d) : The SP 46 - 2003 does not specify the A5 and A0 sheets.

- Drawing sheet is a white paper on which an object is drawn which is available in various sizes.



78. The smallest size drawing sheet as per ISO-A series has a designation of ____.

- (a) A₀ (b) A₃
(c) A₂ (d) A₄

Ans. (d) : The smallest size drawing sheet as per ISO-A series has a designation of A₄.

• The preferred sizes of the trimmed sheets as selected from the main ISO-A series are given in table–

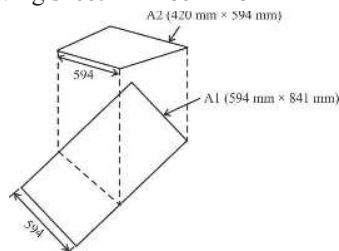
Designation	Trimmed size (in mm)
A ₀	841 × 1189
A ₁	594 × 841
A ₂	420 × 594
A ₃	297 × 420
A ₄	210 × 297

79. If width (shorter side) of A1 drawing paper is 594 mm, what is the longer side if A2 paper?

- (a) 297 mm (b) 594 mm
(c) 841 mm (d) 210 mm

Ans. (b) : According to question, width (shorter side) of A1 drawing paper is 594 mm. and we know,

Size of drawing sheet A1 = 594 × 841



So, from the above graphic representation longer side of A2 paper is 594 mm.

80. The number of A2 size sheet that can be trimmed from one A0 size sheet is:

- (a) 2 (b) 4
(c) 6 (d) 8

Ans. (b) : A0, A1, A2 sheet nomenclature are practical examples of ratio.

• From the above figure–

We can get 2 A1 sheets from one A0 sheet, likewise, We can get 2 A2 sheet from one A1 sheet.

Therefore, from A0 sheet we can get 4 A2 sheets.

81. Why always a ratio of $1:\sqrt{2}$ is kept between the sides of A series sheets?

- (a) For ease of printing
(b) For weight reduction
(c) For microfilming
(d) For ease of handling

Ans. (c) : For microfilming always a ratio of $1:\sqrt{2}$ is kept between the sides of a series sheets.

• The area of the successive sizes are in the ratio of 1:2.

82. The area of A1 size sheet is ____.

- (a) 0.5 m (b) $\frac{1}{2}$ m²
(c) 2m² (d) $\left(\frac{1}{2}\right)^2$ m²

Ans. (b) : The dimension of A1 size sheet drawing paper = 594 mm × 841 mm.

Area of A1 sheet = 594 × 841
= 0.49954
≈ 0.5 m²

• Area of A0 size drawing paper is 1 m² & area of sheet A2 size sheet is 0.25 m².

83. The ISO size of A4 sheet is 210 × 297 mm. The size of A4×3 sheet will be = ?

- (a) 297 × 630 mm (b) 630 × 891 mm
(c) 210 × 891 mm (d) Not defined

Ans. (a) : Special elongated series increasing its widths, double, triple etc. are designated as follows A3 × 3, A3 × 4

The ISO size of A4 sheet is 210 × 297 mm.

The size of A4 × 3 sheet will be–

297 × (3 × 210) = 297 × 630 mm.

The ISO size of A4 sheet is 210 × 297 mm, the size of A4 × 3 sheet 297 × (3 × 210) = 297 × 630 mm

Special elongated series–

Designation	Size
A3 × 3	420 × 891
A3 × 4	420 × 1189
A4 × 3	297 × 630
A4 × 4	297 × 841
A4 × 5	297 × 1051

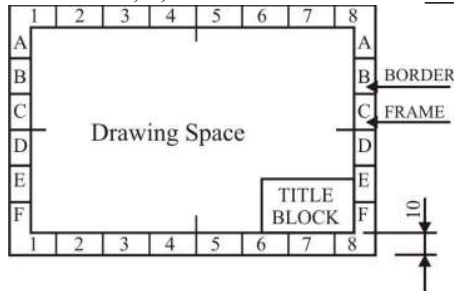
84. Do we have the designations such as $\frac{1}{2}$ A0, $\frac{1}{3}$ A1 etc?

- (a) No (b) Yes
(c) Sometimes (d) None of these

Ans. (a) : No, we have not such designations such as $\frac{1}{2}$ A0, $\frac{1}{3}$ A1.

- The drawing sheets are designated by symbols such as A0, A1 A2, A3 and A5.
- The drawing which cannot be accommodated in above sheets, elongated series are used.
- Elongated series are designated by symbols A1 $\times$ 3; A2 $\times$ 4 etc.

85. Figure given below shows a simple drawing sheet and a, b, c on short sides are for _____



- (a) Folding (b) Grid reference
(c) Orientation (d) Direction

Ans. (b) : Give drawing sheet A, B, C on short sides shows a grid reference system.

Grid reference system (zones system)–

- The grid reference system is drawn on the sheet to permit easy location on the drawing such as details, alterations or additions.
- The rectangle of grid along the length should be referred by numerals 1, 2, 3 etc. & along the width by the capital letters A, B, C, D etc.

86. A title block contains all of the following information except_____.

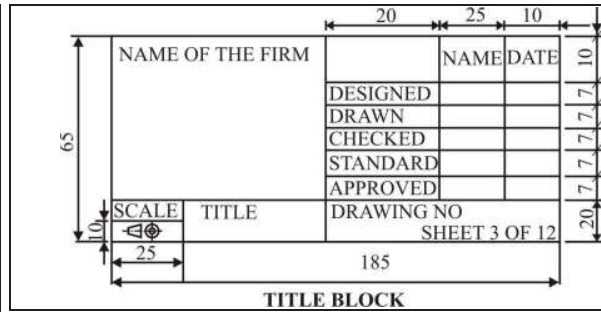
- (a) Name and address of the company
(b) Parts list
(c) Drawing sheet size letter designation
(d) Drawing number

Ans. (b) : A title block contain all of the following information–

- Name and address of the company.
- Drawing sheet size
- Drawing number
- Scale

Title block–

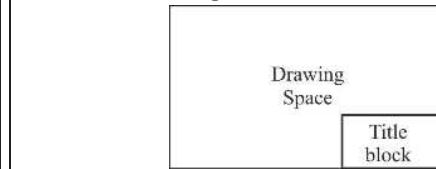
- The position of this block should be within the drawing space such that the portion of the title block containing the identification or information of the drawing is situated in the bottom right hand corner of the drawing space.
- It contains the details of drawing, here we include the name of the persons who have designed and drawn.



87. The title block should not contain_____.

- (a) Details of MTO
(b) Signature of the head of organisation
(c) Detail of reference no. of other related drawings
(d) All of (a), (b) and (c)

Ans. (d) : The title block should not contain all of above mentioned option.



88. The following is not included in title block of drawing sheet_____.

- (a) Sheet no. (b) Scale
(c) Method of projection (d) Size of sheet

Ans. (d) : Size of sheet is not included in title block of drawing sheet.

The title block should contain–

1. Name of firm
2. Title of the drawing
3. Scale
4. Symbol for the method of projection
5. Drawing number
6. Initials with dates of persons who have designed, drawn, checked, standard & approved.
7. No. of sheet.

89. A0 size sheets are mostly used in_____ engineering

- (a) Chemical (b) Civil
(c) Mechanical (d) All of (a), (b) and (c)

Ans. (d) : The standard for drawing sheet size is the A series.

- The basic size in this series is the A0 size (1189 mm $\times$ 841 mm).
- Surface area of are mostly used in engineering (Civil, mechanical, chemical).

90. Border lines on a drawing sheet are provided for purpose of_____.

- (a) Elegance
(b) Defining working space
(c) Printing
(d) All of these (a), (b) and (c)

Ans. (b) : Border lines–

- A clear working space on the drawing sheet is obtained by drawing border lines.
- In general, more space is kept on the left side for filing or binding when necessary.

91. Zoning areas on the drawing sheet are

- (a) Squares (b) Rectangles
(c) Rhombus (d) Either of these

Ans. (b) : Zoning areas on the drawing sheet are rectangles.

- The zone along the length l are designated by numerals, while along the width w are designated by letters.

92. Drawings made on tracing papers of A3 sheet should be rolled.

- (a) True (b) False
(c) Sometimes (d) None of these

Ans. (b) : Drawing made on the tracing papers of A3 sheet should be rolled– It is a false statement.

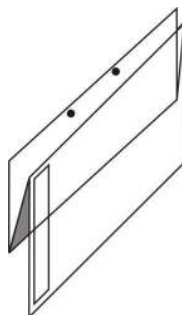
- A3 → No. of folds 1.

93. Drawings drawn on A3 sheets should have _____ fold (3)

- (a) 1 (b) 2
(c) 3 (d) NIL

Ans. (a) : Drawings drawn on A3 sheets should have fold 1.

- Folding marks are made in the drawing sheets.
- They are helpful in folding of print in proper and easy manner.



94. _____ size drawings are generally not folded

- (a) A3 (b) A4
(c) A0 (d) A1

Ans. (b) : A4 size drawings are generally not folded.

- Dimensions for folding for various sizes of drawing sheets by the two method are–

1. Method-I
2. Method-II

95. When complete drawing runs into several sheets, all the used sheets of _____ size.

- (a) Different (b) Same
(c) A4 (d) A1

Ans. (b) : When complete drawing runs into several sheets, all the used sheet of same size.

96. The place on the drawing sheet where all the revision number with date are recorded is _____ of the sheet.

- (a) Left hand corner (b) Right hand corner
(c) Title block (d) Any where

Ans. (c) : Title block of the sheet is the place on the drawing sheet where all the revision number with date are recorded.

- A revision panel is drawn either attached to the title block above it or in the top right-hand corner of the sheet.
- The revisions are recorded in it giving the revision number, date, zone etc. and also the initials of the approving authority.

97. When a drawing is made in the portrait position, in A4 sheet, the title block is generally for

65 × _____ width.

- (a) Full (b) Half
(c) One fourth (d) None of these

Ans. (a) : When a drawing is made in the portrait position, in A4 sheet, the title block is generally of 65 × full width (185) mm.

98. The quality of a drawing paper is expressed in _____.

- (a) Density (gsm) (b) Kg per run
(c) Whiteness of paper (d) Either (a) or (b)

Ans. (d) : The quality of a drawing paper is expressed in–

- Density (gsm)
- Kg per run
- Whiteness of paper.

99. The thickness of the drawing board generally varies from _____ mm.

- (a) 15 to 25 (b) 25 to 40
(c) 40 to 50 (d) 5 to 10

Ans. (a) : The thickness of the drawing board generally varies from 15-25 mm.

Size of drawing board–

Designation	Length × width × thickness
B0	1500 × 1000 × 25
B1	1000 × 700 × 25
B2	700 × 500 × 15
B3	500 × 350 × 15

100. Battens are provided on the drawing board for _____ of the board.

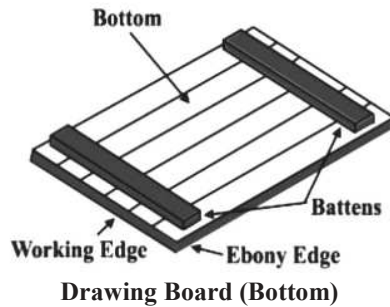
- (a) Strengthening
(b) Preventing bending
(c) Ease of handling
(d) All of (a), (b) and (c)

Ans. (d) : Batten are provided on the drawing board for–

- (a) Strengthening
- (b) Prevent bending

(c) Ease of handling.

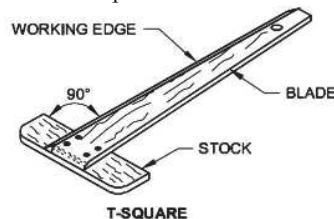
- Drawing boards are used to provide support to the drawing sheets or papers.



101. The angle between the stock and working edge of T-square should be ____ 90° .
- (a) Exactly
(b) Approximately
(c) More than
(d) None of these

Ans. (a) : The angle between the stock and working edge of T-square should be exactly 90° .

- Joined together at right angles to each other by means of screw & pin.



102. T-square slides on the drawing sheet parallel to the ____ of the board.
- (a) Width
(b) Length
(c) Either (a) or (b)
(d) None of these

Ans. (b) : T-square slides on the drawing sheet parallel to the length of the board.

- It is used for drawing horizontal parallel lines.
- It can also be used as a base for drawing the various angles with the help of set square.

103. Tee-square (or T-square) can be used for drawing only ____ lines.
- (a) Vertical
(b) Horizontal
(c) Inclined
(d) Curves

Ans. (b) : T-square alone can be used for drawing horizontal lines.

- Horizontal parallel lines are drawn by sliding the stock to the desired position.

104. The plastic or steel metric scale used in the construction of engineering drawings has a minimum division of ____ mm.
- (a) 1
(b) 2
(c) 0.5
(d) 10

Ans. (a) : The plastic (or) steel metric scale used in the construction of engineering drawing has a minimum division of 1 mm.

105. The maximum accuracy of a plain scale is considered to be

- (a) 1 mm
(b) 2 mm
(c) 0.5 mm
(d) 0.01 mm

Ans. (c) : The maximum accuracy of a plain scale is considered to be 0.5 mm.

106. Plain scales used for engineering drawing work are made of ____.

- (a) Steel
(b) Plastic
(c) Wood
(d) All of these

Ans. (d) : For engineering drawing work plain scales made of wood, steel, celluloid plastic (or) card board.

- Stainless steel scales are more durable.

107. Scales may be flat or ____ cross section.

- (a) Square
(b) Triangular
(c) Any section
(d) None of these

Ans. (b) : Scales may be flat (or) triangular cross-section.

108. Plain scales are available in ____ length.

- (a) 15, 30 cm
(b) 15, 20 cm
(c) 20, 30 cm
(d) 25, 40 cm

Ans. (a) : Plain scales are available in 15, 30 cm length.

109. The scale shown in Fig is ____.



- (a) Triangular scale
(b) Isometric scale
(c) Linear reducing scale
(d) (a) and (c)

Ans. (a) : The scale shown in fig. is triangular scale.

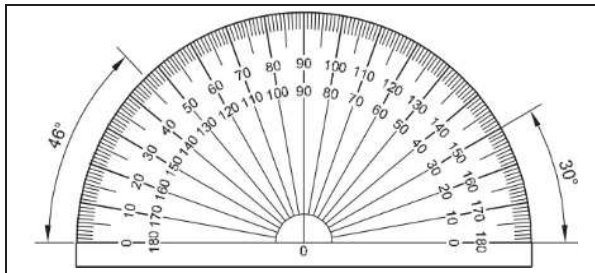
- Scale may be flat or of triangular cross-section.
- Made of wood, steel, celluloid or plastic.
- Edges of the scale are marked with division of centimeters which are sub-divided into millimeters.
- Rustless steel scales are more durable.
- 15 cm long and 2 cm wide or 30 cm long and 3 cm wide flat scales are in common use.
- Both the longer edges of the scales are marked with divisions of centimeters, which are sub-divided into millimeters.
- Scales are used to transfer the true or relative dimensions of an object to the drawing.

110. To measure or draw any angle ____ is used.

- (a) Set-square
(b) T-square
(c) Protractor
(d) Compass

Ans. (c) : The protractor is used to draw or measure such angles as cannot be drawn with the set-squares.

- The angle can be set or measured from both sides aligning the reference line and point 'O' with the corner point of the angle.



111. Any angle can approximately be divided into any number of equal parts with the help of ____.

- (a) Divider (b) Compass
(c) Protractor (d) Diagonal scale

Ans. (c) : Any angle can approximately be divided into any number of equal parts with the help of protractor.

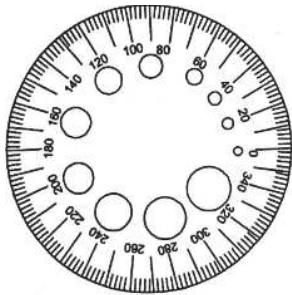
- They are graduated in degree measurable with a least count of upto 0.50.

112. Protractor can be used to draw any angle upto ____.

- (a) 90° (b) 180°
(c) 270° (d) 360°

Ans. (d) : Protractor can be used to draw any angle upto 360°.

- A circle can be divided into any number of equal parts by means of the protractor.
- The diameter of semi-circular protractor is generally 100 mm and its circumferential edge is graduated to 1° division. (Angle $\Rightarrow 0^\circ$ to 180°).
- Circular protractor is called as circle master. (Angle $\Rightarrow 0^\circ$ to 360°)

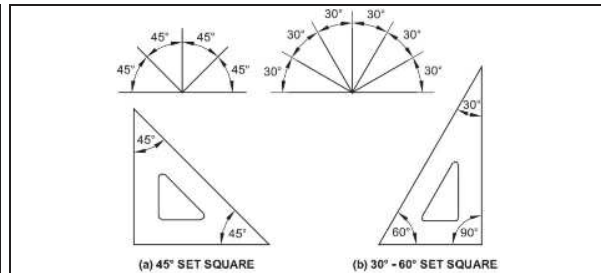


113. For engineering drawing the number of set square used is ____.

- (a) 1 (b) 2
(c) 3 (d) 4

Ans. (b) : For engineering drawing the number of set square used is 2.

- Two forms of set-squares are in general use.
- They are used to draw parallel inclined and perpendicular lines, often in conjunction with T square.
- The two set squares are used simultaneously along with the T-square will produce lines making angles of 15° , 75° , 105° etc. ($\angle$ Multiple of 15°).



114. The set square are usually made of ____.

- (a) Plastic
(b) Transparent celluloid
(c) Both (a) and (b)
(d) Polished wood

Ans. (c) : A set square are usually made of wood, transparent celluloid, tin or plastic.

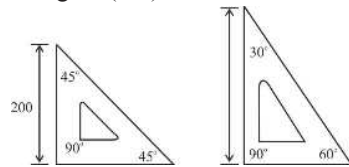
- Those made of transparent celluloid (or) plastic are commonly used as they retain their shape and accuracy for a longer time.

115. Two set squares are known as 45°/45° and 60°/30°

- (a) True (b) False
(c) Sometimes (d) None of these

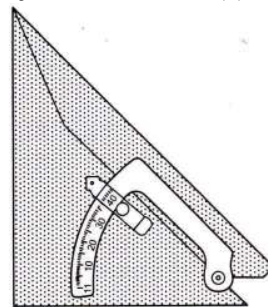
Ans. (a) : They are two types of set square–

1. Thirty-sixty (30-60°)
2. Forty five degree (45°)



116. Figure shows a type of set square. This is known as ____ set square.

- (a) Rotable (b) Fixed
(c) Adjustable (d) All of these



Ans. (c) : Figure shows a adjustable set square.

- Adjustable set squares allow a range of angles to be drawn accurately.
- They can be adjusted to a variety of angles which means only one set-square is required.

117. With the combination of T and set-squares, the following angle cannot be drawn, ____.

- (a) 15° (b) 25°
(c) 45° (d) 105°

Ans. (b) : The two set square used simultaneously along with the T-square will produce line making angles of 15° , 75° , 105° etc.

118. Linking pen is used for _____ in ink on drawing curves

- (a) Writing (b) Drawing Curves
(c) Drawing straight lines (d) Drawing sphere

Ans. (c) : Linking pen is used for drawing straight lines and non-circular arc in ink.

- It consist of a pair of steel nibs fitted to a holder made of metal or ivory.

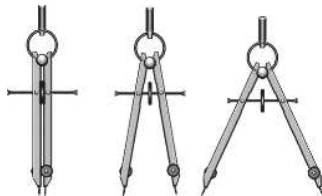
119. Which of the following purpose is not served by a divider?

- (a) Divide lines or curves into a number of equal parts
(b) Transfer measurements from one part of the drawing to another part
(c) Make full size, reduced size of enlarged size drawing
(d) Set off a series of equal distances on the drawing

Ans. (c) : The following purpose is not served by a divider make full size, reduced size of enlarged size drawing.

Purpose of dividers are–

1. To divide curved or straight lines into desired number of equal parts.
2. To transfer dimensions from one part of the drawing to another part.
3. To set-off given distances from the scale to the drawing.

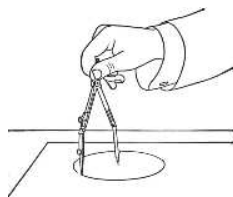


120. A compass can be used to draw:

- (a) Circles (b) Arcs
(c) Irregular curves (d) (a) and (b)

Ans. (d) : A compass can be used to draw circles & arcs of circles.

- It consists of two legs hinged together at its upper end.
- It is generally made of steel and consists two legs–
 1. One leg contains needle at the bottom
 2. Other leg contains a ring in which a pencil is placed.
- The needle tip is placed at the respected point and pencil tip is adjusted to the height at least 1 mm just above the tip of the needle.



120. Which one of the following compasses is used to draw SMALL size circles?

- (a) Beam (b) Large
(c) Bow (d) Drop

Ans. (d) : Drop spring bow pencil and pen are designed for drawing multiple identical small circles.

Example– Rivet holes, drilled/reamed holes.

121. Radius curves is useful for drawing _____ fillet radii.

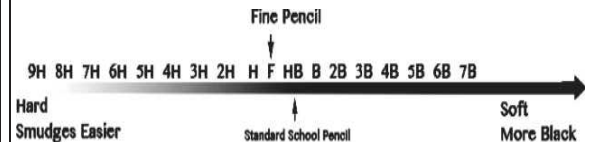
- (a) Internal (b) External
(c) Both (a) and (b) (d) None of these

Ans. (b) : Radius curves in useful for drawing external fillet radii.

122. Total number of grades of pencils available in the market is _____.

- (a) 9 (b) 6
(c) 15 (d) 18

Ans. (d) : Total number of pencils available in the market is 18.



- Generally in engineering drawing mostly HB, H, 2H and 4H pencils are used.

123. Apart from H and B grades, two other grades of pencils are _____.

- (a) 1H, 1B (b) 2H, 2B
(c) HB, F (d) FB, HB

Ans. (c) : Apart from H and B grades two other grades of pencils are HB & F.

HB — Medium soft

F — Grade H $\Rightarrow$ Harden than F, HB etc.

Grade B $\Rightarrow$ Soft than HB.

Grade	Uses
Hard Grade (9H, 8H, 7H, 6H, 5H, 4H)	Uses to draw light and fine lines
Medium Grade 3H, 2H, H, HB, B	Used for lettering and dimensioning

124. 6 B grade pencil is the softest pencil.

- (a) True (b) False
(c) Partially true (d) None of these

Ans. (a) : 6B grade pencil is the softest pencil.

9H $\Rightarrow$ Very hard grade pencil

7B $\Rightarrow$ Very soft grade pencil.

Grade	Uses
Hard Grade (9H, 8H, 7H, 6H, 5H, 4H)	Uses to draw light and fine lines
Medium Grade 3H, 2H, H, HB, B	Used for lettering and dimensioning
Soft Grade 2B, 3B, 4B, 5B, 6B, 7B	Used to draw thick and shiny lines

125. Centre lines, section lines are drawn using _____ pencil.

- (a) H (b) 2 H
(c) 3 H or 4 H (d) H B

Ans. (c) : Centre lines, section lines are drawn using 3H or 4H pencil

Lines	Pencil
Initial work and construction lines	H
Outlines, dotted lines, section plane lines, dimension line arrowheads	2H
Centre line, section lines	2H or 3H or 4H

126. Which set of lead grades has a grade out of sequence?

- (a) H, HB, B, 3B (b) 7B, H, F, 3H
(c) 6B, B, H, 4H (d) 9H, HB, B, 2B

Ans. (b) : 7B, H, F, 3H set of lead grades has a grade out of sequence.

3B ↑ Softest pencil
2B
B
HB
F
H
2H
3H
4H ↓ Hardest pencil

127. Which of the following is softest pencil?

- (a) 2B (b) 1B
(c) HB (d) H

Ans. (a) : From the following softest pencil is 2B, among 2B, 1B, HB, H.

- The increase in hardness is shown by the value of the figure put in front of the letter H.
- Similarly, the grade becomes softer according to the figure placed in front of the letter B.

128. Medium grade pencil is _____ grade.

- (a) 1B (b) HB
(c) H (d) None of the above

Ans. (b) : Medium grade pencil is HB grade.

HB– Soft grade pencils where considerable erasing is required to be done.

129. Which of the following is the lightest pencil?

- (a) 2 B (b) 1 B
(c) HB (d) H

Ans. (d) : Beginning of a drawing H or 2H pencil using it very lightly.

- H is the lightest pencil among 2B, 1B, HB and H.
- A 9H pencil is the hardest and lightest pencil.

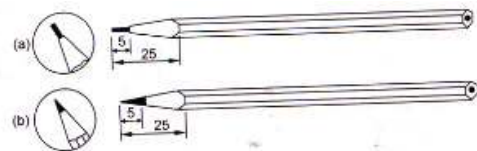
130. Which one of the following pencils has the hardest lead.

- (a) HB (b) H
(c) B (d) F

Ans. (b) : Among the following pencils H pencil has the hardest lead.

- 9H has the hardest graphite lead.
- The letter "H" is used to indicate the hardness of a pencil's mark.
- The highest the number to the "H" harder the pencil lead.

131. The pencil shown in Fig. (a) is sharpened as _____.

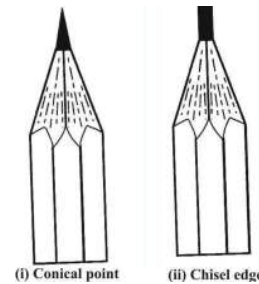


- (a) Conical pound (b) elliptical edge
(c) Chisel edge (d) Round

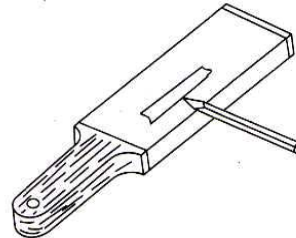
Ans. (c) : The pencil shown in fig. is sharpened as chisel edge.

Chisel edge– Used for drawing long thin lines of uniform thickness.

- This edge is prepared by rubbing the lead on a sand paper block.



132. The item shown in Fig. is known as _____.



- (a) Sand paper block (b) Erase
(c) Rubber (d) Erasing shield

Ans. (a) : The item shown in figure is a sand paper block.

- Sand paper block consists of a wooden block about 150 mm × 50 mm × 12 mm thick with a piece of sand paper pasted (or) nailed on about half of its length.

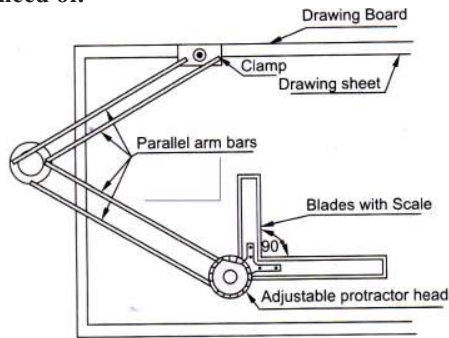
133. The eraser generally used for engineering drawing is _____ pencil rubber.

- (a) Soft black (b) Soft white
(c) Hard white (d) Hard green

Ans. (b) : The eraser generally used for engineering drawing is soft white pencil rubber.

- It should be such as not to spoil the surface of the paper.

134. The mini drafter shown in Fig. eliminates the need of.



- (a) Scale and set squares (b) T-square
(c) protractor (d) All of these

Ans. (d) : The mini-drafter shown in the figure eliminates the need of following—

- (a) Scale & set-squares
(b) T-square
(c) Protractor.

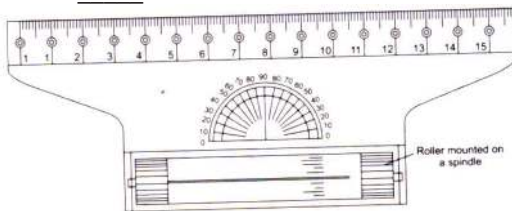
135. A drafting machine serves the functions of ____.

- (a) Protractor (b) Scale
(c) Tee and set squares (d) All of these

Ans. (d) : A drafting machine serves the functions of protractor, scale and Tee & set squares all of these.

- The uses and advantage of the T-square, set squares scale and protractor are combined in the drafting machine.

136. The drawing instrument shown in Fig below is ____.



- (a) Mini drafter (b) Drafting machine
(c) Roll-n-draw (d) None of these

Ans. (c) : The drawing instrument shown in figure is a roll-n-draw.

- It consists of graduated roller, scale of 16 diameter and protractor.
- It is ideal for drawing vertical lines, horizontal lines, angles and circle.

137. During operation of drafter, the two arms of the drafter remain at ____.

- (a) 45° (b) 90°
(c) 180° (d) Any angle

Ans. (b) : During operation of drafter, the two arms of the drafter remain at 90° .

- Two blades of transparent celluloid accurately set at right angles to each-other.

138. To fix the drawing sheet on the drawing board, present practice is to use ____.

- (a) Cello tape (b) Clips
(c) Gum (d) Both (a) and (b)

Ans. (d) : To fix the drawing sheet on the drawing board, present practice is to use cello tape and clips.

- They are used to fix the drawing sheet firmly in position to the drawing board.
- Care should be taken while removing the clips or tapes otherwise the sheet may tore.



139. BIS specifies D-series of drawing boards and T-series of T-squares. The drawing board and T-squares are specified in ____ sizes respectively.

- (a) 5, 5 (b) 4, 4
(c) 5, 4 (d) 4, 5

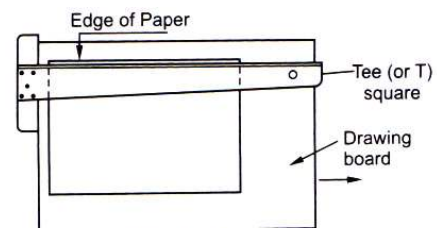
Ans. (c) : The sizes of drawing board recommended by the bureau of Indian standard (IS : 1444 - 1989) are—

Sl. No.	Designation	Size (mm)
1.	D0	$1500 \times 1000 \times 25$
2.	D1	$1000 \times 700 \times 25$
3.	D2	$700 \times 500 \times 15$
4.	D3	$500 \times 350 \times 15$

The standard 'T' square are designated as follows with—

Sl. No.	Designation	Blade length
1.	T0	1500
2.	T1	1000
3.	T2	700
4.	T3	500

140. Figure below shows a set of drawing board. T-square. The total number of ebony edges (s) is :



- (a) 1 (b) 2
(c) 3 (d) 4

Ans. (b) : For a given set of drawing board T-square has 2 ebony edges.

- T-square is used to draw vertical, inclined or mutually parallel lines.
- The head also has an ebony edge which slides against the working edge of the board.

EXAM POINTS

- These longer side of A0 drawing sheet is– **1189 mm**
- The width of A4 size paper/sheet is– **210 mm**
- The ISO designation of sheet of size 594 mm × 841 mm is– **A1**
- Indian standard specifies _____ number of A series of drawing papers/sheets– **5**
- The smallest size drawing sheet as per ISO-A series has a designation of– **A3**
- The area of trimmed A0 size sheet is _____ sq. metre– **1**
- The area of A0 × 2 size (i.e. 2 A0) sheet is– **2 m²**
- If width (shorter side) of A1 drawing paper is 594 mm, the longer side if A2 paper is– **594 mm**
- The width (or shorter side) of A4 sheet is 210 mm, its longer side can be determined by multiplying 210 with– **$\sqrt{2}$**
- A1 papers can be cut from A0 size paper– **2**
- The number of A2 size sheet that can be cut from one A0 size sheet is– **4**
- A4 size sheets are available in one A0 size sheet– **16**
- The ratio of short side to long side (or width to length) of A size series of sheets is– **$1:\sqrt{2}$**
- What is the ratio of height and width of a portrait drawing sheet is to be microfilmed– **$\sqrt{2}:1$**
- Why always a ratio of **$1:\sqrt{2}$** is kept between the sides of A series sheets– **For microfilming**
- A1 size sheet sometimes also known as “imperial size” sheet. The size of half imperial size sheet is– **420 × 594 mm**
- The area of A1 size sheet is– **$\frac{1}{2} \text{ m}^2$**
- The available size of grid papers in the market is limited to– **A4 and A3**
- The ISO A3 sheet has a measure of 297 × 420 mm. The size A3 × 3 will be– **420 × (3 × 297 = i.e 891 mm)**
- The ISO size of A4 sheet is 210 × 297 mm. The size of A4×3 sheet will be– **297 × 630 mm**
- The ISO size of A4 sheet is 210 × 297 mm. The size of A4 × 5 sheet is– **297 × (210 × 5 ≈ 1051 mm)**
- A4 × 2 sheet is actually– **A3 sheet**
- A0 × 2 sheet size is– **1189 × 1682 mm**
- A typical layout of drawing sheet does not contain– **Identification mark**
- Centering marks are provided in A0 sheet is– **4**
- Orientation mark(s) are provided in A0 sheet– **1**
- The standard size of title block is– **185 × 65 mm**
- The title block used on working drawings should not includes– **Line type**
- A title block contains all of the following information except– **Parts list**
- The essential item(s) in a title block is/are– **Revision no., Date of revision and Previous revisions with dates**
- The title block should not contain– **Details of MTO, Signature of the head of organisation and Detail of reference no. of other related drawings**
- The title block is placed in the right hand– **Bottom corner**
- The following is not included in title block of drawing sheet– **Size of sheet**
- Engineering drawings are generally made in landscape position for the ease is– **Reading the drawing**
- Types of papers / sheets are used for engineering drawings– **5**
- “Paramtrace” is– **Polyester tracing film that film that does shrunk or expand for drawing required for longer time.**
- The size of 2 A0 sheet is– **1189 mm × 1682 mm**
- A0 size sheets are mostly used in– **Chemical, Civil and Mechanical engineering**
- Border lines on a drawing sheet are provided for purpose of– **Defining working space**
- As per Indian Standard SP 46 : 2003 a border of _____ mm width is recommended for A0 and A1 drawing sheets/paper– **20**
- As per SP 46 : 2003 the recommended border width for A2, A3 and A4 size sheets is– **10 mm**
- When several prints are to be kept in the form of a book, the border on the _____ side of the drawing sheet should be more– **Left**
- Copies of printed A3 drawings are to be kept in a cabinet. The width of the border lines should be– **10 mm**
- Centering marks provided on a standard drawing sheet– **4**
- Zoning or grid reference system on a drawing sheet is provided for easy location to– **Identify the subsequent modification(s)**
- Zone B3 is nearer to _____ of the sheet– **Left top corner**
- Zoning areas on the drawing sheet are– **Rectangles**
- The revision on a drawing is indicated by making _____ around the revised portion of the drawing– **Bubble**
- A drawing has several fold. The size of one fold containing the title block is– **297 × 210 mm**
- The folded sheet in the given Fig. _____ has only one fold. It is _____ sheet– **A3**
- When a revision ‘0’ is further revised for some modification, the mark  is put _____ of the drawing sheet– **At the location of modification**

- When Rev 1, of a drawing is issued subsequently in Rev 2, the previous mark of revision 1 i.e.  and bubble are— **Deleted**
- Revised number of the drawing is indicated in the title block by Rev. No such as 2, 3, 4 etc and—
Date issue of revised drawing
- Information in a title block are— **Specific**
- Which ever method is adopted for folding the drawing sheet, _____ should always be visible on the folded drawing— **Title block**
- Drawings are generally not folded— **A4 size**
- When a complete drawing runs into 3 sheets, the sheets no. are marked as— **1 of 3, 2 of 3, 3 of 3**
- When complete drawing runs into several sheets, all the used sheets of— **Same size**
- The place on the drawing sheet where all the revision number with date are recorded is _____ of the sheet— **Title block**
- Whenever one particular drawing is revised (out of total number of drawings), the title block is to be updated— **Only of the revised drawing**
- When a drawing is made in the portrait position, in A4 sheet, the title block is generally for 65 × _____ width— **full**
- Whenever an engineering drawing is issued to third party, the purpose of the issuance of drawing is— **Always indicated**
- The drawing board has _____ebony edge (s)— **2**
- The drawing board is generally made of _____strips of soft wood— **4 to 6**
- The thickness of the drawing board generally varies form _____ **15 to 25 mm**
- BIS standard (IS 1444 : 1989) specifies _____ sizes of drawing boards— **5**
- As per (IS 1444 : 1989), the width of any drawing board should not exceed— **1220 mm**
- The part of the drawing board on which the stock/head of the T-square slides— **Ebony edge**
- Battens are provided on the drawing board for _____ of the board—
- Strengthening, Preventing bending and Ease of handling**
- As per IS 1360 : 1989 T3 is to used for— **A3 sheet**
- Of the two parts of Tee-square (or T- square), one is the stock and the other is— **Blade**
- Two parts of a Tee-square are— **Stock and blade**
- The angle between the stock and working edge of T-square should be— **Exactly 90°**
- T-square slides on the drawing sheet parallel to the _____ of the board— **Length**
- Tee-square (or T-square) can be used for drawing only— **Horizontal lines**
- Tee-square is designated by— **Blade length**
- The plastic or steel metric scale used in the construction of engineering drawings has a minimum division of— **1 mm**
- The maximum accuracy of a plain scale is considered to be— **0.5 mm**
- Plain scales used for engineering drawing work are made of— **steel, plastic and wood**
- Scales may be flat or _____ cross section—
Triangular
- Plain scales are available in— **15, 30 cm length**
- 15 cm. plain scale is 2 cm wide while 30 cm. scale is— **3 cm. wide**
- Plain scales are generally— **1 mm thick**
- More than 1 mm thick scales are generally _____ on their marked edge for ease of taking measurement— **Beveled**
- The Marking on the scale is done with— **Black colour**
- A protractor is usually graduated in _____ degree divisions— **1**
- The protractor can be used to make—
Complementary and Supplementary angles
- To measure or draw any angle— **Protractor is used**
- Any angle can approximately be divided into any number of equal parts with the help of— **Protractor**
- A protractor should not be used to make lines—
Horizontal, Vertical and Inclined
- From the protractor we can measure angles only into— **Degrees**
- A protractor is an angle measuring instrument which is readable from— **2 sides**
- Protractor used in engineering drawings are generally made from—
Transparent celluloid, tin and wood
- Protractor can be used to draw any angle upto— **360°**
- For engineering drawing the number of set square used is— **2**
- The set square are usually made of—
Plastic, Transparent celluloid
- The angle which we cannot made using a single set square is— **75°**
- With the use of a single set square, we can make—
Adjacent angles, Supplementary angles and Complementary angles
- With the use of a single set square, we can make _____ angle to any existing acute angle—
Complementary, Supplementary angle
- With the use of a single set-square we can make angle of— **Less than 75° and More than 75°**
- 60°/30° set square has a _____ length than a 45°/45° set square— **Longer**
- 60°/30°, 45°/45° set squares are used for drawing—
Vertical and Inclined lines
- 60°/30°, 45°/45° set squares should not be used for drawing— **Horizontal lines**
- Using a 60°/30° set square we can draw angles of— **90, 60 and 150 degrees**
- Using a 45°/45° set square, we cannot draws angles of such as— **60°**

- 45°/45° and 60°/30° set squares used simultaneously with a T-square can produce angles of—**15°, 75° and 105°**
- 60°/30°, 45°/45° set squares can be used to make complementary angle of any stated angle—
Only for 15°, 30°, 45°, 60°, 75°
- For drawing vertical lines on a drawing sheet using drawing board and T-square, additional item needed is—**Any one 60°/30° or 45°/45° set square**
- Angles in multiple of 15° are normally constructed by the combined use of _____ and _____ and T-square—**30°/60° and 45°/45° set square**
- Set-squares are not used for drawing—
Curved lines
- An adjustable set square can be used to draw any angle between—**0° to 90°**
- Clinographs are used to—**Draw parallel lines**
- With the combination of T and set-squares, the following angle cannot be drawn—**25°**
- To draw large size circles _____ is attached with compass—**Lengthening bar**
- Drop spring bow pencil is used for drawing—
Multiple identical small circles
- Bow instruments have adjusting—**Nut, Wheel**
- Compasses is used to draw very large circles by—
Beam
- Linking pen is used for _____ in ink on drawing curves—**Drawing straight lines**
- Which of the following purpose is not served by a divider—
Make full size, reduced size of enlarged size drawing
- A compass can be used to draw—**Circles and Arcs**
- Which one of the following compasses is used to draw SMALL size circles—**Drop**
- French curves are not used for drawing—
Circles, Straight lines
- French curves are used for drawing—
Part of a circle
- To draw smooth curves of any size, the drafting instrument is—**French Curve**
- It is used for drawing curves which cannot be drawn by compass—**French curves**
- French curves are generally made of—
Plastic material
- In bigger size set-squares, for ease of handling, some irregular shapes are cut in the body of set squares. These irregular shapes are known as—
French curves
- To draw a smooth curve of any nature, draughting instruments used is—**French curve**
- French curves are used to draw—
Where the radius of curvature varies
- French curves are normally available in sets of—**6, 12, 16**
- Radius curves is useful for drawing _____ fillet radii—
External
- _____ is used for setting-off short equal distances—
Bow divider
- The range of dividers can be—**Extended**
- Circles of very small radii are drawn by using a—
Bow compass
- The main ingredients of lead pencil are—
Graphite and clay
- Softer grades of pencil have—**Less clay**
- Total number of grades of pencils available in the market is—**18**
- Apart from H and B grades, two other grades of pencils are—**HB, F**
- 3H grade pencil is _____ than 2 H grade pencil—
Harder
- 2B grade pencil is _____ soft and _____ blackness pencil than 3B grade pencil—**Less, less**
- This grade of pencils are used for drawing light construction work—**2H, 3H**
- Which grade of pencil are used for dotted lines, centre line, hidden details, dimensions—**2 H**
- Drawing pencils are grade according to increase in relative—**Hardness**
- Initial work and construction lines are drawn using—
H pencil
- Centre lines, section lines are drawn using—
3 H or 4 H pencil
- Pencils can be sharpened to—
Chisel point and cone point
- The wooden pencils for drawing work are available in standard length and of _____ section of the wood—
Hexagonal
- It is generally not used in engineering drawing—**3 B**
- This set of lead grades has a grade out of sequence—**7B, H, F, 3H**
- Medium grade pencil is—**HB grade**
- It is the lightest pencil—**H**
- This pencils has the hardest lead—**H**
- Instead of Keeping so many grades of pencils, it is sufficient to keep the _____ grades of pencils—
H, HB, 2H
- For Construction line work, the pencils generally used are of—**2 H and 3 H grade**
- Lead is not integral part of—**Mechanical pencil**
- Usual pencils require frequent re-sharpening and greater skill to lines. The type of pencil does not require re-sharpening—**Mechanical**
- This type of pencil usually give uniform thickness for a longer time—**Mechanical**
- The lead available in normal pencils is of _____ thickness than for the lead used with mechanical pencils—**Higher**
- For drawing thin lines of uniform unknown the pencil should be sharpened in the form of—
Chisel edge
- Pencil of grade sharpened in the form of _____ is used for sketching and lettering—**Conical**
- Leads used in clutch pencil are available in—
Black colour

- Pencil of ____ grade sharpened in the form of ____ are used for sketching and lettering–
Soft, conical
- For drawing the lines of uniform thickness the pencil should be sharpened in the form of–
Chisel edge
- The hexagonal wooden section of lead pencils is provided to–
Prevent rolling down of pencils from drawing board
- A drawing instrument set usually contains all of the following except–
Extra leads
- The available lead diameter for mechanical pencils is–
0.3, 0.5, 0.7 and 0.9
- The eraser generally used for engineering drawing is ____ pencil rubber–
Soft white
- Erasing shield is used for–
Erasing mistakes
- To rub a portion of straight line, or curved line, use is made of eraser with–
Erasing shield
- To make nearly accurate drawings, which of the following is not–
Pen used
- The functions of erasing shield and soft rubber are–
Complementary
- A drafting machine serves the functions of–
Protractor, Scale and Tee and set squares
- A drafting machine is sometimes called–
Pantagraph
- The scales available of mini drafter or drafting machine are beveled on both sides, graduated to–
1 : 1, 1 : 2
- The artificial light on the drawing board should be diffused from–
Top
- In lead pencils, the lead becomes softer as the numeral figure ____ along with H letter on the pencil–
Decreases
- During operation of drafter, the two arms of the drafter remain at–
90°
- To fix the drawing sheet on the drawing board, present practice is to use–
Cello tape, Clips
- Cello tapes used for fixing the drawing paper on to the board are generally of ____ mm width–
10
- It is not essential thing for free hand sketches–
French curves
- A cotton duster is required for–
Cleanliness of drawing sheet during making a drawing
- For same quality of line work, during rainy season–
A slightly harder pencil is to be used
- BIS specifies D-series of drawing boards and T-series of T-squares. The drawing board and T-squares are specified in ____ sizes respectively–
5, 4
- The ratio of the length in the drawing to its corresponding length of an object, when both the lengths are in same unit is called–
RF
- When a 10 mm long line of a drawing represents 1 metre length of the object, the R.F.–
 $\frac{1}{100}$
- If a 2 mm long edge of an object is shown by a line 1 cm long, the R.F.–
5
- Available M1 to M8 cardboard scale have–
Reducing scales
- The cardboard scales to M8 are–
Reducing scales
- M8 cardboard scale is the available highest reducing scale and it has reducing scale(s) of–
1 : 2000 and 1 : 1000
- Scale selected for drawing a component is 1 : 5, the type of scale to compare the given ratio is–
Enlarged
- To show a small detail of a component, ____ scale is used–
Enlarging
- The enlarged scale is used for showing details of–
Small objects
- The R. F. in the case of enlarged scale is–
> 1
- If 100 m of length is drawn as 10 cm. on a drawing sheet the R.F. of the scale–
< 1
- If a scale is stated as X : 1, where X is a whole number and (greater than 1), then it indicates–
Enlarging scale
- RF on a drawing indicates–
Length of a in the drawing/Actual length of the line on the object
- The scales generally used in engineering drawing are–
Plain scale and Diagonal scale
- The length of the scale to be drawn is–
Maximum length required to be measured × RF
- When the drawing is drawn of the same size as that of the object, the scale used is–
Full size
- When measurements are required in three units, this scale is used–
Diagonal
- The scale of chords is used to set out or measure–
Angles
- A scale of chords is used to measure–
Angles
- Circular vernier scale is used to measure–
Angles
- Circular vernier scale is usually used by–
Surveyors
- In a vernier scale least count is–
1 msd – 1 vsd
- The vernier scale has–
2 scales
- In isometric is–
Linear scale
- An area of 144 sq. cm on a map represents an area of 36 sq. km. The RF is–
 $\frac{1}{50000}$
- When drawing a component of 100 mm × 40 mm on a reduced scale of 1 : 2, the dimension on the drawing of this component are shown as–
50 mm and 20 mm
- A diagonal scale is used to show–units of measurement–
3
- 1 metre is represented by 10 mm on a drawing. The R.F.–
 $\frac{1}{100}$
- Isometric scale is–
Reducing scale

2.

Symbolic Representation

Symbolic Representation of Conventions

- Various types of fasteners, sections, joints etc. used in Engg. drawing are represented or shown by symbols.
- By this drawings are made easily and fastly.

◆ Representation of conventions

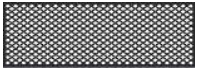
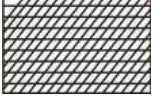
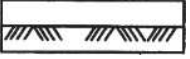
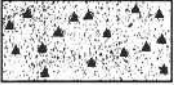
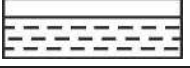
- Engg. Drawings are completely based on convention.
- By the using of this convention, we can make drawing of any objects easily and can understand the drawing in a very low time consuming.
- As per **ISO 696 : 1972**, Convention of various parts or objects, materials etc. are recommended –

- Conventional Representation of Materials
- Conventional Representation of Breaks
- Conventional Representation of Rivets and Bolts
- Conventional Representation of Welding
- Conventional Representation of Roughness of surface
- Conventional Representation of Machine Elements, Parts and Operation
- Symbolic Representation of Fasteners
- Conventional Representation of Pipe Fitting and Valve Joints
- Conventional Representation of Various Beams, Pipes and Rods
- Symbols of Electronics and Electrical Elements

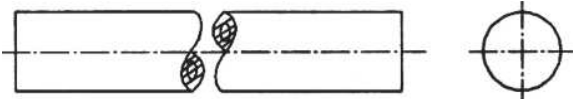
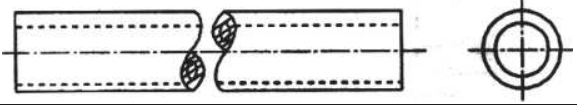
A. Conventional Representation of Materials

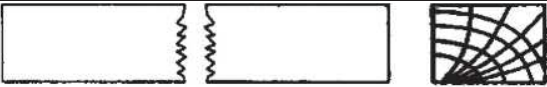
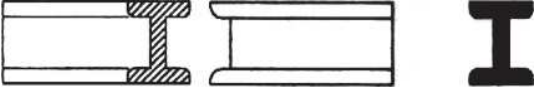
- The conventions for materials are used to represent various materials in section which saves time, labor and makes drawing simple.

S. No.	Material	Conventions
1.	Steel	 Or

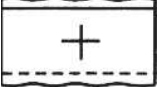
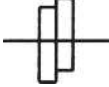
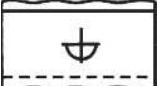
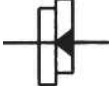
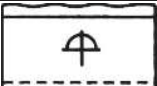
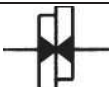
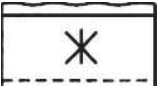
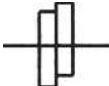
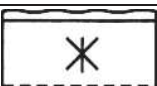
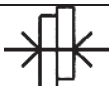
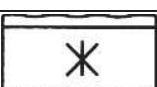
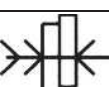
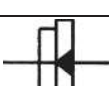
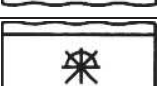
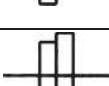
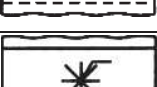
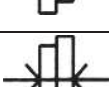
		
2.	Zinc, Tin, White metal etc.	
3.	Brass, Bronze, Gun metal etc.	
4.	Cast iron, Aluminium and its alloys etc.	
5.	Plastic, Rubber, Packing material, Marble, slate, Porcelain, Stone, Asbestos, Fibre, Felt, Synthetic resin products, Paper, Press-phan, Cork Linoleum, Leather, Wax insulating and filling materials etc.	
6.	Wood, Plywood etc.	
7.	Earth, Rubble etc.	
8.	Brick-work, Masonary, Concrete, Fire bricks etc.	
9.	Water, Oil, Petrol, Kerosene etc.	
10.	Glass	

B. Conventional Representation of Breaks

S.No.	Object	Convention
1.	Rectangular Section	
2.	Round Section	
3.	Pipe	

4.	Tubing	
5.	Wood Rectangular Section	
6.	Rolled Section	
7.	Channel Section	

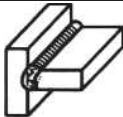
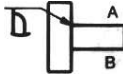
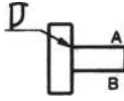
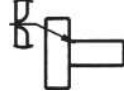
C. Conventional Representation of Rivets and Bolts

Description	Pictorial Representation	Method of Drawing in	
		View	Section
Rivet General			
Rivet, Countersunk on Back Side			
Rivet, Countersunk on Front Side			
Rivet, Counter Sunk Back And Front Side			
Bolt, General			
Bolt, to Distinguish from the Rivet			
Bolt , Place of Nut Indicated (nut)			
Bolt , Head Countersunk on Back Side			
Bolt, Head Countersunk on Front Side			
			
Bolt to Fit on site			

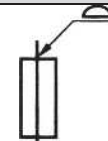
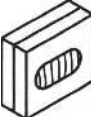
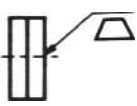
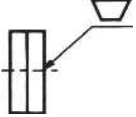
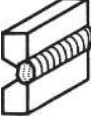
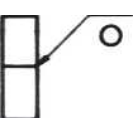
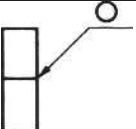
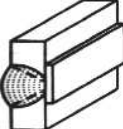
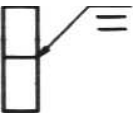
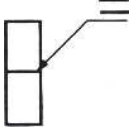
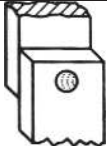
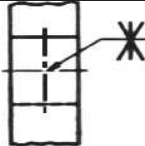
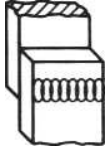
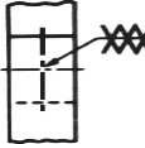
S.No.	Holes and rivets	Symbols	
		Axial view	Lateral view
1.	Drilled in the Workshop		
2.	Drilled on site		
3.	Fitted in the workshop		
4.	Fitted on site		
5.	Drilled and fitted on site		

(D.I) Conventional Representation of Welding

Types of Welds	Welded Joint	Symbol	Symbolic Representation			Sectional Representation
			Weld on the Arrow size	Weld on the Other Side	Weld on the Both Sides	
Single and Doubles						
Single and Double Square fillet						
Single-V Butt						
Double-V Butt						
Single-U Butt						
Doubles-U Butt						
Single Bevel Butt						

Double Bevel Butt						
Single-J Butt						
Double-J Butt						

D.II Conventional Representation of Welding and Symbols

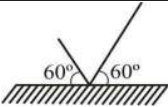
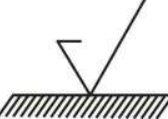
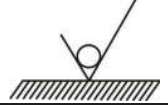
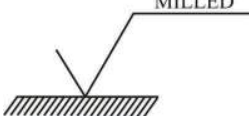
Types of Welds	Welded Joint	Symbol	Symbolic Representation		Sectional Representation
Bead Edge or Seal					
Plug or Slot					
Sealing Run					
Backing Strip					
Spot					
Seam					

E. Conventional Representation of Roughness of surface

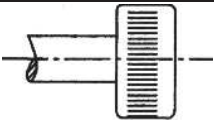
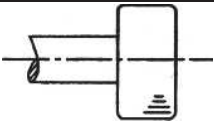
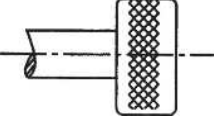
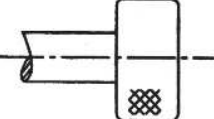
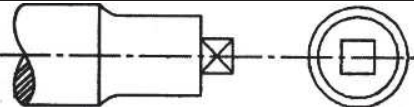
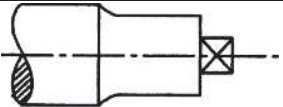
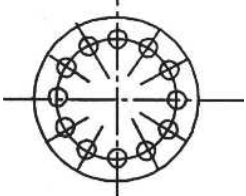
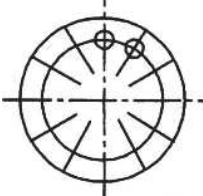
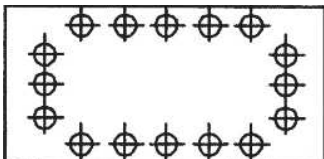
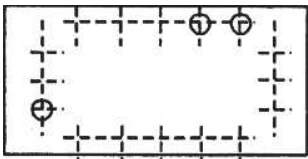
(S.No.)	(Convention)	Objects
1.		Surface, which is finished by drill
2.		Surface, which is finished by grinding
3.		Surface, which is finished by Machine
4.		Finish of surface up to n ⁺ roughness number

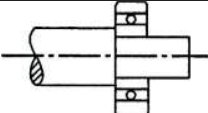
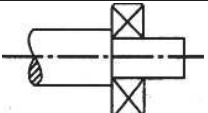
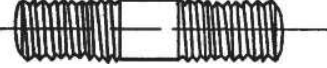
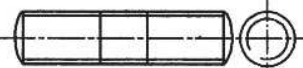
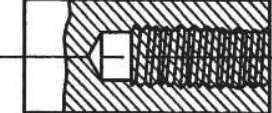
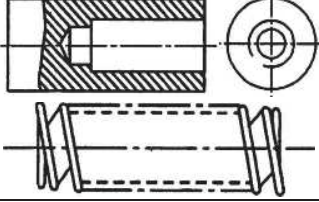
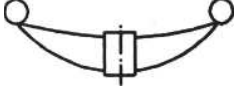
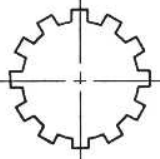
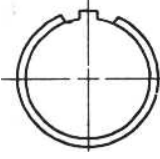
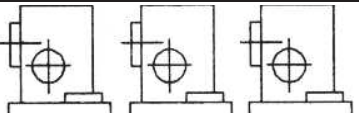
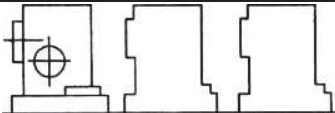
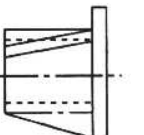
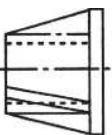
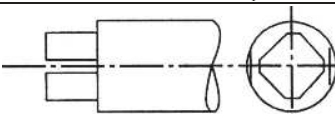
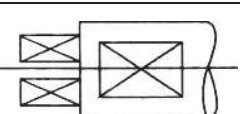
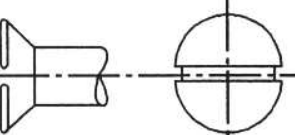
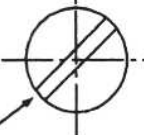
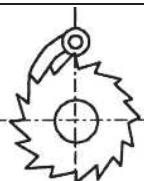
5.	M.20 × 1.5	Metric thread, which has 20mm diameter and 1.5 mm pitch
6.		Threaded surface
7.	6φ8	6 holes of diameter of 8mm
8.	H5	Tolerance of hole (H) has 5 grade
9.	±	Maximum and minimum limitations of tolerances
10.	CBR	Counter bore operations

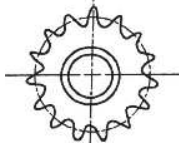
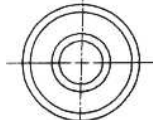
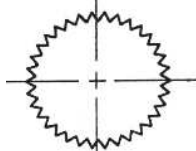
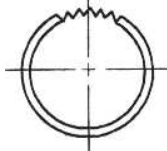
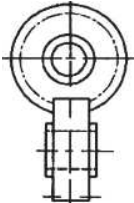
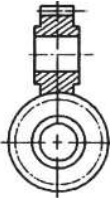
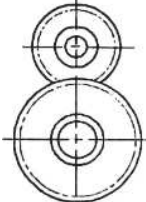
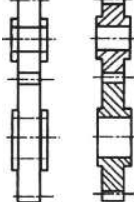
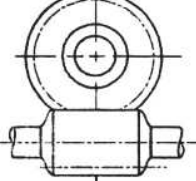
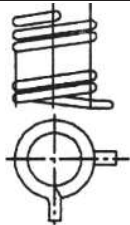
★ Symbols used for indication of surface roughness

Basic symbol	
Symbol of surface where machining or material removal required	
Symbol of surface where machining or material removals are not required	
Milled surface	

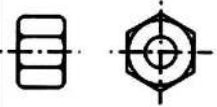
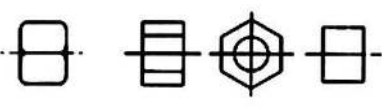
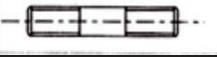
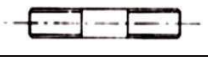
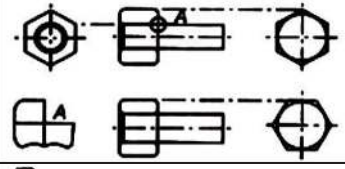
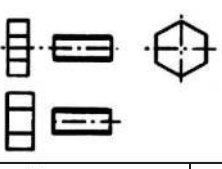
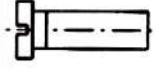
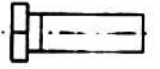
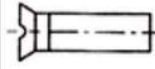
F. Conventional Representation of Machine Elements, Parts and Operation

S.No.	Subject	Object	Convention
1.	Straight Knurling		
2.	Diamond Knurling		
3.	Square on Shaft		
4.	Holes on circular pitch		
5.	Holes on a Linear Pitch		

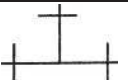
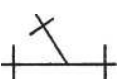
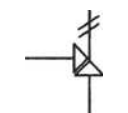
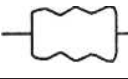
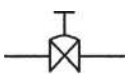
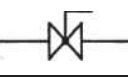
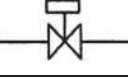
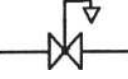
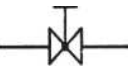
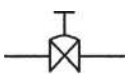
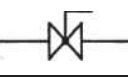
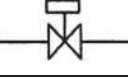
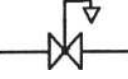
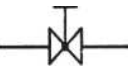
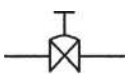
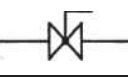
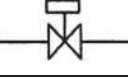
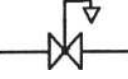
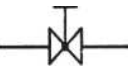
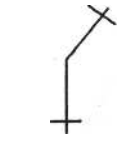
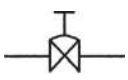
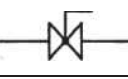
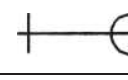
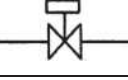
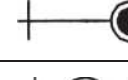
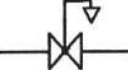
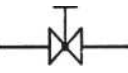
6.	Bearing		
7.	External Thread		
8.	Internal Screw Thread		
9.	Compression Springs		
10.	Tension Spring		
11.	Leaf Spring		
12.	Splined Shafts		
13.	Repeated Parts		
14.	Radial Ribs		
15.	Square End and Flat		
16.	Slotted Head Screw		
17.	Ratchet and Pinion		

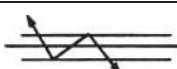
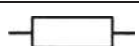
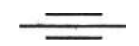
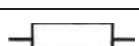
18.	Chain Wheel			
19.	Serrated Shaft			
20.	Spur Gear			
21.	Spur/Helical Gears			
22.	Worm and Worm Wheel			
S.N.	Name	Subject		Convention
		View	Section	
1.	Helical Tension Spring			
2.	Helical Torsion Spring			
3.	Compression Spring with Square Section			

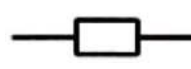
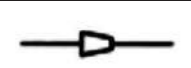
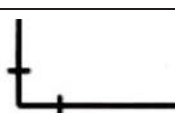
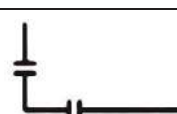
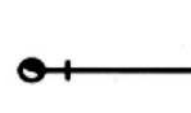
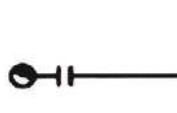
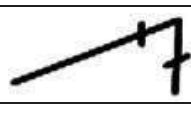
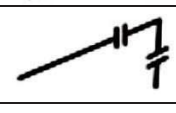
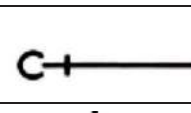
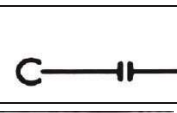
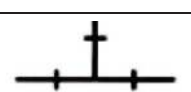
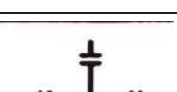
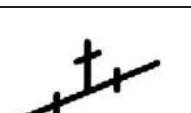
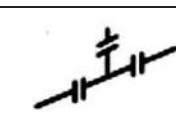
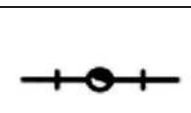
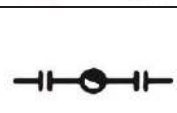
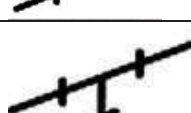
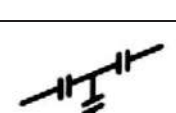
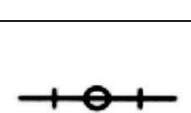
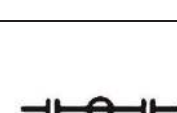
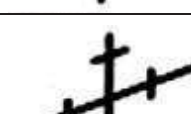
G. Symbolic Representation of Fasteners

S.N.	Types of fasteners	Exact drawing	Simplified drawing	Symbol
1.	Nut			
2.	Stud bolt			
3.	Hex head bolt			
4.	Cheese head screw			
5.	Countersunk head screw			

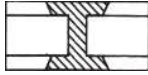
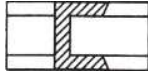
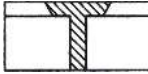
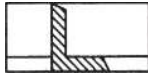
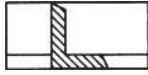
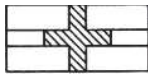
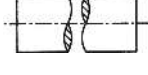
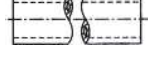
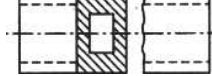
H. Conventional Representation of Pipe Fitting and Valve Joints

Pipe Fittings	Symbols	11. Tee Outlet Up															
1. Cross		12. Gate Valve															
2. Tee		13. Globe Valve															
3. Sleeve		14. Angle Valve															
4. Lateral joint		15. Safety Valve															
5. Expansion joint		<table><tr><th>Pipe Fittings Valve</th><th>Symbol</th></tr><tr><td>1. Diaphragm Valve</td><td></td></tr><tr><td>2. Ball Valve</td><td></td></tr><tr><td>3. Solenoid Valve</td><td></td></tr><tr><td>4. Float Valve</td><td></td></tr><tr><td>5. Butterfly Valve</td><td></td></tr><tr><td>6. Regulating Globe Valve</td><td></td></tr></table>		Pipe Fittings Valve	Symbol	1. Diaphragm Valve		2. Ball Valve		3. Solenoid Valve		4. Float Valve		5. Butterfly Valve		6. Regulating Globe Valve	
Pipe Fittings Valve	Symbol																
1. Diaphragm Valve																	
2. Ball Valve																	
3. Solenoid Valve																	
4. Float Valve																	
5. Butterfly Valve																	
6. Regulating Globe Valve																	
6. 45° Elbow		1. Diaphragm Valve															
7. 90° Elbow		2. Ball Valve															
8. Elbow Down		3. Solenoid Valve															
9. Elbow Up		4. Float Valve															
10. Tee outlet Down		5. Butterfly Valve															
		6. Regulating Globe Valve															

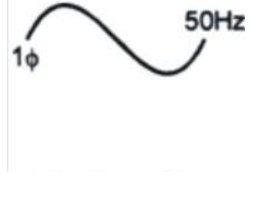
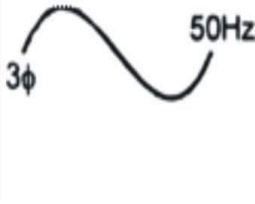
7. Plug Valve		14. Y-Type Strainer	
8. Control Valve		15. Jacketed Lines	
9. Float Valve		16. Hose lines	
10. Flexible Hose		17. Orifice	
11. Steam Trap		18. Concentric Reducer	
12. Insulation			
13. Sight Glass			

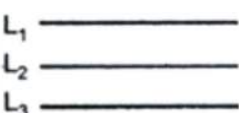
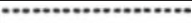
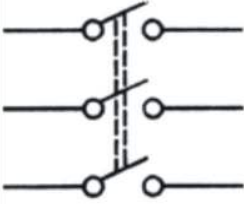
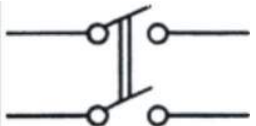
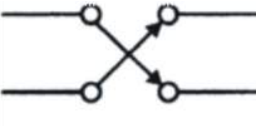
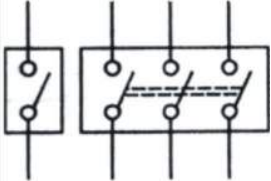
Sr. No.	Description	Isometric symbol		Orthographic symbol	
		Screwed	flanged	Screwed	Flanged
1.	Joint / Coupling				
2.	Reducer				
3.	90° elbow				
	(i) Turned up				
	(ii) Turned down				
	Tee				
	(i) Turned up				
	(ii) Turned down				
5.	Cross				

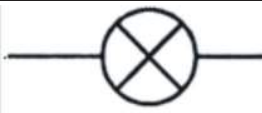
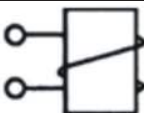
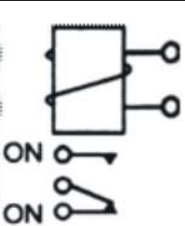
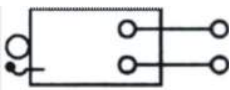
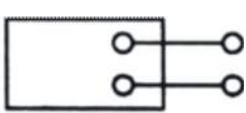
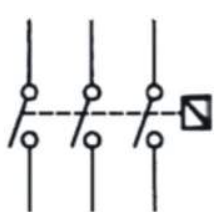
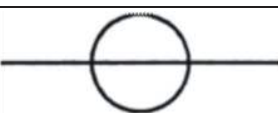
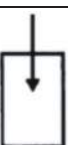
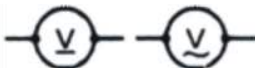
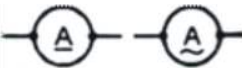
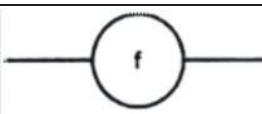
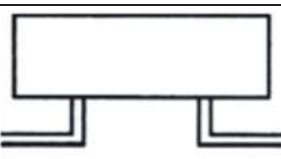
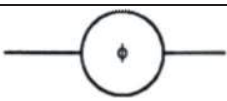
H. Conventional Representation of various Beams, Pipes and Rods

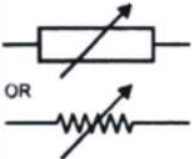
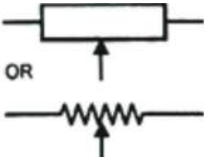
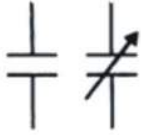
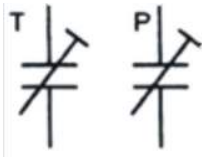
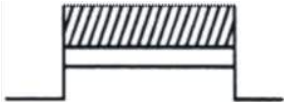
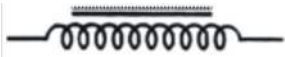
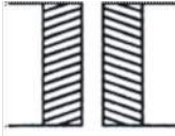
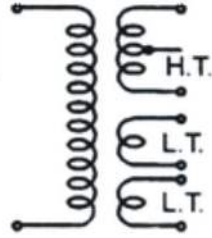
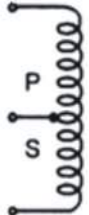
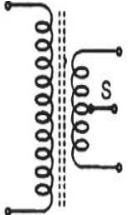
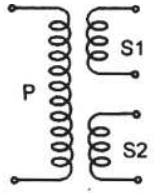
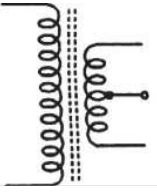
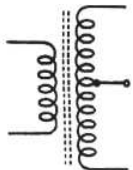
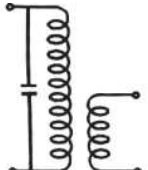
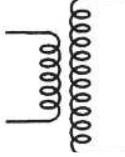
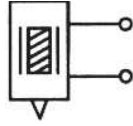
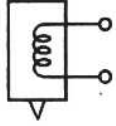
S.No.	Material	Conventions	Sectional side views
1.	I-beam or rolled section		
2.	Channel section		
3.	Tee-section		
4.	Unequal angular section		
5.	Equal angular section		
6.	Cross-beam section		
7.	Rectangular section		
8.	Round rod section		
9.	Round pipe section		
10.	Rectangular pipe section		

J. Symbols of Electronics and Electrical Elements

			
A . C.	A.C. Single Phase	A.C. Three Phase	D. C.

			
AC/DC	Negative	Positive	3-Phase line
			
Neutral Line	Earth Line	Shielded Line	Earth
			
Crosse Wire	Joints of Wires	Cell	Battery
			
Single Pole Switch	Push Button Switch	Two-way Switch	D.P.D.T. Switch
			
I.C.T.P. Swtich	I.C.D.P. Switch	Intermediate Switch	Oil Circuit Breaker
			
Socket 2-pin, 3-pin	Link	Fuse	Ceiling Rose 2-pin, 3-pin

			
Lamp	Fan Regulator	Electromagnet	Relay
			
Electric Bell	Buzzer	Contacts - NO, NC	Three Phase Contactor
			
Aerial	Star, Delta Connection	Overhead Line	Lightening Arrester
			
Fault	Ohm Meter	Overhead Line	Ammeter
			
Frequency Meter	Watt Meter	Energy Meter	Power Factor Meter
			
A.C. Motor	D.C. Motor	3-Phase Slip Ring Motor	3-Phase Squirrel Cage Motor

			
Alternator	Generator	Resistor Fixed	Resistor Variable
			
Adjustable Resistor	Capacitor Fixed Variable	Trimmer	Electrolytic Capacitor
			
Capacitor Gang	Choke	L.F. Choke	R.F. Choke
			
Transformer	Main Transformer	Auto Transformer	Battery Eliminator Transformer
			
Push-pull Transformer	Input Push-pull Transformer	Output Push-pull Transformer	I.F. Transformer
			
R.F. Transformer	Rectifier diode	Crystal Pick-up	Dynamic Pick-up