#### 1 Introduction to Oracle Database

Objectives

Oracle Database Server Architecture: Overview Oracle Multitenant Container Database: Introduction Oracle Multitenant Container Database: Architecture

Oracle Database Instance Configurations

**Database Sharding: Introduction** 

Oracle Database Server: Interactive Architecture Diagram

Summary

# 2 Accessing an Oracle Database

Objectives

Connecting to an Oracle Database Instance

Oracle Database Tools Database Tool Choices

SQL\*Plus

Oracle SQL Developer

Oracle SQL Developer: Connections
Oracle SQL Developer: DBA Actions
Database Configuration Assistant (DBCA)
Oracle Enterprise Manager Database Express
Enterprise Manager Cloud Control 13c Features
Oracle Enterprise Manager Component Overview
Single Pane of Glass for Enterprise Management
Oracle Enterprise Manager Database Management
Summary

# 3 Creating an Oracle Database by Using DBCA

Objectives

Planning the Database

Choosing a Database Template

Choosing the Appropriate Character Set

How Are Character Sets Used?

Setting NLS\_LANG Correctly on the Client

Using the Database Configuration Assistant

Using DBCA in Silent Mode

Summarv

**Practice Overview** 

#### 4 Creating an Oracle Database by Using a SQL Command

Objectives

Creating a Container Database (CDB)

Creating a CDB by Using a SQL Command: Example

Using the SEED FILE\_NAME\_CONVERT Clause

Using the ENABLE PLUGGABLE DATABASE Clause

Summary

**Practice Overview** 

# 5 Starting Up and Shutting Down a Database Instance

Objectives

Starting the Oracle Database Instance

Shutting Down an Oracle Database Instance

Comparing SHUTDOWN Modes

Opening and Closing PDBs

Configuring PDBs to Automatically Open

Summary

**Practice Overview** 

# **6 Managing Database Instances**

Objectives

Working with Initialization Parameters

**Initialization Parameters** 

Modifying Initialization Parameters

Viewing Initialization Parameters

Working with the Automatic Diagnostic Repository

**Automatic Diagnostic Repository** 

Viewing the Alert Log

**Using Trace Files** 

Administering the DDL Log File

Querying Dynamic Performance Views

Considerations for Dynamic Performance Views

Data Dictionary: Overview

Querying the Oracle Data Dictionary

Summary

**Practice Overview** 

#### 7 Oracle Net Services: Overview

Objectives

Connecting to the Database Instance

Oracle Net Services: Overview

**Defining Oracle Net Services Components** 

Tools for Configuring and Managing Oracle Net Services

Oracle Net Listener: Overview

The Default Listener

Comparing Dedicated and Shared Server Architecture

Summary

#### **8 Configuring Naming Methods**

Objectives

**Establishing Oracle Network Connections** 

Connecting to an Oracle Database Instance

Name Resolution

Establishing a Connection

**User Sessions** 

Naming Methods

Easy Connect

**Local Naming** 

**Directory Naming** 

Using Database Services to Manage Workloads

**Creating Database Services** 

Summary

Practice Overview

#### 9 Configuring and Administering the Listener

Objectives

Review: Oracle Net Services Overview

Oracle Net Listener: Overview

The Default Listener

Configuring Dynamic Service Registration Configuring Static Service Registration

Summary

**Practice Overview** 

# 10 Configuring a Shared Server Architecture

Objectives

Shared Server Architecture: Overview

Comparing Dedicated and Shared Server Architecture: Review

**Enabling Shared Server** 

**Controlling Shared Server Operations** 

SGA and PGA Usage

**Shared Server Configuration Considerations** 

Summarv

**Practice Overview** 

# 11 Configuring Oracle Connection Manager for Multiplexing and Access Control

Objectives

Oracle Connection Manager: Overview
Oracle Connection Manager Processes
Oracle Connection Manager: Architecture

Using Filtering Rules

Implementing Intranet Access Control Implementing Internet Access Control

**Using Session Multiplexing** 

Configuring Oracle Connection Manager

Configuring the cman.ora File Example of a cman.ora File

**Configuring Clients** 

Configuring the Database Server

Configuring the Database Server for Multiplexing (Optional)

Using the Oracle Connection Manager Control Utility

Review of Oracle Connection Manager Features

Summarv

**Practice Overview** 

# 12 Creating PDBs from Seed

Objectives

Provisioning New Pluggable Databases

Tools

Creating a New PDB from PDB\$SEED

Using the FILE NAME CONVERT Clause

Using OMF or the PDB\_FILE\_NAME\_CONVERT Parameter

Summary

**Practice Overview** 

#### 13 Using Other Techniques to Create PDBs

Objectives

Cloning Regular PDBs 3Migrating Data from a Non-CDB into a CDB

Plugging a Non-CDB into CDB Using DBMS\_PDB

Replicating a Non-CDB into a CDB by Using GoldenGate

Cloning a Non-CDB or Remote PDB

Using DBCA to Clone a Remote PDB

Plugging an Unplugged Regular PDB into CDB

Plugging in a PDB Using an Archive File

Cloning Remote PDBs in Hot Mode

Near-Zero Downtime PDB Relocation

Using DBCA to Relocate a Remote PDB Proxy PDB: Query Across CDBs Proxying Root Replica Creating a Proxy PDB Summary Practice Overview

#### 14 Managing PDBs

Objectives
Changing the PDB Mode
Modifying PDB Settings
Impact of Changing Initialization Parameters
Changing Initialization Parameters: Example
Using the ALTER SYSTEM Command in a PDB
Configuring Host Name and Port Number per PDB
Dropping PDBs
Summary
Practice Overview

#### 15 Database Storage Overview

Objectives

Database Storage Architecture

Logical and Physical Database Structures

Segments, Extents, and Blocks

Tablespaces and Data Files

Default Tablespaces in a Multitenant Container Database

SYSTEM and SYSAUX Tablespaces

Types of Segments

How Table Data Is Stored

**Database Block Content** 

Understanding Deferred Segment Creation

Controlling Deferred Segment Creation

Monitoring Tablespace Space Usage

Summary

# 16 Creating and Managing Tablespaces

Objectives

Creating Tablespaces

Creating a Tablespace: Clauses

Creating Permanent Tablespaces in a CDB

**Defining Default Permanent Tablespaces** 

**Temporary Tablespaces** 

Altering and Dropping Tablespaces

Viewing Tablespace Information

Implementing Oracle Managed File (OMF)

Enlarging the Database

Moving or Renaming Online Data Files

Examples: Moving and Renaming Online Data Files

Summary

**Practice Overview** 

### 17 Improving Space Usage

Objectives
Space Management Features
Block Space Management
Row Chaining and Migration

Free Space Management Within Segments

Allocating Extents

Using Unusable Indexes

**Using Temporary Tables** 

Creating Global Temporary Tables

**Creating Private Temporary Tables** 

Table Compression: Overview Table Compression: Concepts

Compression for Direct-Path Insert Operations
Advanced Row Compression for DML Operations

Specifying Table Compression Using the Compression Advisor Resolving Space Usage Issues

Reclaiming Space by Shrinking Segments

Shrinking Segments

Results of a Shrink Operation

Managing Resumable Space Allocation

Using Resumable Space Allocation

**Resuming Suspended Statements** 

What Operations Are Resumable?

Summary

**Practice Overview** 

### **18 Managing Undo Data**

Objectives

Undo Data: Overview

Transactions and Undo Data Storing Undo Information

Comparing Undo Data and Redo Data

Managing Undo

Comparing SHARED Undo Mode and LOCAL Undo Mode

Configuring Undo Retention

Categories of Undo

Guaranteeing Undo Retention

Changing an Undo Tablespace to a Fixed Size

Temporary Undo: Overview Temporary Undo Benefits Enabling Temporary Undo Monitoring Temporary Undo

Summary

Practice Overview

#### **19 Creating and Managing User Accounts**

Objectives

**Database User Accounts** 

Oracle-Supplied Administrator Accounts

Creating Oracle Database Users in a Multitenant Environment

Creating Common Users in the CDB and PDBs

Creating Schema Only Accounts

**Authenticating Users** 

Using Password Authentication

Using Password File Authentication

Using OS Authentication

OS Authentication for Privileged Users

**Assigning Quotas** 

Summary

**Practice Overview** 

#### 20 Configuring Privilege and Role Authorization

Objectives

Privileges

System Privileges

System Privileges for Administrators

**Object Privileges** 

Granting Privileges in a Multitenant Environment

Granting Privileges: Example Using Roles to Manage Privileges

Assigning Privileges to Roles and Assigning Roles to Users

Oracle-Supplied Roles

Granting Roles in a Multitenant Environment

Granting Roles: Example Making Roles More Secure Revoking Roles and Privileges

Granting and Revoking System Privileges Granting and Revoking Object Privileges

Summary

**Practice Overview** 

#### 21 Configuring User Resource Limits

Objectives

Profiles and Users

Creating Profiles in a Multitenant Architecture

Creating Profiles: Example Profile Parameters: Resources

Profile Parameters: Locking and Passwords Oracle-Supplied Password Verification Functions Assigning Profiles in a Multitenant Architecture

Summary

Practice Overview

### 22 Implementing Oracle Database Auditing

Objectives

**Database Security** 

Monitoring for Compliance

Types of Activities to be Audited

Mandatorily Audited Activities

**Understanding Auditing Implementation** 

Viewing Audit Policy Information

Value-Based Auditing

Fine-Grained Auditing

**FGA Policy** 

Audited DML Statement: Considerations

**FGA Guidelines** 

Archiving and Purging the Audit Trail

Purging Audit Trail Records

Summary

**Practice Overview** 

# 23 Introduction to Loading and Transporting Data

Objectives

Moving Data: General Architecture
Oracle Data Pump: Overview
Oracle Data Pump: Benefits
SQL Loader: Overview

Summary

# 24 Loading Data

Objectives

SQL Loader: Review

Creating the SQL\*Loader Control File

SQL\*Loader Loading Methods Protecting Against Data Loss SQL\*Loader Express Mode

Using SQL\*Loader to Load a Table in a PDB

Summary

**Practice Overview** 

# 25 Transporting Data

Objectives

Data Pump Export and Import Clients

Data Pump Interfaces and Modes
Data Pump Import Transformations

Using Oracle Data Pump with PDBs

Exporting from a Non-CDB and Importing into a PDB

Exporting and Importing Between PDBs

Full Transportable Export/Import

Full Transportable Export/Import: Example

Transporting a Database Over the Network: Example Using RMAN to Transport Data Across Platforms

RMAN CONVERT Command

Transporting Data with Minimum Down Time

Transporting a Tablespace by Using Image Copies

Determining the Endian Format of a Platform

Transporting Data with Backup Sets

Transporting a Tablespace

Transporting Inconsistent Tablespaces

Database Transport: Data Files

Transporting a Database

Transporting a Database: Conversion Transporting a Database: Example Transporting a Database: Considerations

Transporting a Database with Backup Sets

Summary

**Practice Overview** 

### 26 Using External Tables to Load and Transport Data

Objectives

**External Tables** 

External Tables: Benefits

ORACLE\_LOADER Access Driver ORACLE\_DATAPUMP Access Driver

**External Tables** 

Viewing Information About External Tables

Summary

**Practice Overview** 

# 27 Automated Maintenance Tasks: Overview

Objectives

Proactive Database Maintenance Infrastructure

Automated Maintenance Tasks: Components

Predefined Automated Maintenance Tasks

Maintenance Windows

**Predefined Maintenance Windows** 

Viewing Maintenance Window Details

**Automated Maintenance Tasks** 

Summary

### 28 Automated Maintenance Tasks: Managing Tasks and Windows

Objectives

Configuring Automated Maintenance Tasks

Enabling and Disabling Maintenance Tasks

Creating and Managing Maintenance Windows

Resource Allocations for Automated Maintenance Tasks

Changing Resource Allocations for Maintenance Tasks

Summary

**Practice Overview** 

### 29 Database Monitoring and Tuning Performance Overview

Objectives

Performance Management Activities

Performance Planning Considerations

**Database Maintenance** 

Automatic Workload Repository (AWR)

Automatic Database Diagnostic Monitor (ADDM)

Configuring Automatic ADDM Analysis at the PDB Level

Advisory Framework

Performance Tuning Methodology

Summary

#### **30 Monitoring Database Performance**

Objectives

Server-Generated Alerts

Setting Metric Thresholds

Reacting to Alerts

Alert Types and Clearing Alerts

**Database Server Statistics and Metrics** 

Performance Monitoring

Viewing Statistics Information

Monitoring Wait Events

Monitoring Sessions

Monitoring Services

Summary

**Practice Overview** 

### 31 Database Processes

Objectives

**Process Architecture** 

**Process Structures** 

Database Writer Process (DBWn & BWnn)

Log Writer Process (LGWR & LGnn)

Checkpoint Process (CKPT)

System Monitor Process (SMON)

Process Monitor Process (PMON)

Process Manager (PMAN)

Recoverer Process (RECO)

Listener Registration Process (LREG)

Manageability Monitor Process (MMON)

Archiver Processes (ARCn)

Interacting with an Oracle Database: Memory, Processes, and Storage

Summary

**Practice Overview** 

# **32 Managing Memory**

Objectives

Managing Memory Components

**Shared Pool** 

Database Buffer Cache

Redo Log Buffer

Large Pool

Java Pool

Streams Pool

Program Global Area (PGA)

Managing Memory Components

Efficient Memory Usage: Guidelines

**Automatic Memory Management** 

Monitoring Automatic Memory Management

**Automatic Shared Memory Management** 

**Understanding Automatic Shared Memory Management** 

Oracle Database Memory Parameters

Managing the SGA for PDBs

Managing the Program Global Area (PGA)

Managing the PGA for PDBs

Summary

**Practice Overview** 

### 33 Analyzing SQL and Optimizing Access Paths

Objectives

**SQL Tuning Process** 

Oracle Optimizer

**Optimizer Statistics** 

**Optimizer Statistics Collection** 

Setting Optimizer Statistics Preferences

Optimizer Statistics Advisor

**Optimizer Statistics Advisor Report** 

**Executing Optimizer Statistics Advisor Tasks** 

**SQL Plan Directives** 

Adaptive Execution Plans

SQL Tuning Advisor: Overview

SQL Access Advisor: Overview

SQL Performance Analyzer: Overview

Managing Automated Tuning Tasks

Summary

Practice Overview