## All India (English Medium)

# ENGINEERING DRAWING Study Material & Solved Papers

<u>Useful for</u>: RRB ALP & Technician, RRB JE, RRB SSE, Rajasthan Water Resource Department JE, MP Vyapam JE, Central Diploma JE & Technician (DRDO, ISRO, IOF, MES), SAIL, BHEL, NTPC, Coal India Ltd., VIZAG STEEL, HAL, NCVT (Fitter, Machinist, Turner, Electrician, Carpenter).

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### <u>ALP/Technician Online Exam Syllabus</u> <u>Second Stage (CBT)</u>

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

### <u>Trend Analysis of Previous Year Engineering Drawing</u> <u>Papers Through Bar Graph and Pie Chart</u>





6



### INTRODUCTION TO ENGINEERING DRAWING

<ul> <li>▲</li> <li>▲</li> <li>▲</li> </ul>	Basics of Engin Language of a represents his/h dimensioning an It is the grap containing all shape, size etc. engineering corr (It is a g Artistic Drawing	neering Drawing an engineer by which he/she can be imagination on paper with proper accuracy. bhical representation of an object necessary information like actual required for the manufacturing of an nponent. Drawing : graphical representation)	• * 1.	2D ⇒ Two-Dimensional, 3D ⇒ Three-Dimensional Hence, Engineering drawing is also known as the universal language of engineers or engineer's language. Some of the common terms used to described technical drawing includes (a) Drafting (b) Engineering graphics (c) Engineering Drawing (d) All of these RRB ALP & Tech. 21.01.2019 Shift-I
	or Model drawin	g) made by use of instrument)	An dra	us. (d): Common terms used to described technical awing includes–
1.	Classification of Engg. Drawing1. Geometrical Engg. Drawing• Art of representation of geometrical objects on paper e.g. rectangle, cube, cylinder, sphere etc.		1. 2. 3. 4. <b>2.</b>	Drafting Engineering graphics Engineering drawings CAD (computer aided design) Advertisements and company manuals
2.	Mechanical	<ul> <li>i. Plain G.DArt of representation of 2D objects on paper.</li> <li>Ex. square, hexagon, rectangle etc.</li> <li>ii. Solid G.DArt of representation of 3D objects on paper.</li> <li>Ex. sphere, cone, cylinder, pyramid etc.</li> <li>Art of the representation of mechanical energy parts or</li> </ul>	An ger • con tha	generally contain drawings.         (a) Orthographic       (b) Scaled         (c) Graphical       (d) Isometric         RRB ALP & Tech. 23.01.2019 Shift-III         is. (c) : Advertisement and company manuals         nerally contain graphical drawings.         Graphic designers rate visual concepts, using         mputer software or by hand, to communicate ideas         it inspire, inform and captivate consumers.         'Indicative' drawing of any discipline is just
3.	Drawing Civil Engg. Drawing	<ul> <li>mechanical engg. parts or machine parts and machine tool parts on paper.</li> <li>e.g. drawing of tool parts, IC engine parts, automobile parts etc.</li> <li>(ÆAlso called Machine drawing)</li> <li>Art of the representation of civil engg. objects on paper.</li> </ul>	S.	indicative drawing of any discipline is just         for         (a) Broad idea         (b) Coordination with other departments         (c) Legal purposes         (d) None of these         RRB ALP & Tech. 08.02.2019 Shift-I         is. (a) : Indicative drawing of any discipline is just
	0	e.g. drawing of buildings, road,	for	broad idea.
4.	Electrical Engg. Drawing	<ul> <li>Art of the representation of electrical engg. parts on paper.</li> <li>e.g. drawing of circuits', motors, generators, transformers etc.</li> </ul>	4.	rurnitureorawingaregenerallydrawings.(a) Symbolic(b) Pictorial(c) Freehand(d) (b) and (c)RRB Kolkata Jr. Engineer-II Electrical/DRG &
5.	Electronics Engg. Drawing	<ul> <li>Art of the representation of electronics engg. objects on paper.</li> <li>e.g. drawing of electronic circuit, T.V. circuits, computers etc.</li> </ul>	An dra • T Per	<b>Design 11.06.2006</b> <b>is. (b) :</b> Furniture drawing are generally pictorial awings. There are 3 types of pictorial drawings— rspective, isometric, oblique.

Introduction to Engineering Drawing

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5.	The number of drawings in any engineering discipline is		<ul><li>(b) Electrical components</li><li>(c) Electronic components</li></ul>
	(a) fixed		(d) All of (a) (b) and (c)
	(b) not fixed	1	RPR Allababad Signal Maintainer II 22 01 2006
	(c) need-based	<b>1</b>	(a) · Las matrice durantice a
	(d) according to BIS	Ans.	(a) : Isometric drawing–
	(d) according to DIS <b>DDB</b> Secondershed Section Engineer (Civil)	• Iso:	metric drawing is a particular drawing style where
	KKB Secunderabad Section Engineer (CIVII)	the a	ngle between the X, Y and Z axes are all $120^{\circ}$ .
Ang	(a) • The number of drawings in any engineering	10.	Electrical engineering drawings generally
Ans.	(c): The number of drawings in any engineering		consist of
uisci	A second se		(a) Wiring diagrams
0.	A company often uses specific item in its		(b) Connection details of electric equipment
	for this item and this standard drawing is		(c) Motor and generator drawings
	referred to in its other related drawings. This		(d) All of these
	standard drawing is known as	_	RRB JE Ranchi Yellow Paper 04.01.2015
	(a) BIS drawing	Ans.	(d) : Electrical engineering drawing generally
	(b) ISO standard drawing	consi	st of–
	(c) Company standard drawing	(a) W	Viring diagrams
	(d) Interchangeable drawing	(b) C	onnection details of electric equipment
	(d) Interchangeable drawing DDB Thirwyononthonurom Section Eng	(c) M	lotor and generator drawing
	(Mechanical) 04 01 2009	11.	Electric drawing are generally made for
<b>A</b> ma	(internancial) 04.01.200)		(a) Circuit diagram
Ans.	(c): A company often uses specific item in its		(b) PCB track drawings
and t	his standard drawing is referred to in its other		(c) (a) and (b)
relate	d drawings		(d) Welding drawings
This	standard drawing is known as- company standard		DMRC Station Controller, 09.09.2007
drawi	ng.	Ans.	(c) : Electrical drawing are generally made for-
7	Chemical engineering (process engineering	circu	it diagram and PCB track drawings
	drawings) are generally	Simp	le electric circuit
	(a) Flow diagrams		
	(b) Contain arrows for directions for flow of		
	liquids/gas slurry		T Light bulb
	(c) Contain symbols		
	(d) All of these		Switch
RR	B Bangalore Section Engineer (Civil) 01.02.2009	12.	Electrical drawings are generally
Ans.	(d) : Chemical engineering are generally-		drawings.
(a) Fl	ow diagrams		(a) Dimensioned
(b) C	ontain arrows for directions for flow of liquids/gas		(b) Symbolic
slurry			(c) Abbreviation
(c) C	ontain symbols.		(d) Graphical
8.	Mechanical engineering drawings generally		RRB Patna/Allahabad ESM-II, 30.01.2011
0.	consist of	Ans.	(b) : Electrical drawing are generally symbol
	(a) Equipment foundation drawings	draw	ings.
	(b) Mechanical component drawings	For e	g
	(c) Electrical connection		
	(d) (a) and (b)		
	RRB Bhubaneswar App. Electrical . 19.08.2001		Fault Ohm Overhead
Ane	(a) • Mechanical engineering drawing generally		
consi	(a) . Meenamear engineering drawing generally st of equipment foundation drawings	13.	Civil engineering drawings generally consist
0	Isometric drawings consist of		
7.	(a) Machanical components		(a) Koom layout
	(a) with annual components		(b) Equipment foundation
Introd	luction to Engineering Drawing	8	YCT

(c) Building drawings (d) All of these	<b>Ans. (b) :</b> A mechanical engineering drawing is a 2 dimensional administration of these dimensional
(d) All of these <b>BDB</b> Kelliste Technical III 20.09 2006	dimensional visual representation of three-dimensional
Ans. (d) : Civil engineering drawing generally consist of-	• A 2D drawing view is a representation of a 3D part
• Room layout	(or) assembly that is placed on a drawing sheet.
• Equipment foundation	• A drawing view represents the shape of the object
Building drawing	when viewed from various standard directions, such
14. Which of the following discipline drawings are	
generally dimensioned drawings?	18. Since an engineering drawing is used as a
(a) Mechanical (b) Civil	it must be
(c) Architectural (d) All of these	It must be
RRB Bangalore Technical (Eng.), 22.04.2007	(a) Clear
Ans. (d) : Mechanical, civil, architectural all of these	(b) Concise
discipline drawings are generally dimensioned drawings.	(c) Accurate $(1)$ All $f(x)$ $f(x)$ $f(x)$
• Besides showing the true shape of an object must	(d) All of (a), (b) and (c) $(a) = a + b + b + b + b + b + b + b + b + b +$
supply its length, breath, height sizes providing this	BHEL Hyderabad Fitter 2014
information on a drawing is called dimensioning.	Ans. (d) : Engineering drawings are used to
15. A simple or common engineering drawing is	communication design ideas and technical information
drawing.	to engineers and other professionals throughout the
(a) Pictorial	design process.
(b) Orthogonal drawing	• It must be clear, concise, accurate, they should convey
(c) Artistic	when required.
(d) All of (a), (b) and (c)	19. A mechanical engineering drawing should
DRDO 2015	convey, when required
Ans. (a) : A simple or common engineering drawing is	(a) Information about the shape of components
pictorial drawing.	(b) Size of components
• An engineering drawing is a type of technical drawing	(c) Instruction about the method of manufacture
that is used to convey information about an object.	(d) All of (a), (b) and (c)
16. Figure below shows the drawing of a bracket.	DRDO Fitter 2016
It is a drawing.	Ans. (d) : A mechanical engineering drawing should
	convey, when required information about the shape of
$\langle O \rangle$	components, size of components and instruction about
	the method of manufacture.
	20. A formal engineering drawing may consists of
(a) Artistic (b) Pictorial	the following
(c) Engineering (d) None	(a) One or more views of an engineering
RRR Chennai Section Eng. 12.02.2012	components (object) or an assembly of
Ans (b) · Dictorial view describes the angle in which a	components
three dimensional object is depicted on a drawing surface.	(b) A title block for drawing number, explanatory
• Pictorial drawing can be divided into three main	(a) A title block for quick identification and
subcategories that all describe different views-	(c) A little block for quick identification and traceability of the drawing
1. Isometric	(d) All of (a) (b) and (c)
2. Oblique	(d) All of (a), (b) and (c) $\mathbf{D}\mathbf{D}\mathbf{D}\mathbf{O}$ Turner 2016
3. Perspective.	DRDO Turner 2010
17 A mechanical engineering drawing is a	Ans. (d) : In general a formal engineering drawing may
dimensional visual representation of three-	(a) One on more views of on one
dimensional objects.	(a) One or more views of an engineering component
(a) One (b) Two	(b) Dimensional assembly of components.
(c) Multi (d) None	(b) Dimensions, symbols, explanatory and instruction
RRB Chandigarh Section Eng. (Civil). 26.02.2012	noies.
	(c) A ULLE DIOCK.
Introduction to Engineering Drawing	9 YCT

21. In India we follow the standard for	Ans. (a) : Detailed drawing–
mechanical engineering drawing.	• A 'detail drawing' is a drawing of a single component
(a) IS : 696	assembly of multiple parts, or an entire system of
(b) SP 46 : 2003	assemblies.
(c) Company standard drawing	• A detail drawing provides complete and precise
(d) (b) and (c)	descriptions of a parts dimensions, shape.
DRDO Motor Mechanic 2016	25. Different engineering disciplines require
Ans. (d) : In India we follow the SP 46 : 2003 and company	different types of engineering drawings.
standard drawing for mechanical engineering drawing.	Orthographic drawings are generally required
22. All engineering drawing should be produced	for
using appropriate drawing standard and	(a) Machine components
conventions for the following reasons	(b) Instrument connections
(a) Savings of time	(c) Electrical wiring
(b) Professional	(d) Piping layouts for a process plant
(c) Portability	NTPC Fitter 2014
(d) All of (a), (b) and (c).	Ans. (a) : Orthographic drawings are generally required
DRDO Mechanic Diesel 2016	for machine component.
Ans. (d) : All engineering drawings should be produced	• Orthographic reading is the ability to visualize the shape
using appropriate drawing standard and conventions for	of an object from its drawing is orthographic view.
Time. It gread up the drawing process by making life	26. Three-dimensional solid objects are usually
easier this reduces costs and also reduces the 'lead-time'	represented on a detail drawing using
Appearance The consistent use standards and	(a) Oblique projection
conventions not only serve to make drawing look more	(b) orthographic projection
professional but it also improve the image.	(c) Isometric projection
<b>Portability</b> – Drawing produced to international	(d) Axonometric projection
standards and conventions can be read and correctly	(RRB JE (Shift-III), 26.08.2015)
interpreted by any trained engineer anywhere in this	Ans. (b) : Three-dimensional solid objects are usually
country (or) abroad.	represented on a detail drawing using orthographic projection.
23. For correct understanding, we make	• In the orthographic projection an object is
engineering drawings.	represented by two or three view on the mutual 1 <sup>er</sup>
(a) Perspective view	projection plans.
(b) Section views	• Each projection view represents 2D of an object.
(c) Orthographic drawing	27. A typical drawing of a hexagonal bolt will
(d) All of (a), (b) and (c) $(A + B) = (A + B) = (A + B)$	show
SAIL Bokaro Steel Plant 2016	(a) All details with dimensions (for example
Ans. (d) : For correct understanding, we make	length and diameter) to be decided for the
perspective view, section view and an orthographic in	specific purpose
	(b) Variations in the hexagonal head
24. Drawing that has all the information required to make the components part is called	(c) Variations in the hexagonal head
(a) Detailed drawing (or detailed engineering	(d) All of (a), (b) and (c)
(a) Detailed drawing (of detailed engineering drawing)	(RRB SSE Secunderabad (yellow), 21.12.2014)
(b) Industrial drawing	Ans. (b) : A typical drawing of a hexagonal bolt will
(c) standard drawing	show the all details with dimensions (for example
(d) all of (a), (b) and (c)	length and diameter) to be decided for the specific
Vizag Steel Fitter 2015	purpose, variation in the hexagonal head.
Introduction to Engineering Drawing 1	0 YCT

28. The illustrated drawing complicated assembly of the type shown in figure are of usually oneview representation of a components or an 'exploded view' showing a number of components separated from each other but in their sequential order for assembly. Is it technically a correct statements?



- (a) Yes
- (b) No
- (c) Depends upon situation to situation
- (d) None

#### (RRB JE Mumbai (Shift-II), 27.08.2015)

**Ans. (a) :** Exploded view show how a product can be assembled and how the separate parts fit together with dotted lines showing where the parts slide into place.

- 29. Exploded (or blown-up) view drawings are used to show the various\_\_\_\_\_.
  - (a) Sectional view
  - (b) sequence of assembly of various parts of a component
  - (c) Details of a component
  - (d) All of these

(RRB JE Bhopal Paper-I (Shift-II), 28.08.2015)

**Ans. (b) :** An exploded view drawing is a type of drawing, that shows the intended assembly of mechanical or other parts.

• It shows all the parts of the assembly and how they fit together.

- 30. Blown up (or exploded) drawings are generally used in\_\_\_\_.
  - (a) Company technical literature
  - (b) Training manuals
  - (c) assembly drawings
  - (d) All of these

#### (UPRVUNL JE 2014)

Ans.	(d)	:	Blown	up	(or	exploded)	drawing	are
gener	ally ı	ise	d in–					
(a) As	sseml	bly	drawing	3				
(b) Tı	rainin	ıg ı	manuals					
(c) Co	ompa	ny	technica	al lite	eratu	re.		

- Drawings for service engineers must show the relationship between the assembled parts clearly and in such a way that the parts can be quickly identified by using\_\_\_\_\_.
  - (a) First-angle orthographic projection
  - (b) Third-angle orthographic projection
  - (c) Perspective drawing
  - (d) Exploded views

#### (M.P. Vyapam 09.07.2017, 9 am)

Ans. (d) : Exploded views– An exploded-view drawing is a diagram, picture, schematic or technical drawing of an object, that shows the relationship or order of assembly of various part.

- 32. Technical drawing is an important communication tool \_\_\_\_\_.
   (a) In industries
  - (b) Between organization
  - (c) Between countries
  - (d) All of (a), (b) and (c)

#### **COAL India Fitter 2013**

**Ans. (d) :** Technical drawing is essential for communicating ideas in industry and engineering.

- To make the drawings easier to understand between organization and countries.
- 33. An engineering drawing is only a means of recording the intensions of the designer and communicating these to the manufacture. Now cheaper methods of communication such as CAD where the drawings are stored digitally on magnetic or optical disks and can be transmitted between companies by the internet. However, hard copy, of printed drawing, still has to be produced\_\_\_\_\_.
  - (a) For the inspection or the technician to work with
  - (b) For legal contract agreement
  - (c) For immediate reference during discussion
  - (d) For all of (a), (b) and (c)

#### **CRPF** Constable Tradesman 2016

**Ans. (d) :** An engineering drawing is only a means of recording the intensions of the designer and communicating these to the manufacture. Now cheaper methods of communication such as CAD where the drawings are stored digitally on magnetic or optical disks and can be transmitted between companies by the internet. However, hard copy, of printed drawing, still has to be produced for the inspection or the technician to work with, for legal contract agreement and for immediate reference during discussion.

**Introduction to Engineering Drawing** 

34. Extensive use of related symbols is seen in the drawings related to discipline.	Ans. (c) : The bill of material found on engineering drawing for quantity of different items required for the
(a) Electrical	item.
(b) Instrumentation	• It includes all alternative and substitute part number
(c) Architectural	and parts contained in the drawing notes.
(d) All of (a). (b) and (c)	<b>39.</b> What is not mentioned in the 'Title Block' of
(d) 111 of (d), (d) and (d) HAL Fitter 201	an engineering drawing?
<b>Ans</b> (d) · Extensive use of related symbols is seen in	(a) Date of issue (b) Rev. Number
the drawings related to-	(c) Validity (d) None
Electrical, instrumentation, architectural.	THDC Electrician 2015
35. engineering drawings for manufacture	<b>Ans. (c) :</b> Validity is not mentioned in the title block of
are heavily dimensional referenced drawing.	engineering drawing.
(a) Electrical	• Title block contain, name of the firm, title of the
(b) mechanical	drawing, scale, drawing no, method of projection etc.
(c) Electronic	40. When a drawing A in someway is related to
(d) All of (a), (b) and (c)	other drawings such as B, C, D etc., it is
Mazagon Dock Shipbuilders Ltd. Fitter 201.	the
Ans. (b) : Mechanical engineering drawings for	(a) Reference number of a drawing
manufacture are heavily dimensional referenced drawing.	(b) Full description of A drawing
• Mechanical drawing or drafting, is a technique used	(c) Discipline of A drawing
to represent a 3D object on a 2D piece of drawing	(d) No reference required
paper.	RRB Kolkata Supervisor (P.Way), 20.02.2000
36. While issuing a drawing it is necessary to	Ans. (a) : Reference no. of a drawing required to be
specify the purpose of the drawing.	mentioned when a drawing A in someway is related to
(a) True (b) False	other drawing such as B, C, D etc.
(c) Sometimes (d) None	41. A drawing has been in Rev. 1. It is
Indian Ordnance Factory Fitter 201	subsequently issued in Rev. 2. While issuing
Ans. (a) : It is a true statement, while issuing a drawing	Rev. 2 drawing, what items are deleted?
it is necessary to specify the purpose of the drawing.	(a) Rev. I and its date from the fille block (b) The grid reference and corrections of Poy. 1
37. In assembly drawings, sometimes the BOM is	issue
given. The meaning of BOM is	(c) Reasons for issuing the Rev. 1
(a) Balancing of materials	(d) None
(b) Bought out materials	<b>RRB JE 2014</b>
(c) Bill of material	Ans. (b) : A drawing has been in Rev. 1. It is
(d) None	subsequently issued in Rev. 2 while issuing Rev. 2
MES Electrician Tradesman 201	drawing the grid reference and corrections of Rev. 1
Ans. (c) : The meaning of BOM in assembly drawings	issue items are deleted.
is bill of materials.	42. The drawing number of a particular drawing
• On a traditional assembly drawing the identifiers for	does not contain
components and part drawings are defined by a written	(a) Linear dimension of the drawing sheet
list, a "bill of materials" BOM.	(b) $A_1, A_2$ etc series of paper size
38. The Bill of material sometimes found on	(c) The name of user $(1)$
engineering drawings is for	(d) (a) and (c) DDD IE 2015
(a) Cost of material	KKB JE 2015
(b) Material in stock	Ans. (a): The drawing number of a particular drawing
(c) Quantity of different items required for the item	(a) Linear dimension of the drawing sheet
(d) None	(b) The name of user
IOF 2014	
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### **DRAWING INSTRUMENTS**

#### **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	l.

#### 1. Drawing Board



- 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

**Drawing Instruments** 

DesignationTo be  
used  
with  
sheetSize (in mm) :  
(Length ×  
Width ×  
Thickness)Name
$$D_0$$
 $A_0$ 1500×1000×25Antiquarian $D_0$  $A_0$ 1500×1000×25Double  
Elephant $D_1$  $A_1$ 1000×700×25Double  
Elephant $D_2$  $A_2$ 700×500×15Imperial $D_3$  $A_3$ 500×350×15Half Imperial $D_4$  $A_4$ 350×250×15Quarter  
Imperial $\bullet$ Mostly imperial size ( $D_2$ ) drawing board is used in

 Mostly imperial size (D<sub>2</sub>) 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  $\rightarrow$  (1) Stock (2) Blade
- Stock and blade joined together at right angle (90°) by means of screw and pins.



- 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.

#### Constant Constant

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



GradeUsesHard grade(9H,Used to drawlight and fine	Pencils are made by various companies. e.g. Vinus Short hand, Kutubminar, Artiste, Kohinoor, Naturei Amare etc.
8H, 7H, 6H, 5H, lines 4H)	<ul> <li>Now a days mechanical pencils or clutch pencils are mostly used.</li> </ul>
Medium gradeUsed for lettering and(3H, 2H, H, HB, B)dimensioning	6. Set-Square
<b>Soft grade</b> Used to draw thick and shiny	> Triangular in shape & are made of celluloid or
6B, 7B)	<ul> <li>plastic materials.</li> <li>&gt; Used for drawing all straight lines except the</li> </ul>
S Important Points-	horizontal lines which are usually drawn with the
• HB denotes $\Rightarrow$ Medium, soft • Grade H $\Rightarrow$ Harder than F HB etc	Vertical lines can be drawn with the T-square and
• Grade $B \Rightarrow$ Soft than HB	the set-square.
Generally in Engg. drawing mostly HB, H, 2H, and	> They are – (i) $30^\circ - 60^\circ - 90^\circ$ set square
4H pencils are used.	(ii) $45^{\circ} - 45^{\circ} - 90^{\circ}$ set square
and lettering works.	45°   45° 30° 30° 30°
$\swarrow$ 2H & 3H Pencils $\Rightarrow$ Used for drawing dimension	$\times$
lines, centre lines and projection lines. $H \rightarrow U_{read}$ for drawing dimension batching	45 \45 30
lettering, circle curves.	/30"
Lead of hard pencil has small diameter where as	45
lead of soft pencil has comparatively greater	
Neat clean, and precision drawing depends on	
pencils.	
drawing	(a) 45° SET SQUARE (b) 30° - 60° SET SQUARE
The lead of pencils may be sharpened to two different	t Length of $30^{\circ}-60^{\circ}-90^{\circ}$ set square $\Rightarrow 250 \text{ mm}$
forms-	⇒ Length of $45^{\circ}$ – $45^{\circ}$ – $90^{\circ}$ set square ⇒ 200 mm
1. Conical point 11. Chisel edge	The two set squares are used simultaneously along
	with the T-square will produce lines making angles
	of 15°, 75°, 105° etc. ( $\swarrow$ Multiple of 15°)
	Made of wood steel celluloid or plastic
	<ul> <li>Edges of the scale are marked with division of</li> </ul>
	centimeters which are sub-divided into millimeters.
	1 4 A
$\bigstar$ Conical point $\Rightarrow$ Used in sketch work and fo	r i i i i i i i i i i i i i i i i i i i
lettering.	
E For making conical end, the pencil should be rotate between the thumb and fingers while rubbing the lead	
$\Rightarrow$ Chisel edge $\Rightarrow$ Used for drawing long thin lines of	f
uniform thickness.	Talinimum
A This edge is prepared by rubbing the lead on a same paper block.	STEEL RULE WOODEN SCALE
<ul> <li>Remember–</li> </ul>	$\succ$ Rustless steel scales are more durable.
<b>&gt;</b> Pencil lead is made of the composition of <b>graphite</b>	Scales may be flat or of triangular cross section.
and <b>clay</b> content.	▶ 15 cm long and 2 cm wide or 30 cm long and 3 cm wide flat scales are in common use
$9H \rightarrow \text{very nard grade pencil (Clay content})$ $7B \rightarrow \text{Very soft grade pencil (Graphite content})$	$\ll$ Both the longer edges of the scales are marked
When clay content $\uparrow \Rightarrow$ Pencil lead becomes light	with divisions of centimeters, which are sub-
and hardness $\uparrow$	divided into millimeters.
<b>x</b> When Graphite content $\uparrow \Rightarrow$ Pencil lead becomes	Scales are used to transfer the true or relative
dark and softness $\uparrow$	dimensions of an object to the drawing.
Drawing Instruments	15 YCT

#### 8. French Curve



**Drawing Instruments** 

#### 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.

➤ 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.



 $\blacktriangleright$  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).

Drawing Instruments



#### 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.

- ROLL-N-DRAW



#### 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



#### S Some important points–

- ★ Large size compass ⇒ For drawing more than 150 mm radius of circle
- ★ Lengthening bar ⇒ For drawing more than 150 mm radius of circle
- ☆ Small size compass ⇒ For drawing 25 to 50 mm diameter of circle
- $\Rightarrow$  Large size divider  $\Rightarrow$ 150 mm long

<ul> <li>★ Small size divider ⇒ 95 mm long</li> <li>★ Small size ink-bar compass ⇒ 95 mm long</li> <li>★ Small size pencil bar compass ⇒ 95 mm long</li> <li>★ Inking pen ⇒ Used for drawing straight lines and non circular arcs in ink.</li> <li>For drawing large circles and circular arcs, inking attachment should be fitted in place of the pencil leg in the compass.</li> <li>◆ Drawing standards-</li> <li>◆ International standards -</li> <li>▶ ISO is the leading world's largest voluntary</li> </ul>	Filling margin	<ul> <li>Left side ⇒ 20 mm to 30 mm (for A<sub>0</sub> and A<sub>1</sub>) and 10 mm (for A<sub>2</sub>, A<sub>3</sub> and A<sub>4</sub>) and other 3 sides, ⇒ 5 mm</li> <li>Frame shows the clear space available for the drawing purpose.</li> <li>Margin is provided in the drawing sheet by drawing margin lines.</li> <li>It is provided for taking performance for the purpose of filling the drawing sheets.</li> </ul>
<ul> <li>Iso is the leading world's largest voluntary developer for international standards and is responsible to specify the standards for product, service and good practice to ensure quality, safety and efficiency.</li> <li>ISO is referred and followed throughout the world for international trading of any product and its service.</li> <li>The ISO is a document that provides requirements, specifications, guidelines, or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their nurpose</li> </ul>	Title Block	<ul> <li>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.</li> <li>It contains the details of drawing, here we include the names of the persons who have designed and drawn.</li> </ul>
<ul> <li>purpose.</li> <li>BIS –</li> <li>It is the national body of India working under the support of ministry of consumer affairs, food and public distribution, Government of India.</li> <li>ISO : International Organization for Standard BIS : Bureau of Indian Standard IS : Indian Standard</li> <li>The latest BIS drawing codes ⇒ SP46 (2003) : Engineering drawing practice for schools and colleges.</li> <li>Layout of drawing sheets-</li> <li>It is defined by choosing suitable scale, providing proper margins, along title block, parts list, etc. on the drawing sheet.</li> <li>Minimum width</li> <li>(20 mm for A0 and A1 (20 mm for A0 and A1)</li> </ul>	Grid references	<ul> <li>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.</li> <li>The number of divisions should be divisible by two and be chosen in relation to the complexity of the drawing.</li> <li>It is also called a zone system as the grids divide the sheets into zones.</li> <li>The grid reference systems along the width are referred by alphabets A,B, C, D</li> <li>The grid reference systems along the length are referred by numerals 1,2, 3,4</li> </ul>
Borders and Frames Borders and Frames	Folding marks	<ul> <li>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. A<sub>0</sub>, A<sub>1</sub> and A<sub>2</sub> are divided into a number of equal zones.</li> <li>A revision panel is drawn either attached to the title block above it or in the top right-hand corner of the sheet.</li> <li>The revisions are recorded in it giving the revision number, date, zone etc. and also the initials of the approving authority.</li> <li>Folding marks are made in the drawing sheet.</li> <li>They are helpful in folding of prints in proper and easy manner.</li> </ul>











32.	Plain scales used	l for engineering drawing work	(a) Triangular scale
	(a) steel	_• (b) plastic	(b) Isometric scale
	(a) steel	(d) all of (a) (b) and (c)	(d) (a) and (a)
	(c) wood	DRDO Turner 2016	(d) (a) and (c) $(\mathbf{PRR} \ \mathbf{SSE} \ \mathbf{Sacundarabad} \ (vallow) \ 21 \ 12 \ 2014)$
Ans	(d) · For engine	ring drawing work plain scales	(RRB SSE Secunderabad (yearw), 21.12.2014)
mad	e of wood steel ce	lluloid plastic (or) card board	Ans. (a): The scale shown in fig. is triangular scale.
inaci	Stainless steel scale	s are more durable	• Scale may be flat or of triangular cross-section.
22			• It is made of wood, steel, celluloid or plastic.
33.	(a) square	(b) triangular	• The edges of the scale are marked with division of
	(a) square	(d) none of these	De the test sub-divided into minimeters.
	(c) any section	DBDO Motor Mechanic 2016	• Rustless steel scales are more durable.
Ans	(b) : Scales may b	e flat or triangular cross-section.	• 15 cm long and 2 cm wide or 30 cm long and 3 cm wide flat scales are in common use.
34.	Plain scales are	available in length.	• Both the longer edges of the scales are marked with
011	(a) $15 - 30 \text{ cm}$	(b) 15 20 cm	divisions of centimeters, which are sub-divided into
	(c) $20.30 \text{ cm}$	(d) $25, 40 \text{ cm}$	millimeters.
	(0) 20,000	DRDO Mechanic Diesel 2016	• Scales are used to transfer the true or relative
Ans	(a) · Plain scales a	re available in 15, 30 cm length	dimensions of an object to the drawing.
35	15 cm nlain se	ale is 2 cm wide while 30 cm	40. The protractor shown in Fig. is graduated into
55.	scale is cn	1. wide.	divisions
	(a) 1	(b) 3	and a standard and a
	(c) $4$	(d) 1.5	10 10 00 00 00 100 170 00 00 100 100 100
		SAIL Bokaro Steel Plant 2016	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
Ans	( <b>b</b> ) : 15 cm plain	scale is 2 cm wide while 30 cm	
scale	is 3 cm wide.		
36.	Plain scales are	generallymm thick.	$(a) 1/2^{a}$ (b) 1 <sup>a</sup>
	(a) 1	(b) 2	$\begin{array}{cccc} (a) 1/2 & (b) 1 \\ (c) 10^{\circ} & (d) 180 \\ \end{array}$
	(c) 3	(d) 1.5	(C) 10 (d) 100 (RRR IF Mumbai (Shift-II) 27.08.2015)
	(-) . <b>D</b> 1 1	Vizag Steel Fitter 2015	<b>Ans</b> (b) · Protractor is made of wood tin (or) celluloid
Ans	(a) : Plain scales a	re generally 1 mm tnick.	<ul> <li>Its circumferential edge is graduated to 1° divisions</li> </ul>
37.	More than 1 n	im thick scales are generally	<ul> <li>Protractors of transparent celluloid are in common</li> </ul>
	On their i	narked edge for ease of taking	use.
	(a) Beveled	(b) Rounded	• A protractor is an instrument for measuring angles.
	(a) Develed	(d) None of these	• It is semi circular and is made of a flat celluloid
	(c) I blislied	NTPC Fitter 2014	sheet.
Ans	(a) • More than 1 m	m thick scales are generally haveled	41. A protractor is usually graduated in
on th	eir marked edge for e	ase of taking measurement	degree divisions.
38	The Marking or	the scale is done with	(a) $1/2^{\circ}$ (b) $1^{\circ}$
50.		i the scale is done with	(c) $10^{\circ}$ (d) $180^{\circ}$
	(a) Blue	(b) Green	(RRB JE Bhopal Paper-I (Shift-II), 28.08.2015)
	(c) Black	(d) any color	<b>Ans.</b> (b) : A protractor is usually graduated in $1^{\circ}$
	(-)	RRB JE (Shift-III), 26.08.2015)	divisions, is numbered at every 10 interval and is
Ans	(c) : The marking	on the scale is done with black	12 The protrector can be used to make
1 1115	(0) • • • • • • • • • • • • • •	, on the scale is done with chack	42. The protractor can be used to make
colo	ſ.		angles.
colo: <b>39</b> .	r. The scale shown	in Fig is .	(a) Complementary (b) Supplementary
colo: <b>39.</b>	The scale shown	in Fig is	(a) Complementary (b) Supplementary (c) (a) and (b) (d) None of these
colo: 39.	The scale shown	in Fig is pupulanpunpunpunpunpunpunpunpunpunpunpunpunpun	(a) Complementary (c) (a) and (b) (d) None of these (UPRVUNL JE 2014)
colo: <b>39.</b>	The scale shown	in Fig is	(a) Complementary (b) Supplementary (c) (a) and (b) (d) None of these (UPRVUNL JE 2014) (Ans. (c) : The protractor can be used to make





<b>Supplementary angle</b> – The pair of angles whose sum	61. Using a 60°/30° set square we can draw angles
Is equal to 180° are supplementary angles.	(a) 90 (b) 60
Let, the acute angle be a $C = 1 + C + C + C + C + C + C + C + C + C +$	(a) $50$ (b) $50$ (c) $150$ (d) All of (a) (b) and (c)
Complementary angle of $\mathbf{a} = (90 - \mathbf{a})$	DDB Bangalara Sastian Engineer (Civil) 01 02 2000
Also, supplementary angle of $a^{\circ} = (180 - a^{\circ})$	<b>KKB bangaiore Section Engineer</b> (Civit) 01.02.2009
Difference between supplementary and complementary angle = $(180 - a^{\circ}) - (90 - a^{\circ}) = 90^{\circ}$	Ans. (d) : Using a $60^{7}30^{\circ}$ set square we can draw angles of $30^{\circ}$ , $60^{\circ}$ , $90^{\circ}$ , $150^{\circ}$ all of these.
• Angle between 0 and 90 degree $0^{\circ} < \theta < 90^{\circ}$ are called acute angle.	62. Using a 45°/45° set square, we can not draws angles of such as .
57 With the use of a single set-square we can make	(a) $90^{\circ}$ (b) $45^{\circ}$
angle of	(c) $60^{\circ}$ (d) $135^{\circ}$
(a) Less than 75° (b) More than 75°	RRB Bhubaneswar App. Electrical , 19.08.2001
(c) Equal to $75^{\circ}$ (d) (a) and (b)	<b>Ans.</b> (c) : Using a $45^{\circ}/45^{\circ}$ set square, we can not draw
RRB ALP & Tech. 08.02.2019 Shift-I	angles of such as $60^{\circ}$ .
Ans (d) · With the use of single set-square we can	• Using a 45° set square we can measure (or) draw
make angle of less than $75^{\circ}$ and more than $75^{\circ}$	angles $45_{11}^{\circ}$ , 90°, 135° etc.
They are_	63. 45°/45° and 60°/30° set squares used
(i) $30^{\circ} - 60^{\circ} - 90^{\circ}$ set-square	simultaneously with a T-square can produce
(i) $45^{\circ} - 45^{\circ} - 90^{\circ}$ set square	angles of
• Vertical lines can be drawn with the T square and	(a) $15^{\circ}$ (b) $75^{\circ}$
the set-square	(c) $105^{\circ}$ (d) All of (a), (b) and (c)
$59 \qquad (09/200  set servers has a length the set$	RRB Allahabad Signal Maintainer-II, 22.01.2006
58. $60^{\circ}/50^{\circ}$ set square has alength than a $45^{\circ}/45^{\circ}$ set square	Ans. (d) : The two set squares used simultaneously
(a) Smaller (b) equal	along with the T-square will produce line making angles
(a) Smaller (b) equal	of 15°, 75°, 105° etc.
DDR Kolkata Ir Engineer II Floatricel	64. Using 45°/45° and 60°/30° set square with T-
DDC & Design 11.06.2006	square, a circle can be divided into
	equal parts.
Ans. (c): $60^{-7}30^{-5}$ set square has a longer length than a $45^{\circ}/45^{\circ}$ set square	(a) 6 (b) 8
45 /45 set square.	(c) 12 (d) All of (a), (b) and (c)
• The length of $00/50^\circ$ set square is 200 mm	<b>RRB JE Ranchi Yellow Paper 04.01.2015</b>
$\frac{1}{1000} \frac{1}{1000} \frac{1}{10000} \frac{1}{10000} \frac{1}{10000} \frac{1}{10000000000000000000000000000000000$	Ans. (d) : A circle can be divided in six, eight, twelve
59. 00-750-, 45-745- set squares are used for drawing lines	square
(a) Horizontal (b) Vertical	$\frac{54}{65} = \frac{60^{\circ}/30^{\circ}}{45^{\circ}/45^{\circ}}$ set squares can be used to
(a) Inclined (b) vertical	make complementary angle of any stated angle
RPR Secunderabed Section Engineer (Civil)	(a) Correct
29 06 2008	(b) Incorrect
27.00.2000	
Ans (d) · Set squares are used for drawing all straight	(c) Only for 15°, 30°, 45°, 60°, 75°
<b>Ans. (d) :</b> Set squares are used for drawing all straight lines except the horizontal line which are usually drawn	<ul> <li>(c) Only for 15°, 30°, 45°, 60°, 75°</li> <li>(d) None of these</li> </ul>
<b>Ans. (d) :</b> Set squares are used for drawing all straight lines except the horizontal line which are usually drawn with the T-square.	<ul> <li>(c) Only for 15°, 30°, 45°, 60°, 75°</li> <li>(d) None of these</li> <li>DMRC Station Controller, 09.09.2007</li> </ul>
Ans. (d) : Set squares are used for drawing all straight lines except the horizontal line which are usually drawn with the T-square. • $60^{\circ}/30^{\circ}$ $45^{\circ}/45^{\circ}$ set squares are used for drawing	<ul> <li>(c) Only for 15°, 30°, 45°, 60°, 75°</li> <li>(d) None of these</li> <li>DMRC Station Controller, 09.09.2007</li> <li>Ans. (c) : 60°/30°, 45°/45° set squares can be used to</li> </ul>
<ul> <li>Ans. (d) : Set squares are used for drawing all straight lines except the horizontal line which are usually drawn with the T-square.</li> <li>60°/30°, 45°/45° set squares are used for drawing vertical (or) inclined lines.</li> </ul>	<ul> <li>(c) Only for 15°, 30°, 45°, 60°, 75°</li> <li>(d) None of these</li> <li>DMRC Station Controller, 09.09.2007</li> <li>Ans. (c) : 60°/30°, 45°/45° set squares can be used to make complementary angle of any stated angle only for</li> </ul>
<ul> <li>Ans. (d) : Set squares are used for drawing all straight lines except the horizontal line which are usually drawn with the T-square.</li> <li>60°/30°, 45°/45° set squares are used for drawing vertical (or) inclined lines.</li> </ul>	<ul> <li>(c) Only for 15°, 30°, 45°, 60°, 75°</li> <li>(d) None of these</li> <li>DMRC Station Controller, 09.09.2007</li> <li>Ans. (c) : 60°/30°, 45°/45° set squares can be used to make complementary angle of any stated angle only for 15°, 30°, 45°, 60°, 75°.</li> </ul>
<ul> <li>Ans. (d) : Set squares are used for drawing all straight lines except the horizontal line which are usually drawn with the T-square.</li> <li>60°/30°, 45°/45° set squares are used for drawing vertical (or) inclined lines.</li> <li>60. 60°/30°, 45°/45° set squares should not be used for drawing lines</li> </ul>	<ul> <li>(c) Only for 15°, 30°, 45°, 60°, 75°</li> <li>(d) None of these DMRC Station Controller, 09.09.2007</li> <li>Ans. (c) : 60°/30°, 45°/45° set squares can be used to make complementary angle of any stated angle only for 15°, 30°, 45°, 60°, 75°.</li> <li>66. For drawing vertical lines on a drawing sheet</li> </ul>
<ul> <li>Ans. (d) : Set squares are used for drawing all straight lines except the horizontal line which are usually drawn with the T-square.</li> <li>60°/30°, 45°/45° set squares are used for drawing vertical (or) inclined lines.</li> <li>60. 60°/30°, 45°/45° set squares should not be used for drawing lines. <ul> <li>(a) Horizontal</li> <li>(b) Parallel</li> </ul> </li> </ul>	<ul> <li>(c) Only for 15°, 30°, 45°, 60°, 75°</li> <li>(d) None of these DMRC Station Controller, 09.09.2007</li> <li>Ans. (c) : 60°/30°, 45°/45° set squares can be used to make complementary angle of any stated angle only for 15°, 30°, 45°, 60°, 75°.</li> <li>66. For drawing vertical lines on a drawing sheet using drawing board and T-square, additional</li> </ul>
<ul> <li>Ans. (d) : Set squares are used for drawing all straight lines except the horizontal line which are usually drawn with the T-square.</li> <li>60°/30°, 45°/45° set squares are used for drawing vertical (or) inclined lines.</li> <li>60°/30°, 45°/45° set squares should not be used for drawing lines. <ul> <li>(a) Horizontal</li> <li>(b) Parallel</li> <li>(c) Inclined</li> </ul> </li> </ul>	<ul> <li>(c) Only for 15°, 30°, 45°, 60°, 75°</li> <li>(d) None of these DMRC Station Controller, 09.09.2007</li> <li>Ans. (c) : 60°/30°, 45°/45° set squares can be used to make complementary angle of any stated angle only for 15°, 30°, 45°, 60°, 75°.</li> <li>66. For drawing vertical lines on a drawing sheet using drawing board and T-square, additional item needed is</li> </ul>
<ul> <li>Ans. (d) : Set squares are used for drawing all straight lines except the horizontal line which are usually drawn with the T-square.</li> <li>60°/30°, 45°/45° set squares are used for drawing vertical (or) inclined lines.</li> <li>60. 60°/30°, 45°/45° set squares should not be used for drawing lines. <ul> <li>(a) Horizontal</li> <li>(b) Parallel</li> <li>(c) Inclined</li> <li>(d) Vertical</li> </ul> </li> </ul>	<ul> <li>(c) Only for 15°, 30°, 45°, 60°, 75°</li> <li>(d) None of these DMRC Station Controller, 09.09.2007</li> <li>Ans. (c) : 60°/30°, 45°/45° set squares can be used to make complementary angle of any stated angle only for 15°, 30°, 45°, 60°, 75°.</li> <li>66. For drawing vertical lines on a drawing sheet using drawing board and T-square, additional item needed is</li> <li>(a) Any one 60°/30° or 45°/45° set square</li> </ul>
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Ans. (a) : For drawing vertical lines on a drawing sheet using drawing board and T-square, additional item needed is any one  $60^{\circ}/30^{\circ}$  or  $45^{\circ}/45^{\circ}$  set square.

67. Manipulating two set square together can give many angles to draw and measure. What is the angle ' $\alpha$ ' formed by 45°/45° and 60°/30° set square in Fig. below?



RRB Kolkata Technical-III, 20.08.2006



 $\alpha = 75^{\circ}$ 

68. manipulating two set squares together can give many angle to draw and measure. What is the angle 'A' formed by the 45°/45° and 60°/30° set squares in the fig.?



RRB Bangalore Technical (Eng.), 22.04.2007



Manipulating the set squares together can give various angles to draw and measure. What is the angle ' $\theta$ ' formed by 45°/45° and 60°/30° set square as placed in fig.?



**Ans. (b) :** Angles in multiple of  $15^{\circ}$  are normally constructed by the combined use of  $30^{\circ}/60^{\circ}$  and  $45^{\circ}/45^{\circ}$  set square and T-square.

74. The set-squares 60°/30° and 45°/45° have been placed in position as per Fig. The value of angle A is .



**Drawing Instruments** 

