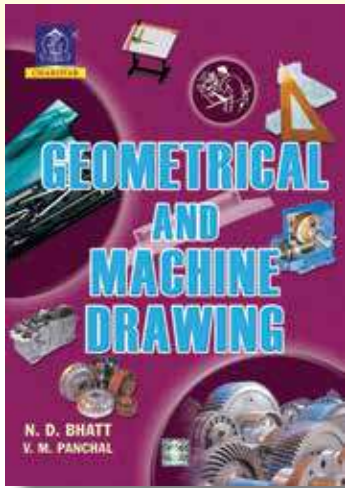


GEOMETRICAL AND MACHINE DRAWING

[IN FIRST-ANGLE PROJECTION METHOD]

By

N. D. Bhatt, V. M. Panchal



Edition : 20th Edition : 2014
ISBN : 9789380358895
Size : 170 mm × 240 mm
Binding : Paperback
Pages : 408 + 16 = 424



₹ 225.00 **BUY**

ABOUT THE BOOK

This text-book follows:

- (i) the metric system of length measurement and
- (ii) first-angle method of orthographic projection.

However, the third-angle projection method has not been completely ignored.

The topics of the subject matter are covered in 22 well-arranged chapters — therein it now contains:

- * 914 Self-explanatory and neatly drawn diagrams
- * 230 Worked examples (Problems)
- * 500 Exercises at the end of chapters
- * 36 Useful tables

It describes in an easy-to-follow style and with application of the principles of orthographic projection, forms, proportions and uses of simple machine, engine and boiler parts.

The techniques of freehand sketching, dimensioning, conversion of pictorial views and interpretation of views are treated in clear and simple manner. Most of the orthographic views are accompanied by the pictorial views of the objects to enable the students to visualize the shapes easily.

The book covers the syllabi in Engineering Drawing of the First Year of the three year Diploma courses in various branches of Engineering conducted by the Department of Technical Education, for I.T.I. students and also to the candidates reading for the A.M.I.E. and U.P.S.C. Examinations.

CONTENT

- 1: DRAWING INSTRUMENTS AND THEIR USES
 - 2: SHEET LAYOUT AND SKETCHING
 - 3: LINES, LETTERING AND DIMENSIONING
 - 4: SCALES
 - 5: GEOMETRICAL CONSTRUCTION
 - 6: CURVES USED IN ENGINEERING PRACTICE
 - 7: LOCI OF POINTS
 - 8: PRINCIPLES OF PROJECTION
 - 9: ISOMETRIC PROJECTION
 - 10: OBLIQUE PROJECTION
 - 11: CONVERSION OF PICTORIAL VIEWS INTO ORTHOGRAPHIC VIEWS
 - 12: SECTIONAL VIEWS
 - 13: ORTHOGRAPHIC READING OR INTERPRETATION OF VIEWS
 - 14: SCREW THREADS
 - 15: SCREWED FASTENINGS
 - 16: KEYS, COTTER-JOINTS, PIN-JOINTS
 - 17: SHAFT COUPLINGS, CLUTCHES AND BRAKES
 - 18: PIPE JOINTS
 - 19: RIVETED JOINTS AND WELDED JOINTS
 - 20: SHAFT BEARINGS, BRACKETS AND HANGERS
 - 21: PULLEYS
 - 22: ASSEMBLY DRAWINGS
- INDEX

Catalogue Checklist

GEOMETRICAL AND MACHINE DRAWING
DETAILED CONTENTS

Chapter 1 DRAWING INSTRUMENTS AND THEIR USES

- 1-0. Introduction
 - 1-1. Drawing board
 - 1-2. T-square
 - 1-3. Set-squares
 - 1-4. Drawing instrument box
 - (i) Large-size compass with interchangeable pencil and pen legs
 - (ii) Lengthening bar
 - (iii) Small bow compass
 - (iv) Large-size divider
 - (v) Small bow divider
 - (vi) Small bow ink-pen
 - (vii) Inking pen
 - 1-5. Scales
 - 1-6. Protractor
 - 1-7. French curves
 - 1-8. Drawing papers
 - 1-9. Drawing pencils
 - 1-10. Eraser (Rubber)
 - 1-11. Drawing pins
 - 1-12. Sand-paper block
 - 1-13. Duster
 - 1-14. Drafting machine
 - 1-15. General suggestions for drawing a sheet
 - (i) Cleaning the instruments
 - (ii) Pinning the paper to the drawing board
 - (iii) Border lines, To draw the border lines
 - (iv) Spacing of drawings
- Exercises I

Chapter 2 SHEET LAYOUT AND SKETCHING

- 2-1. Sheet layout
 - Sheet sizes
 - Margin
 - Border lines
 - Borders and frames
 - Orientation mark
 - Grid reference system
 - Title block
 - List of parts or the bill of materials
 - Revisions of drawing
 - Folding marks
 - Scales and scale drawing
 - 2-2. Types of machine drawings
 - (i) Production drawing
 - (ii) Exploded assembly drawing
 - (iii) Schematic assembly drawing
 - (iv) Drawing for instruction manual
 - (v) Drawing for installation
 - (vi) Drawing for catalogue
 - (vii) Tabular drawing
 - (viii) Patent drawing
 - 2-3. Sketching
 - Sketching materials
 - To sketch straight lines
 - To sketch circles and arcs
 - Sketching procedure
- Exercises II

Chapter 3 LINES, LETTERING AND DIMENSIONING

- 3-0. Introduction
- 3-1. Lines
 - Line thickness
 - Inked drawings
 - Pencil drawings
 - Types of Lines
 - Outlines
 - Margin lines
 - Dimension lines

- Extension or projection lines
 - Construction lines
 - Hatching or section lines
 - Leader or pointer lines
 - Border lines
 - Short-break lines
 - Long-break lines
 - Hidden or dotted lines
 - Centre lines
 - Cutting-plane lines
 - Chain thick
 - Chain thick double-dashed
 - 3-2. Lettering
 - I. Single-stroke letters
 - II. Gothic letters
 - 3-3. Dimensioning
 - Types of dimensions
 - 3-4. Dimensioning terms and notations
 - Dimension line
 - Extension line
 - Arrowhead
 - Leader
 - 3-5. Placing of dimensions
 - (i) Aligned system
 - (ii) Unidirectional system
 - 3-6. Unit of dimensioning
 - 3-7. General rules for dimensioning
 - 3-8. Practical hints on dimensioning
 - (a) Continuous or chain dimensioning
 - (b) Progressive or parallel dimensioning
- Exercises III

Chapter 4 SCALES

- 4-0. Introduction
 - 4-1. Scales
 - (i) Engineer's scale
 - (ii) Graphical scale
 - (iii) Representative fraction
 - 4-2. Scales on drawings
 - 4-3. Types of scales
 - (i) Plain scales
 - (ii) Diagonal scales
 - Principle of diagonal scale
 - (iii) Comparative scales
 - (i) Inch scale
 - (ii) Comparative scale
 - (i) Scale of miles
 - (ii) Scale of kilometres
 - (iv) Vernier scales
 - Principle of vernier
 - Least count of a vernier
 - (i) Forward vernier
 - (ii) Backward vernier
 - (v) Scale of chords
- Exercises IV

Chapter 5 GEOMETRICAL CONSTRUCTION

- 5-0. Introduction
- 5-1. Bisecting a line
- 5-2. To draw perpendiculars
- 5-3. To draw parallel lines
- 5-4. To divide a line
- 5-5. To bisect an angle
- 5-6. To trisect an angle
- 5-7. To find the centre of an arc
- 5-8. To construct equilateral triangles
 - (a) With T-square and set-square only
 - (b) With the aid of a compass

- 5-9. To construct squares
 - 5-10. To construct regular polygons
 - (a) Inscribe circle method
 - (b) Arc method
 Alternative method
 - 5-11. Special methods of drawing regular polygons
 - 5-12. Regular polygons inscribed in circles
 - 5-13. To draw regular figures using T-square and set-squares
 - 5-14. To draw tangents
 - (a) External tangents
 - (b) Internal tangents
 - 5-15. Lengths of arcs
 - 5-16. Circles and lines in contact
 - 5-17. Inscribed circles
- Exercises V

Chapter 6 CURVES USED IN ENGINEERING PRACTICE

- 6-0. Introduction
 - 6-1. Conic sections
 - 6-1-1. Ellipse
 - (a) General method of construction of an ellipse
 - (b) Construction of ellipse by other methods
 Normal and tangent to an ellipse
 - 6-1-2. Parabola
 - (a) General method of construction of a parabola
 - (b) Construction of parabola by other methods
 - 6-1-3. Hyperbola
 - Rectangular hyperbola
 - General method of construction of a hyperbola
 - 6-1-4. Tangents and normals to conics
 - (a) General method
 - (b) Other methods of drawing tangents to conics
 - 6-2. Cycloidal curves
 - 6-2-1. Cycloid
 - Normal and tangent to a cycloid curve
 - 6-2-2. Trochoid
 - 6-2-3. Epicycloid and hypocycloid
 - Normal and tangent to an epicycloid and a hypocycloid
 - 6-2-4. Epitrochoid
 - 6-2-5. Hypotrochoid
 - 6-3. Involute
 - Normal and tangent to an involute
 - 6-4. Evolutes
 - 6-5. Spirals
 - 6-5-1. Archimedean spiral
 - Normal and tangent to an Archimedean spiral
 - 6-5-2. Logarithmic or equiangular spiral
 - 6-6. Helix
 - 6-6-1. A method of drawing a helical curve
 - 6-6-2. Helical springs
 - (a) Helical spring of a wire of square cross-section
 - (b) Helical spring of a wire of circular cross-section
 - 6-6-3. Screw threads
 - 6-6-4. Helix upon a cone
 - 6-7. Cam
- Exercises VI
Miscellaneous problems

Chapter 7 LOCI OF POINTS

- 7-0. Introduction
 - 7-1. Loci of points
 - 7-2. Simple mechanisms
 - 7-2-1. The slider-crank mechanism
 - 7-2-2. A four-bar mechanism
- Exercises VII

Chapter 8 PRINCIPLES OF PROJECTION

- 8-0. Engineering drawing
 - 8-1. Principle of projection
 - 8-2. Methods of projection
 - 8-3. Orthographic projection
 - 8-3-1. First-angle projection
 - 8-3-2. Third-angle projection
 B.I.S. code of practice
Symbols for methods of projection
Combination of two methods
 - 8-4. Isometric projection
 - 8-5. Oblique projection
 - 8-6. Perspective projection
- Exercises VIII

Chapter 9 ISOMETRIC PROJECTION

- 9-0. Introduction
 - 9-1. Isometric axes, lines and planes
 - 9-2. Isometric scale
 - 9-3. Isometric drawing or isometric view
 - 9-4. Isometric graph
 - 9-5. Illustrative problems
 - 9-5-1. Isometric drawing of planes or plane figures
 - I. Method of points
 - II. Four-centre method
 - 9-5-2. Isometric drawing of prisms and pyramids
 - Methods of drawing non-isometric lines
 - (i) Box method
 - (ii) Offset method
 - 9-5-3. Isometric drawing of cylinders
 - 9-5-4. Isometric drawing of cones
 - 9-5-5. Isometric drawing of sphere
 - 9-6. Typical problems
- Exercises IX

Chapter 10 OBLIQUE PROJECTION

- 10-0. Introduction
 - 10-1. Principle of the oblique projection
 - 10-2. The oblique projection and the isometric projection
 - 10-3. Receding lines and receding angles
 - 10-4. Types of the oblique projection
 - (i) Cavalier projection
 - (ii) Cabinet projection
 - 10-5. Rules for the choice of position of an object
 - 10-6. Steps for drawing the oblique projection
- Exercises X

Chapter 11 CONVERSION OF PICTORIAL VIEWS INTO ORTHOGRAPHIC VIEWS

- 11-0. Introduction
 - (i) First-angle projection method
 - (ii) Third-angle projection method
 - 11-1. Orthographic projection
 - 11-2. Procedure for preparing a scale-drawing
 - 11-3. Illustrative problems
- Exercises XI
Solutions to Exercises XI

Chapter 12 SECTIONAL VIEWS

- 12-0. Introduction
- 12-1. Cutting-plane line
- 12-2. Types of sectional views
 - 12-2-1. Full section
 - 12-2-2. Half section
 - 12-2-3. Partial or broken section

- 12-2-4. Revolved section
- 12-2-5. Removed section
- 12-2-6. Offset section
- 12-3. Sectioning conventions
- 12-4. Hatching or section lines
- 12-5. Conventions of section lines
- Illustrative problems
- Exercises XII
- Solutions to exercises XII

Chapter 13 ORTHOGRAPHIC READING OR INTERPRETATION OF VIEWS

- 13-0. Introduction
- 13-1. Reading of orthographic views (Blue-print reading)
- 13-2. Missing lines and missing views
- 13-3. Identification of planes
- Exercises XIII
- Solutions to exercises XIII

Chapter 14 SCREW THREADS

- 14-0. Introduction
- 14-1. Definitions
 - Crest
 - Root
 - Flank
 - Angle
 - Depth
 - Nominal diameter
 - Outside or major diameter
 - Core or minor diameter
 - Effective diameter
 - Pitch
 - Lead
 - Slope
- 14-2. Forms of screw threads
- 14-2-1. Triangular or V threads
 - (a) Unified thread
 - (b) Metric thread
 - (c) Whitworth thread
 - (d) British Standard Fine and British Standard Pipe threads
 - (e) Sellers thread
 - (f) British Association thread
- 14-2-2. Square thread
 - (a) Acme thread IS: 7008-1988
 - (b) Knuckle thread
 - (c) Buttress thread
- 14-3. Conventional representation of threads SP: 46-1988
 - (a) External threads
 - (b) Internal threads
 - (a) External V thread
 - (b) Internal V thread
 - (c) External square thread
 - (d) Internal square thread
- 14-4. Multiple-start threads
- 14-5. Right-hand and left-hand threads
- Exercises XIV

Chapter 15 SCREWED FASTENINGS

- 15-0. Introduction
- 15-1. Types of nuts
 - 15-1-1. Hexagonal nut
 - 15-1-2. Square nut
- 15-2. Types of nuts for special purpose
 - Flanged nut

- Cap nut
- Dome nut
- Cylindrical or capstan nut
- Ring nut
- Wing nut
- 15-3. Washers
- 15-4. Types of bolts
- 15-5. Forms of bolts
 - Hexagonal-headed bolt
 - 15-6. Methods of preventing rotation of a bolt while screwing a nut on or off it
 - Square-headed bolt
 - Cylindrical or cheese-headed bolt
 - Cup-headed or round-headed bolt
 - T-headed bolt
 - Countersunk-headed bolt
 - Hook bolt
 - Headless tapered bolt
 - Eye-bolt
 - Lifting eye-bolt
 - Tap-bolt or cap-screw
 - Stud-bolt or stud
 - 15-7. Set-screws
 - 15-8. Locking arrangements for nuts
 - (i) Lock-nut or check-nut
 - (ii) Split-pin
 - (iii) Slotted nut
 - (iv) Castle nut
 - (v) Sawn nut or Wiles nut
 - (vi) Simmond's lock-nut
 - (vii) Penn. ring or grooved nut
 - (viii) Stop-plate or locking-plate
 - (ix) Spring-washer
 - 15-9. Foundation bolts
 - (i) Eye foundation bolt
 - (ii) Rag bolt
 - (iii) Lewis bolt
 - (iv) Cotter bolt
 - 15-10. Spanner
 - 15-11. Longitudinal or bar stay
 - Exercises XV

Chapter 16 KEYS, COTTER-JOINTS, PIN-JOINTS

- 16-0. Introduction
- 16-1. Keys joints
 - (i) Taper keys
 - Sunk taper key
 - Saddle keys
 - Round key or pin key
 - Taper pin
 - Gib-head
 - (ii) Parallel or feather keys
 - Spline shafts
 - Woodruff key
 - Cone keys
 - Staking-on
- 16-2. Cotter and cotter joints
 - (i) Socket and spigot joint
 - (ii) Sleeve joint
 - (iii) Strap joint
- 16-3. Pin-joint or Knuckle joint
- Exercises XVI

Chapter 17 SHAFT COUPLINGS, CLUTCHES AND BRAKES

- 17-0. Introduction
- 17-1. Fast or rigid couplings
 - 17-1-1. Box or muff coupling
 - 17-1-2. Half-lap coupling
 - 17-1-3. Split-muff coupling
- 17-2. Flanged coupling
 - 17-2-1. Protected type flange-coupling
 - 17-2-2. Solid flanged coupling
- 17-3. Flexible couplings
 - 17-3-1. Universal coupling or Hook's joint
 - 17-3-2. Oldham's coupling
 - 17-3-3. Gear coupling
- 17-4. Loose or disengaging couplings or clutches
 - 17-4-1. Claw coupling or clutch
 - 17-4-2. Conical friction coupling or cone friction clutch
 - 17-4-3. Single plate clutch
- 17-5. Brakes
 - Exercises XVII

Chapter 18 PIPE JOINTS

- 18-0. Introduction
- 18-1. Cast-iron pipes
 - 18-1-1. Cast-iron flanged joint
 - 18-1-2. Socket and spigot joint
 - 18-1-3. Hydraulic joint
- 18-2. Wrought-iron and steel pipes
- 18-3. Copper pipes
 - 18-3-1. Union joint
- 18-4. Lead pipes
- 18-5. Expansion joints
- 18-6. Piping drawings
 - Exercises XVIII

Chapter 19 RIVETED JOINTS AND WELDED JOINTS

- 19-0. Introduction
- 19-1. Riveting
 - 19-1-1. Caulking and fullering
- 19-2. Forms and proportions of rivet-heads
- 19-3. Failure of riveted joints
- 19-4. Dimensions of a riveted joint
- 19-5. Types of riveted joints
 - 19-5-1. Lap joint
 - 19-5-2. Butt joint
- 19-6. Rolled-steel sections
 - 19-6-1. Connection of plates at right angles
 - 19-6-2. Gusset stay
- 19-7. Welded joints
 - 19-7-1. Welding
 - 19-7-2. Types of welding process
 - (i) Pressure welding or forge welding
 - (ii) Fusion welding
 - (iii) Fusion and pressure welding

- Types of welded joints
- Types of welds
- 19-7-3. Representation of welded joints
- Exercises XIX

Chapter 20 SHAFT BEARINGS, BRACKETS AND HANGERS

- 20-0. Introduction
 - (i) A journal bearing
 - (ii) A pivot bearing
 - (iii) A collar or thrust bearing
- 20-1. Journal bearings
 - 20-1-1. Solid bearing
 - 20-1-2. Bushed bearing
 - 20-1-3. Pedestal bearing or plummer block
 - 20-1-4. Methods of preventing rotation of brasses in a bearing
- 20-2. Pivot bearing
 - 20-2-1. Foot-step bearing
- 20-3. Wall brackets
- 20-4. Hangers
- 20-5. Wall-plates
- 20-6. Wall-box
 - Exercises XX

Chapter 21 PULLEYS

- 21-0. Introduction
- 21-1. Types of Pulleys
- 21-2. C. I. belt pulleys
- 21-3. Fast and loose pulleys
- 21-4. Speed cones or stepped pulleys
- 21-5. Split pulleys
- 21-6. Built-up pulleys
- 21-7. Rope pulleys
- 21-8. V-belt pulleys
 - Exercises XXI

Chapter 22 ASSEMBLY DRAWINGS

- 22-0. Introduction
- 22-1. Types of assembly drawings
 - (i) Designed assembly
 - (ii) Layout assembly
 - (iii) Installation assembly
 - (iv) Working drawing assembly
 - (v) General assembly
- 22-2. Accepted norms to be observed for assembly drawings
 - (i) Selection of views
 - (ii) Sectioning
 - (iii) Dotted lines
 - (iv) Dimensions
 - (v) Bill of materials
- 22-3. Sequences of preparing the assembly drawing
- Illustrative problems
- Exercises XXII

Index