

## Essential SQL for Oracle 12c

Section	Title	Page	
<b>One</b>	<b>Introduction to SQL</b>	2	
	– Definition of SQL	3	
	– Definition of a Database	4	
<b>Two</b>	<b>Database Objects</b>	5	
	– Introduction	6	
	– Tables	7	
	– Views	8	
	– Materialized Views	9	
	– Indexes	10	
	– Sequences	11	
	– Packages, Functions and Procedures	12	
<b>Three</b>	<b>The SQL Plus Interface</b>	13	
	– Introduction	14	
	– Anatomy of SQL Plus	15	
	– ORA-12560: TNS:protocol adapter error	19	
	– ORA-12545: Connect failed	20	
	– Exiting an SQL Plus Session	21	
	– Using the DOS Window	22	
	– Copying and Pasting	23	
	– Using the Function Keys	24	
	– Using the Line Editor in SQL Plus	27	
	– Using the Editor in SQL Plus	28	
	– SQL Plus Environment Settings	29	
	– File Manipulation in SQL Plus	30	
	– Spooling Results in SQL Plus	31	
	– Changing Passwords / Clearing the Screen	32	
	<b>Four</b>	<b>SQL Scripts</b>	33
		– Commenting SQL Scripts	34
– Running SQL in Batch Scripts		38	
– Passing Parameters with SQL Scripts		40	
<b>Five</b>	<b>Simple Queries</b>	42	
	– Introduction	44	
	– Oracle Metadata	45	
	– SQL Syntax	46	
	– Counting Records in an Oracle Table	51	
	– Displaying Literals in a Select statement	54	
	– Displaying Variables in a Select statement	56	
	– <i>Exercise One</i>	59	
	– Column Aliases	60	
	– Column Manipulation with SQL Functions	64	
	– Concatenating Columns in SQL	67	
	– Performing Calculations in SQL	73	
	– Ordering Data in SQL	74	
	– Ordering More than One Column	75	
	– Manipulating Dates in SQL	77	
– Displaying Dates in SQL	78		
– <i>Exercise Two</i>	79		
<b>Six</b>	<b>Limiting Data Selected with a Where Clause</b>	80	
	– Limiting Data in SQL	85	
	– Structure of an SQL Where Clause	86	
	– Different types of SQL Where Clauses	87	

## Essential SQL for Oracle 12c

Section	Title	Page
	- Handling Nulls in Where Clauses	96
	- Case Restrictions in SQL Where Clauses	97
	- Using Functions in Where Clauses	98
	- Rownum in SQL Tables	101
	- Using Rowid in SQL Tables	103
	- Fetch first rows of a Table in Oracle 12c (Top-N)	105
	- Using Percent with Fetch in Oracle 12c	106
	- Using Offset with Fetch in Oracle 12c	107
	- Using With Ties with Fetch in Oracle 12c	108
	- <i>Exercise Three</i>	109
<b>Seven</b>	<b>Oracle Datatypes</b>	114
	- Introduction	115
	- Varchar2	116
	- ORA-00910: specified length too long for its datatype	118
	- Varchar2 and Char	119
	- Number	120
	- Date	121
	- Float	122
	- Long	123
	- Large Objects	124
	- Bfile	128
<b>Eight</b>	<b>Aggregating Values</b>	129
	- Introduction	130
	- Using Group By	131
	- Using Having with Group By	134
	- Using Rollup to Total Grouping	136
<b>Nine</b>	<b>Tree Walking Tables in SQL</b>	137
	- Introduction	138
	- Syntax for Tree Walking in SQL	140
	- Example of Tree Walking in SQL	141
	- Advanced Ordering of Siblings in Tree Walks	142
	- Sys_Connect_By_Path	144
	- <i>Exercise Four</i>	146
<b>Ten</b>	<b>Joining Tables in an SQL Statement</b>	149
	- Using Table Aliases in SQL	150
	- Linking Tables in an SQL statement	152
	- Problems with Joining Tables in SQL	157
	- Methods of Joining Tables in SQL	159
	- Using Ansi SQL/86 to Join Tables	160
	- Ansi SQL/86 and Outer Joins	161
	- Ansi SQL/99 Standards (Natural Joins)	164
	- Ansi SQL/99 Standards (Cross Joins)	165
	- Ansi SQL/99 Standards (Joins/Using)	166
	- Ansi SQL/99 Standards (On)	167
	- Ansi SQL/99 Standards (Multiple On)	168
	- Ansi SQL/99 Standards (Left Outer Join)	169
	- Ansi SQL/99 Standards (Right Outer Join)	170
	- Ansi SQL/99 Standards (Full Outer Join)	171
	- Merging Tables in SQL	172
	- Using Union to Merge Tables in SQL	173
	- Using Union All to Merge Tables in SQL	174

## Essential SQL for Oracle 12c

Section	Title	Page
	– Using Intersect to Merge Tables in SQL	175
	– Using Minus to Merge Tables in SQL	176
	– Knowledge Check	177
	– Using the Merge Syntax in SQL	182
	– <i>Exercise Five</i>	183
<b>Eleven</b>	<b>Advanced SQL Query Techniques</b>	<b>187</b>
	– Introduction	188
	– Pivot	189
	– Adding a Total to a Pivot	194
	– Changing the Pivot Headings of X Axis	195
	– Rotating the Axis of the Pivot	197
	– Unpivot	198
	– Unpivot and Null values	201
	– Using First_Value/Last_Value in SQL	202
	– Ignoring Nulls with First/Last_Value	204
	– Window Specification	205
	– Breakdown of Window Specification	206
	– Window Specification – The Arguments	208
	– Window Specification – Query Partition	209
	– Window Specification – The Order By	211
	– Window Specification – The Windowing	213
	– Window Specification – Rows between	215
	– Window Specification – Shortcuts	219
	– Difference between Range and Rows	220
	– Using Lead and Lag in SQL	223
	– Using Rank Function in SQL	227
	– Using Ntile Function in SQL	234
	– Using Width_Bucket Function in SQL	236
	– Using Listagg Function in SQL	239
	– Using Case Function in SQL	241
	– <i>Exercise Six</i>	245
<b>Twelve</b>	<b>Creating Database Objects in SQL</b>	<b>249</b>
	– Creating Tables in SQL	250
	– Mandatory Columns in SQL Tables	252
	– Creating Syntax for Tables in SQL	253
	– Virtual Columns	255
	– Creating Virtual Columns with new Table	256
	– Specifying Virtual Column Datatype and Size	257
	– Adding Virtual Columns to Existing Table	258
	– Using Virtual Columns in SQL ...	259
	– Using Virtual Columns with Functions	261
	– Limitations of Virtual Columns (ORA-54012)	262
	– Limitations of Virtual Columns (ORA-54015)	263
	– Limitations of Virtual Columns (ORA-54013)	264
	– Viewing Virtual Columns in USER_TAB_COLS	265
	– Invisible Columns in Oracle 12c	266
	– Commenting on Tables in SQL	269
	– Commenting on Columns in SQL	270
	– Creating Indexes in SQL	271
	– Disabling Indexes in SQL	276
	– Creating Views in SQL	277
	– Creating Sequences in SQL	279

## Essential SQL for Oracle 12c

Section	Title	Page
	- Using Sequences in SQL	280
	- Altering Sequences in SQL	282
	- Using Default Value in SQL Tables	283
	- Using Default Value in Oracle 12c	284
	- Using Identity in Oracle 12c	285
	- Renaming Objects in an Oracle Database	286
	- Dropping Objects from an Oracle Database	289
	- Granting Access in other Schemas	290
	- Accessing other Schemas	293
	- Creating Synonyms in Oracle	294
	- <i>Exercise Seven</i>	295
<b>Thirteen</b>	<b>Altering and Populating Oracle Tables</b>	<b>297</b>
	- Some Rules when Altering Tables	298
	- Syntax for Altering Tables	299
	- Rules When Populating Tables in SQL	300
	- Syntax for Populating Tables	301
	- Using Variables to Populate Tables	306
	- General Comments	307
	- Updating Data in Oracle Tables	308
	- Deleting Data from Oracle Tables	310
	- Handling Large Objects in SQL Plus	311
	- Handling BFiles in SQL Plus	313
<b>Fourteen</b>	<b>Committing Records</b>	<b>314</b>
	- The Difference Between DDL and DML	315
	- Using Autocommit in SQL Plus	318
<b>Fifteen</b>	<b>Materialized Views</b>	<b>319</b>
	- Introduction	320
	- Syntax for Creating Materialized Views	322
	- Refreshing Materialized Views	324
	- Building Materialized Views	330
	- Miscellaneous	332
	- <i>Exercise Eight</i>	333

### Appendices

- Appendix S1 – SQL Functions**
- Appendix S2 – SQL Line Editor Commands**
- Appendix S3 – SQL Environment Settings**
- Appendix S4 – SQL Number Formats**
- Appendix S5 – SQL Date Formats**

### Delegate Questionnaire