

# ELEMENTARY ENGINEERING DRAWING

## TABLE OF CONTENTS

<b>CHAPTER 1 DRAWING INSTRUMENTS AND THEIR USES .... 001-020</b>			
1-1. Introduction .....	01	1-9. Drawing papers .....	13
1-2. Drawing board .....	02	1-10. Drawing pencils .....	13
1-3. T-square .....	02	1-11. Eraser (Rubber) .....	14
1-4. Set-squares .....	04	1-12. Drawing pins, Clips or adhesive tapes .....	14
1-5. Drawing instrument box .....	07	1-13. Sand-paper block .....	15
(1) Large-size compass with inter change eble pencil and pen legs .....	08	1-14. Duster .....	15
(2) Lengthening bar .....	08	1-15. Drafting machine .....	15
(3) Small bow compass .....	08	1-16. Roll-N-Draw .....	16
(4) Large-size divider .....	09	1-17. General suggestions for drawing a sheet .....	16
(5) Small bow divider .....	09	(1) Cleaning the instruments .	16
(6) Small bow ink-pen .....	10	(2) Pinning the paper to the drawing board .....	16
(7) Inking pen .....	10	(3) Border lines .....	17
1-6. Scales .....	10	(4) Spacing of drawings .....	17
1-7. Protractor .....	12	Exercises I .....	18
1-8. French curves .....	12		
<b>CHAPTER 2 SHEET LAYOUT AND FREE-HAND SKETCHING .. 021-032</b>			
2-1. Sheet layout .....	21	(3) Schematic assembly drawing	26
(1) Sheet sizes, (2) Margin ...	21	(4) Drawing for instruction manual	26
(3) Borderlines, (4) Borders & frames	21	(5) Drawing for installation ...	26
(5) Orientation mark .....	21	(6) Drawing for catalogue ....	26
(6) Grid reference system ....	22	(7) Tabular drawing .....	26
(7) Title block .....	22	(8) Patent drawing .....	26
(8) List of parts or the bill of materials .....	23	2-3. Free-hand Sketching .....	26
(9) Revisions of drawing .....	23	(1) Sketching or freehand ....	26
(10) Folding marks .....	24	(2) Sketching materials .....	27
(11) Scales and scale drawing .	25	(3) To sketch straight lines ...	27
2-2. Types of machine drawings ....	26	(4) To sketch circles and arcs .	27
(1) Production drawing .....	26	(5) Sketching procedure .....	28
(2) Exploded assembly drawing	26	(6) Steps in sketching .....	28
		Exercises II .....	30
<b>CHAPTER 3 LINES, LETTERING AND DIMENSIONING ..... 033-050</b>			
3-0. Introduction .....	33	(13) Cutting-plane lines .....	36
3-1. Lines .....	33	(14) Chain thick .....	36
(1) Line thickness .....	33	(15) Chain thick double-dots ..	36
(2) Inked drawings .....	33	3-2. Lettering .....	37
(3) Pencil drawings .....	33	(1) Single-stroke letters .....	37
3-1-1. Types of Lines .....	35	(2) Gothic letters .....	40
(1) Outlines .....	35	3-3. Dimensioning .....	40
(2) Margin lines .....	35	3-4. Dimensioning terms and notations	41
(3) Dimension lines .....	35	(1) Dimension line .....	41
(4) Extension or projection lines	35	(2) Extension line .....	41
(5) Construction lines .....	35	(3) Arrowhead, (4) Leader ....	41
(6) Hatching or section lines .	35	3-5. Placing of dimensions .....	42
(7) Leader or pointer lines ...	35	(1) Aligned system .....	42
(8) Border lines .....	35	(2) Unidirectional system ....	42
(9) Short-break lines .....	35	3-6. Unit of dimensioning .....	43
(10) Long-break lines .....	35	3-7. General rules for dimensioning .	43
(11) Hidden or dotted lines .....	35	3-8. Practical hints on dimensioning	43
(12) Centre lines .....	35	Exercises III .....	48

**CHAPTER 4 SCALES ..... 51-68**

4-1. Introduction .....	51	(1) Plain scales .....	52
4-2. Scales .....	51	(2) Diagonal scales .....	55
(1) Engineer's, (2) Graphical scale	52	(3) Comparative scales .....	59
(3) Representative fraction ...	52	(4) Vernier scales .....	61
4-3. Scales on drawings .....	52	(5) Scale of chords .....	65
4-4. Types of scales .....	52	Exercises IV .....	66

**CHAPTER 5 GEOMETRICAL CONSTRUCTION ..... 69-100**

5-0. Introduction .....	69	5-11. To construct squares .....	81
5-1. Bisecting a line .....	69	5-12. To construct regular polygons .	82
5-2. To draw perpendiculars .....	70	5-13. Special methods of drawing	
5-3. To draw parallel lines .....	72	regular polygons .....	84
5-4. To divide a line .....	73	5-14. Regular polygons inscribed	
5-5. To divide a circle .....	74	in circles .....	86
5-6. To bisect an angle .....	75	5-15. To draw regular figures using	
5-7. To trisect an angle .....	75	T-square and set-squares .....	88
5-8. To find the centre of an arc ..	76	5-16. To draw tangents .....	89
5-9. To construct an ogee or		5-17. Lengths of arcs .....	91
reverse curve .....	79	5-18. Circles and lines in contact ...	92
5-10. To construct equilateral		5-19. Inscribed circles .....	94
triangles .....	80	Exercises V .....	98

**CHAPTER 6 CURVES USED IN ENGINEERING PRACTICE ..... 101-150**

6-0. Introduction .....	101	6-4. Evolutes .....	130
6-1. Conic sections .....	101	6-5. Spirals .....	133
6-1-1. Ellipse .....	102	6-5-1. Archimedean spiral .....	134
6-1-2. Parabola .....	109	6-5-2. Logarithmic or	
6-1-3. Hyperbola .....	112	equiangular spiral .....	136
6-1-4. Tangents and normals to conics	115	6-6. Helix .....	138
6-2. Cycloidal curves .....	116	6-6-1. A method of drawing a	
6-2-1. Cycloid .....	116	helical curve .....	138
6-2-2. Trochoid .....	118	6-6-2. Helical springs .....	139
6-2-3. Epicycloid and hypocycloid ...	120	6-6-3. Screw threads .....	141
6-2-4. Epitrochoid .....	122	6-6-4. Helix upon a cone .....	142
6-2-5. Hypotrochoid .....	123	6-7. Cam .....	143
6-3. Involute .....	124	Exercises VI .....	144

**CHAPTER 7 LOCI OF POINTS ..... 151-168**

7-0. Introduction .....	151	(1) Simple slider crank mechanism	154
7-1. Loci of points .....	151	(2) Offset slider crank mechanism	154
7-2. Simple mechanisms .....	153	7-2-2. A four-bar mechanism .....	156
7-2-1. The slider crank mechanism ...	153	Exercises VII .....	166

**CHAPTER 8 ORTHOGRAPHIC PROJECTION ..... 169-188**

8-0. Introduction .....	169	8-6. First-angle projection .....	171
8-1. Principle of projection .....	169	8-7. Third-angle projection .....	172
8-2. Methods of projection .....	169	8-8. Reference line .....	173
8-3. Orthographic projection .....	169	8-9. B.I.S. code of practice .....	177
8-4. Planes of projection .....	171	8-10. Typical Problems .....	177
8-5. Four quadrants .....	171	Exercises VIII .....	183

**CHAPTER 9 PROJECTIONS OF POINTS ..... 189-194**

9-0. Introduction ..... 189	9-3. A point is situated in the third quadrant ..... 190
9-1. A point is situated in the first quadrant ..... 189	9-4. A point is situated in the fourth quadrant ..... 191
9-2. A point is situated in the second quadrant ..... 190	9-5. General conclusions ..... 191
	Exercises IX ..... 193

**CHAPTER 10 PROJECTIONS OF STRAIGHT LINES ..... 195-240**

10-0. Introduction ..... 195	10-7. Line contained by a plane perpendicular to both the reference planes ..... 205
10-1. Line parallel to one or both the planes ..... 195	10-8. True length of a straight line and its inclinations with the reference planes ..... 206
10-2. Line contained by one or both the planes ..... 196	10-9. Traces of a line ..... 209
10-3. Line perpendicular to one of the planes ..... 197	10-10. Methods of determining traces of a line ..... 211
10-4. Line inclined to one plane and parallel to the other ..... 198	10-11. Traces of a line, the projections of which are perpendicular to xy ..... 212
Exercises X(a) ..... 200	10-12. Positions of traces of a line ... 212
10-5. Line inclined to both the planes 201	10-13. Additional illustrative problems 214
10-6. Projections of lines inclined to both the planes ... 203	Exercises X(b) ..... 237

**CHAPTER 11 PROJECTIONS ON AUXILIARY PLANES ..... 241-254**

11-0. Introduction ..... 241	11-4. To determine true length of a line ..... 247
11-1. Types of auxiliary planes and views ..... 241	11-5. To obtain point-view of a line and edge-view of a plane ..... 248
11-2. Projection of a point on an auxiliary plane ..... 242	11-6. To determine true shape of a plane figure ..... 250
11-3. Projections of lines and planes by the use of auxiliary planes . 246	Exercises XI ..... 253

**CHAPTER 12 PROJECTIONS OF PLANES ..... 255-270**

12-0. Introduction ..... 255	(2) When the plane is parallel to the V.P. .... 259
12-1. Types of planes ..... 255	12-5. Projections of planes inclined to one reference plane and perpendicular to the other 260
(1) Perpendicular planes ..... 255	(1) Plane, inclined to the H.P. and perpendicular to the V.P. .... 260
(2) Oblique planes ..... 257	(2) Plane, inclined to the V.P. & perpendicular to the H.P. 261
12-2. Traces of planes ..... 257	12-6. Projections of oblique planes . 261
12-3. General conclusions	Exercises XII ..... 269
(1) Traces ..... 258	
(2) Projections ..... 258	
12-4. Projections of planes parallel to one of the reference planes 259	
(1) When the plane is parallel to the H.P. .... 259	

**CHAPTER 13 PROJECTIONS OF SOLIDS ..... 271-312**

13-0. Introduction ..... 271	(2) Solids of revolution ..... 273
13-1. Types of solids ..... 271	13-2. Projections of solids in simple positions ..... 274
(1) Polyhedra ..... 271	Exercises XIII(i) ..... 279

13-3. Projections of solids with axes inclined to one of the reference planes and parallel to the other ..... 279	13-4. Projections of solids with axes inclined to both the H.P. and the V.P. .... 286
13-3-1. Axis inclined to the V.P. and parallel to the H.P. .... 280	13-5. Projections of spheres ..... 300
13-3-2. Axis inclined to the H.P. and parallel to the V.P. .... 282	(1) Spheres in contact with each other ..... 302
	(2) Unequal spheres ..... 303
	Exercises XIII(ii) ..... 309

## CHAPTER 14 SECTIONS OF SOLIDS ..... 313-350

14-0. Introduction ..... 313	14-4. Sections of cones ..... 329
(1) Section planes ..... 313	(1) Section plane parallel to the base of the cone .... 329
(2) Sections ..... 314	(2) Section plane passing through the apex of the cone ..... 330
(3) True shape of a section . 314	(3) Section plane inclined to the base of the cone at an angle smaller than the angle of inclination of the generators with the base ..... 331
14-1. Sections of prisms ..... 314	(4) Section plane parallel to a generator of the cone ... 333
(1) Section plane parallel to the V.P. .... 314	(5) Section plane inclined to the base of the cone at an angle greater than the angle of inclination of the generators with the base ..... 334
(2) Section plane parallel to the H.P. .... 315	14-5. Sections of spheres ..... 338
(3) Section plane perpendicular to the H.P. and inclined to the V.P. .... 316	(1) Section plane parallel to the H.P. .... 338
(4) Section plane perpendicular to the V.P. and inclined to the H.P. .... 317	(2) Section plane parallel to the V.P. .... 338
14-2. Sections of pyramids ..... 320	(3) Section plane perpendicular to the V.P. and inclined to the H.P. .... 338
(1) Section plane parallel to the base of the pyramid ..... 321	(4) Section plane perpendicular to the H.P. and inclined to the V.P. .... 339
(2) Section plane parallel to the V.P. .... 321	14-6. Typical Problems of Sections of Solids ..... 340
(3) Section plane perpendicular to the V.P. and inclined to the H.P. .... 322	Exercises XIV ..... 347
(4) Section plane perpendicular to the H.P. and inclined to the V.P. .... 323	
14-3. Sections of cylinders ..... 326	
(1) Section plane parallel to the base ..... 326	
(2) Section plane parallel to the axis ..... 326	
(3) Section plane inclined to the base ..... 326	

## CHAPTER 15 DEVELOPMENT OF SURFACES ..... 351-380

15-0. Introduction ..... 351	15-2-1. Cube ..... 352
15-1. Methods of development .... 352	15-2-2. Prisms ..... 354
(1) Parallel-line development 352	15-2-3. Cylinders ..... 356
(2) Radial-line development . 352	15-2-4. Pyramids ..... 360
(3) Triangulation development 352	15-2-5. Cone ..... 365
(4) Approximate method .... 352	15-3. Development of transition pieces ..... 372
15-2. Developments of lateral surfaces of right solids ..... 352	15-4. Spheres ..... 376
	Exercises XV ..... 377

<b>CHAPTER 16 INTERSECTION OF SURFACES ..... 381-416</b>	
16-0. Introduction ..... 381	16-4. Intersection of cylinder and cylinder ..... 390
16-1. Line of intersection ..... 381	16-5. Intersection of cylinder & prism 396
16-2. Methods of determining the line of intersection between surfaces of two interpenetrating solids ..... 382	16-6. Intersection of cone & cylinder 401
(1) Line method ..... 382	16-7. Intersection of cone & prism 409
(2) Cutting-plane method ... 382	16-8. Intersection of cone and cone 411
16-3. Intersection of two prisms ... 382	16-9. Intersection of sphere and cylinder or prism ..... 412
<b>CHAPTER 17 ISOMETRIC PROJECTION ..... 417-464</b>	
17-1. Introduction ..... 417	17-6-2. Isometric drawing of prisms and pyramids ..... 425
17-2. Isometric axes, lines & planes 418	17-6-3. Isometric drawing of cylinders 429
17-3. Isometric scale ..... 418	17-6-4. Isometric drawing of cones .. 429
17-4. Isometric drawing or isometric view ..... 420	17-6-5. Isometric drawing of sphere . 430
17-5. Isometric graph ..... 420	17-7. Typical problems of isometric drawing ..... 431
17-6. Illustrative problems ..... 421	Exercises XVII ..... 445
17-6-1. Isometric drawing of planes or plane figures ..... 421	Solutions to Exercises XVII ... 454
<b>CHAPTER 18 OBLIQUE PROJECTION ..... 465-476</b>	
18-1. Introduction ..... 465	18-8. Oblique drawing of pyramid . 470
18-2. Principle of the oblique projection 465	18-9. Oblique drawing of circle ... 470
18-3. The oblique projection and the isometric projection ..... 466	(1) Offset method ..... 470
18-4. Receding lines & receding angles 467	(2) Four centre approximate method .... 471
18-5. Types of the oblique projection 467	18-10. Oblique drawing of cylinder . 471
18-6. Rules for the choice of position of an object ..... 468	18-11. Oblique drawing of prism ... 472
18-7. Steps for drawing the oblique projection ..... 469	18-12. Typical problems of oblique projection ..... 474
<b>CHAPTER 19 PERSPECTIVE PROJECTION ..... 477-510</b>	
19-1. Introduction ..... 477	19-8. Types of perspective ..... 486
19-2. Principle of perspective projection 477	(1) Parallel perspective or one point perspective ..... 486
19-3. Definitions of perspective elements ..... 477	(2) Angular perspective or two point perspective ..... 487
(1) Ground plane ..... 478	(3) Oblique perspective or three point perspective .. 488
(2) Station point ..... 478	19-9. Distance points ..... 489
(3) Picture plane ..... 478	19-10. Measuring line or line of heights 491
(4) Horizontal plane ..... 478	19-11. Perspectives of circles & solids 492
(5) Auxiliary ground plane .. 478	19-12. Typical problems of perspective projection ..... 494
(6) Ground line (7) Horizon line 478	(1) Visual-ray method - by means of the top view and the front view ..... 494
(8) Perpendicular axis ..... 478	(2) Visual-ray method - by means of the top view and the side view ..... 494
(9) Centre of vision ..... 478	(3) Vanishing-point method . 494
(10) Central plane ..... 478	Exercises XIX ..... 509
19-4. Station point ..... 479	
19-5. Angle of vision ..... 479	
19-6. Picture plane ..... 480	
19-7. Methods of drawing perspective view ..... 480	
19-7-1. Visual-ray method ..... 481	
19-7-2. Vanishing-point method ..... 485	

**CHAPTER 20 ORTHOGRAPHIC READING AND CONVERSION OF VIEWS 511-538**

- |                                                                   |     |                                                                      |     |
|-------------------------------------------------------------------|-----|----------------------------------------------------------------------|-----|
| 20-1. Introduction .....                                          | 511 | 20-5. Conversion of pictorial views<br>into orthographic views ..... | 517 |
| 20-2. Reading of orthographic views<br>(Blue-print reading) ..... | 511 | 20-6. Orthographic projection .....                                  | 517 |
| 20-3. Missing lines and<br>missing views .....                    | 512 | 20-7. Procedure for preparing a<br>scale-drawing .....               | 522 |
| 20-4. Identification of planes .....                              | 512 | 20-8. Illustrative problems .....                                    | 523 |
|                                                                   |     | Exercises XX .....                                                   | 526 |

**CHAPTER 21 CENTRES OF GRAVITY AND MOMENTS OF INERTIA OF AREAS 539-554**

- |                                                             |     |                                                            |     |
|-------------------------------------------------------------|-----|------------------------------------------------------------|-----|
| 21-0. Introduction .....                                    | 539 | 21-2. Moments of inertia of areas .                        | 547 |
| 21-1. Centre of gravity .....                               | 539 | (1) Definition .....                                       | 547 |
| 21-1-1. Centres of gravity of<br>symmetrical areas .....    | 539 | (2) Unit .....                                             | 547 |
| 21-1-2. Centres of gravity of<br>unsymmetrical areas .....  | 540 | (3) Graphical method .....                                 | 548 |
| 21-1-3. Illustrative problems on<br>centre of gravity ..... | 541 | 21-3. Illustrative problems on<br>moments of inertia ..... | 548 |
|                                                             |     | Exercises XXI .....                                        | 553 |

**CHAPTER 22 NOMOGRAPHY ..... 555-572**

- |                                                                     |     |                                                                 |     |
|---------------------------------------------------------------------|-----|-----------------------------------------------------------------|-----|
| 22-0. Introduction .....                                            | 555 | 22-4. Method of constructing parallel<br>scale nomographs ..... | 559 |
| 22-1. Types of nomographs .....                                     | 555 | 22-5. Layout of nomographs .....                                | 563 |
| 22-2. Definitions of various terms .                                | 556 | 22-6. Z-type nomographs .....                                   | 568 |
| 22-3. Principle of construction of<br>nomographs of three variables | 557 | Exercises XXII .....                                            | 571 |

**CHAPTER 23 SCREW THREADS ..... 573-584**

- |                                       |     |                                                                         |     |
|---------------------------------------|-----|-------------------------------------------------------------------------|-----|
| 23-0. Introduction .....              | 573 | (4) British Standard Fine<br>and British Standard<br>Pipe threads ..... | 576 |
| 23-1. Definitions .....               | 573 | (5) Sellers thread .....                                                | 577 |
| (1) Crest, (2) Root, (3) Flank        | 573 | (6) British Association thread                                          | 578 |
| (4) Angle, (5) Depth .....            | 573 | 23-2-2. Square thread .....                                             | 578 |
| (6) Nominal diameter .....            | 573 | (1) Acme thread .....                                                   | 578 |
| (7) Outside or major diameter         | 573 | (2) Knuckle thread .....                                                | 578 |
| (8) Core or minor diameter .          | 573 | (3) Buttress thread .....                                               | 578 |
| (9) Effective diameter .....          | 574 | 23-3. Conventional representation<br>of threads SP: 46-2003 .....       | 579 |
| (10) Pitch, (11) Lead, (12) Slope     | 574 | 23-4. Multiple-start threads .....                                      | 581 |
| 23-2. Forms of screw threads .....    | 574 | 23-5. Right-hand & left-hand threads                                    | 582 |
| 23-2-1. Triangular or V threads ..... | 575 | Exercises XXIII .....                                                   | 583 |
| (1) Unified thread .....              | 575 |                                                                         |     |
| (2) Metric thread .....               | 576 |                                                                         |     |
| (3) Whitworth thread .....            | 576 |                                                                         |     |

**CHAPTER 24 SCREWED FASTENINGS ..... 585-606**

- |                                         |     |                                                 |     |
|-----------------------------------------|-----|-------------------------------------------------|-----|
| 24-0. Introduction .....                | 585 | 24-4. Bolts .....                               | 590 |
| 24-1. Types of nuts .....               | 585 | 24-5. Forms of bolts .....                      | 590 |
| 24-1-1. Hexagonal nut .....             | 586 | (1) Hexagonal-headed bolt .                     | 590 |
| 24-1-2. Square nut .....                | 588 | (2) Square-headed bolt .....                    | 592 |
| 24-2. Types of nuts for special purpose | 589 | (3) Cylindrical or cheese-<br>headed bolt ..... | 593 |
| (1) Flanged nut .....                   | 589 | (4) Cup-headed or round-<br>headed bolt .....   | 593 |
| (2) Cap nut, (3) Dome nut .             | 589 | (5) T-headed bolt .....                         | 594 |
| (4) Cylindrical or capstan nut          | 589 | (6) Countersunk-headed bolt                     | 594 |
| (5) Ring nut, (6) Wing nut .            | 590 |                                                 |     |
| 24-3. Washers .....                     | 590 |                                                 |     |

(7) Hook bolt .....	594	(7) Penn, ring or grooved nut	600
(8) Headless tapered bolt ..	594	(8) Stop-plate or locking-plate	601
(9) Eye-bolt .....	595	(9) Spring-washer .....	601
(10) Lifting eye-bolt .....	595	24-8. Foundation bolts .....	602
(11) Tap-bolt or cap-screw .	595	(1) Eye or Hoop bolt .....	602
(12) Stud-bolt or stud .....	595	(2) Rag bolt, (3) Lewis bolt .	602
24-6. Set-screws .....	597	(4) Cotter bolt .....	603
24-7. Locking arrangements for nuts	598	(5) Curved or bent bolt ....	603
(1) Lock-nut or check-nut ..	598	(6) Squar-headed bolt .....	604
(2) Split-pin .....	599	24-9. Spanner .....	604
(3) Slotted nut .....	599	24-10. Longitudinal or bar stay .....	604
(4) Castle nut .....	600	24-11. Conventional symbols	
(5) Sawn nut or Wiles nut ..	600	for nuts and bolts .....	605
(6) Simmond's lock-nut ....	600	Exercises XXIV .....	605

**CHAPTER 25 RIVETED JOINTS AND WELDED JOINTS ..... 607-620**

25-1. Introduction .....	607	25-7-1. Connection of plates	
25-2. Riveting .....	607	at right angles .....	614
25-2-1. Caulking and fullering .....	608	25-7-2. Gusset stay .....	614
25-3. Forms and proportions		25-8. Welded joints .....	615
of rivet-heads .....	608	25-8-1. Welding .....	615
25-4. Failure of riveted joints .....	609	25-8-2. Types of welding process ....	615
25-5. Dimensions of a		25-8-3. Types of welded and	
riveted joint .....	609	welds joints .....	616
25-6. Types of riveted joints .....	610	(1) Types of welded joints ..	616
25-6-1. Lap joint .....	610	(2) Types of welds .....	616
25-6-2. Butt joint .....	611	25-8-4. Representation of welded joints	617
25-7. Rolled-steel sections .....	613	Exercises XXV .....	619

**CHAPTER 26 COMPUTER AIDED DRAFTING (CADr) ..... 621-702**

26-1. Introduction .....	621	26-5-5. Drafting Aids .....	630
26-2. Computer Aided Drafting ....	621	26-5-6. Editing of a Drawing .....	632
26-3. Computer .....	622	26-6. Symbol Library .....	634
26-3-1. Processor (CPU) .....	623	26-7. Two dimensional drawings ...	634
26-3-2. Display .....	623	26-8. Isometric drawings .....	659
26-3-3. INPUT Devices .....	624	26-9. 3d Geometrical Modeling ...	665
26-3-4. Graphic Output Devices .....	625	26-9-1. 3d Wireframe Modelling .....	666
26-4. CAD Software .....	625	26-9-2. 3d Surface Modelling .....	669
26-5. AutoCAD .....	626	26-9-3. 3d Solid Modelling .....	680
26-5-1. Hardware required for		26-9-4. Commands To Generate	
AutoCAD 2009/2010 .....	627	Profile Based 3d Solids .....	682
26-5-2. Classic screen layout of		26-10. Three Dimensional Drawings .	686
AutoCAD 2010 .....	627	26-11. Perspective View In AutoCAD	700
26-5-3. Function keys .....	628	Exercises XXVI .....	701
26-5-4. Drawing Entities .....	628		

**INDEX ..... 703-708**