

Table of Contents

Dedication	iii
Preface	xiii
Introduction	xv
Chapter 1: Drawing Sketches in the Sketcher Workbench-I	
The Sketcher Workbench	1-2
Starting a New File	1-2
Invoking the Sketcher Workbench	1-4
Invoking the Sketcher Workbench using the Sketcher Button	1-5
Invoking the Sketcher Workbench using the Sketch With Absolute Axis Definition Button	1-6
Setting Up the Sketcher Workbench	1-6
Modifying Units	1-6
Modifying the Grid Settings	1-7
Understanding the Sketcher Terms	1-8
Specification Tree	1-8
Snap to Point	1-10
Construction/Standard Element	1-10
Sketcher Toolbar	1-10
Inferencing Lines	1-11
Drawing Sketches using the Sketcher Tools	1-12
Drawing Lines	1-12
Drawing Center Lines	1-15
Drawing Rectangles, Oriented Rectangles, and Parallelograms	1-16
Drawing Points	1-18
Drawing Circles	1-19
Drawing Arcs	1-21
Drawing Profiles	1-23
Drawing Display Tools	1-25
Fit All In	1-26
Pan	1-26
Zoom In	1-26
Zoom Out	1-26
Zoom Area	1-26
Normal View	1-27
Hide/Show	1-27
Swap Visible Space	1-27
Tutorial 1	1-28
Tutorial 2	1-34
Tutorial 3	1-38
Tutorial 4	1-41

Self Evaluation Test	1-44
Review Questions	1-45
Exercise 1	1-46
Exercise 2	1-46

Chapter 2: Drawing Sketches in the Sketcher Workbench-II

Other Sketching Tools	2-2
Drawing an Ellipse	2-2
Drawing Splines	2-3
Connecting Two Elements by and Arc or Spline	2-4
Drawing Elongated Holes	2-5
Drawing Cylindrical Elongated Holes	2-6
Drawing Keyhole Profiles	2-6
Drawing Hexagons	2-7
Drawing Centered Rectangles	2-7
Drawing Centered Parallelograms	2-8
Drawing Conics	2-9
Editing and Modifying Sketches	2-11
Trimming Unwanted Sketch Elements	2-12
Extending Sketched Elements	2-13
Trimming by Using the Quick Trim Tool	2-13
Filletting Sketched Elements	2-14
Chamfering Sketched Elements	2-15
Mirroring Sketched Elements	2-16
Mirroring Elements Without Duplication	2-17
Translating Sketched Elements	2-18
Rotating Sketched Elements	2-18
Scaling Sketched Elements	2-19
Offsetting Sketched Elements	2-20
Modifying Sketched Elements	2-21
Deleting Sketched Elements	2-23
Tutorial 1	2-23
Tutorial 2	2-27
Tutorial 3	2-32
Self Evaluation Test	2-35
Review Questions	2-36
Exercise 1	2-37
Exercise 2	2-37

Chapter 3: Constraining Sketches and Creating Base Features

Constraining Sketches	3-2
Concept of Iso-Constraint Sketches	3-2
Iso-Constrained	3-2
Under-Constrained	3-2
Over-Constrained	3-3

Inconsistent	3-3
Not Changed	3-3
Adding Geometrical Constraints	3-3
Adding Automatic Constraints	3-3
Applying Additional Constraints to the Sketch	3-4
Applying Dimensional Constraints	3-7
Applying Contact Constraints	3-12
Applying Fix Together Constraints	3-12
Applying Automatic Constraints	3-13
Editing Multiple Dimensions	3-14
Analyzing and Deleting the Over Defining Constraints	3-15
Exiting the Sketcher Workbench	3-16
Creating Base Features by Extruding	3-16
Creating a Thin Extruded Feature	3-17
Extruding the Sketch by Selecting the Profile Using the Profile Definition Dialog Box	3-18
Extruding the Sketch Along a Directional Reference	3-20
Creating Base Features by Revolving Sketches	3-21
Creating Thin Shaft Features	3-22
Dynamically Rotating the View of the Model	3-22
Rotating the View Using the Rotate Tool	3-23
Rotating the View Using the Compass	3-23
Modifying the View Orientation	3-24
Display Modes of the Model	3-25
Shading (SHD)	3-26
Shading with Edges	3-26
Shading with Edges without Smooth Edges	3-26
Shading with Edges and Hidden Edges	3-26
Shading with Material	3-26
Wireframe	3-26
Customize View Parameters	3-26
Assigning Material to the Model	3-27
Tutorial 1	3-28
Tutorial 2	3-34
Self Evaluation Test	3-40
Review Questions	3-40
Exercise 1	3-41
Exercise 2	3-42

Chapter 4: Reference Elements and Sketch-Based Features

Importance of Sketching Planes	4-2
Reference Elements	4-3
Reference Planes	4-3
Creating Points	4-9
Creating Reference Lines	4-11
Other Sketch-Based Features	4-11

Creating Drafted Filleted Pad Features	4-11
Creating Multi-Pad Features	4-12
Other Feature Termination Options	4-13
Creating Pocket Features	4-14
Creating Drafted Filleted Pocket Features	4-16
Creating Multi-Pocket Features	4-16
Creating Groove Features	4-17
Extruding and Revolving Planar and Nonplanar Faces	4-18
Projecting 3D Elements	4-19
Tutorial 1	4-19
Tutorial 2	4-25
Tutorial 3	4-29
Self Evaluation Test	4-33
Review Questions	4-34
Exercise 1	4-35
Exercise 2	4-35

Chapter 5: Creating Dress-Up and Hole Features

Advanced Modeling Tools	5-2
Creating Hole Features	5-2
Creating Fillets	5-9
Creating Chamfers	5-18
Adding a Draft to the Faces of the Model	5-19
Creating a Shell Feature	5-25
Tutorial 1	5-26
Tutorial 2	5-33
Self Evaluation Test	5-39
Review Questions	5-39
Exercise 1	5-40
Exercise 2	5-42

Chapter 6: Editing Features

Editing Features of a Model	6-2
Editing Using the Definition Option	6-2
Editing by Double-clicking	6-3
Editing the Sketch of a Sketch-Based Feature	6-3
Redefining the Sketch Plane of Sketches	6-3
Managing Features and Sketches by Cut, Copy, and Paste Functionality	6-4
Understanding the Concept of Update Diagnose	6-5
Cut, Copy, and Paste Features and Sketches from One File to Another	6-6
Copying Features Using Drag and Drop	6-6
Copying and Pasting PartBodies	6-7
Deleting Unwanted Features	6-9
Deactivating the Features	6-10
Activating the Deactivated Features	6-10

Defining Features in Work Object	6-11
Reordering Features Enhanced	6-11
Understanding Parent Child Relationships	6-12
Measuring Elements	6-13
Measuring Between Elements	6-13
Measuring Items	6-15
Measuring Inertia	6-15
Tutorial 1	6-16
Tutorial 2	6-21
Tutorial 3	6-26
Self Evaluation Test	6-31
Review Questions	6-31
Exercise 1	6-32
Exercise 2	6-33

Chapter 7: Transformation Features and Advanced Modeling Tools-I

Transformation Features	7-2
Translating Bodies	7-2
Rotating Bodies	7-3
Creating Symmetry Features	7-4
Mirroring Features and Bodies	7-5
Creating Rectangular Patterns	7-6
Creating Circular Patterns Enhanced	7-12
Creating User Patterns	7-15
Scaling Models	7-16
Working with Additional Bodies	7-16
Inserting a New Body	7-16
Inserting a New Body Using Dialog Box New	7-17
Inserting Features in the Assemble Feature	7-17
Applying Boolean Operations to Bodies	7-18
Adding Stiffeners to the Model	7-23
Tutorial 1	7-25
Tutorial 2	7-31
Self Evaluation Test	7-36
Review Questions	7-36
Exercise 1	7-37
Exercise 2	7-39

Chapter 8: Advanced Modeling Tools-II

Advanced Modeling Tools	8-2
Creating Rib Features	8-2
Creating Slot Features	8-7
Creating Lofted Features	8-8
Creating Removed Loft Features	8-15
Tutorial 1	8-16

Tutorial 2	8-22
Tutorial 3	8-26
Self Evaluation Test	8-31
Review Questions	8-32
Exercise 1	8-33
Exercise 2	8-35

Chapter 9: Working with the Wireframe and Surface Design Workbench

Need of Surface Modeling	9-2
Wireframe and Surface Design Workbench	9-2
Starting the Wireframe and Surface Design Workbench	9-2
Creating Wireframe Elements	9-2
Creating Circles	9-2
Creating Splines	9-3
Creating a Helix	9-4
Creating Surfaces	9-5
Creating Extruded Surfaces	9-5
Creating Revolved Surfaces	9-6
Creating Spherical Surfaces	9-7
Creating Cylindrical Surfaces	9-9
Creating Offset Surfaces	9-9
Creating Swept Surfaces	9-10
Creating Fill Surfaces	9-14
Creating Lofted Multisection Surfaces	9-16
Creating Blended Surfaces	9-17
Operation on Shape Geometry	9-18
Joining Surfaces	9-18
Splitting Surfaces	9-19
Trimming Surfaces	9-20
Tutorial 1	9-21
Tutorial 2	9-28
Self Evaluation Test	9-36
Review Questions	9-37
Exercise 1	9-38
Exercise 2	9-39

Chapter 10: Editing and Modifying Surfaces

Surface Operations	10-2
Creating Projection Curves	10-2
Creating Intersection Elements	10-3
Healing Geometries	10-6
Disassembling Elements	10-7
Untrimming Surface or Curve	10-8
Creating Boundary Curves	10-9
Extracting Geometry	10-11

Transformation Features	10-11
Extrapolating Surfaces and Curves	10-17
Splitting a Solid Body With a Surface	10-19
Solidifying Surface Models	10-20
Add Thickness to a Surface	10-21
Creating a Solid Body from a Closed Surface Body	10-22
Sewing a Surface With a Solid Body	10-22
Tutorial 1	10-24
Tutorial 2	10-31
Self Evaluation Test	10-39
Review Questions	10-39
Exercise 1	10-40

Chapter 11: Assembly Modeling

Assembly Modeling	11-2
Types of Assembly Design Approach	11-2
Creating Bottom-Up Assemblies	11-4
Inserting Components in a Product File	11-4
Moving Individual Components	11-6
Moving and Rotating by Using the Manipulation Tool	11-7
Moving Components by Using the Snap Tool	11-9
Moving Components by Using the Smart Move Tool	11-10
Applying Constraints	11-13
Creating Top-Down Assemblies	11-23
Creating Base Part in the Top-Down Assembly	11-23
Creating Subsequent Components in the Top-Down Assembly	11-24
Creating Subassemblies in the Top-Down Assembly	11-25
Editing Assemblies	11-26
Deleting Components	11-26
Replacing Components	11-27
Editing Components Inside an Assembly	11-28
Editing Subassemblies Inside an Assembly	11-28
Editing the Assembly Constraints	11-29
Simplifying the Assembly	11-30
Interference Detection	11-32
Sectioning an Assembly	11-32
Exploding an Assembly	11-34
Tutorial 1	11-37
Tutorial 2	11-50
Self Evaluation Test	11-58
Review Questions	11-59
Exercise 1	11-60

Chapter 12: Working with the Drafting Workbench-I

The Drafting Workbench	12-2
------------------------	------

Starting a New File in the Drafting Workbench	12-2
Type of Views	12-5
Generating the Drawing Views	12-6
Automatically Generating the Views	12-6
Generating Individual Drawing Views	12-11
Working With Interactive Drafting in CATIA V5	12-27
Editing and Modifying Drawing Views	12-27
Changing the Scale of Drawing Views	12-27
Modifying the Project Plane of the Parent View	12-28
Deleting Drawing Views	12-28
Rotating Drawing Views	12-28
Hiding Drawing Views	12-28
Modifying the Hatch Pattern of Section Views	12-28
Tutorial 1	12-29
Tutorial 2	12-36
Self Evaluation Test	12-43
Review Questions	12-44
Exercise 1	12-45

Chapter 13: Working with the Drafting Workbench-II

Inserting Sheets in the Current File	13-2
Inserting the Frame and Title Block	13-3
Automatic Insertion of the Frame and Title Block	13-3
Creating the Frame and Title Block Manually	13-5
Adding Annotations to the Drawing Views	13-7
Generating Dimensions	13-7
Creating Reference Dimensions	13-10
Adding Datum Features	13-12
Adding Geometric Tolerance to the Drawing Views	13-13
Adding Surface Finish Symbols	13-15
Adding Welding Symbols	13-16
Applying Weld	13-17
Editing Annotations	13-18
Generating the Bill of Material (BOM)	13-18
Generating Balloons	13-20
Tutorial 1	13-21
Tutorial 2	13-29
Self Evaluation Test	13-33
Review Questions	13-34
Exercise 1	13-35

Student Project

1

Index

1