

1. What is `refresh()` most useful for after inserting a new record through an ORM session?
(A) Clearing the entire identity map so no entities remain cached in the session.
(B) Publishing the inserted row to related API consumers through background events.
(C) Converting a pending transaction into a read-only query context.
(D) Reloading database-generated values so the in-memory object reflects persisted state.
2. What is the most likely outcome if application code modifies persisted data but forgets to commit?
(A) The engine will reject all future queries until the missing commit is supplied.
(B) The database will save only primary-key fields and discard other modified columns.
(C) The changes may appear in memory during the session but never become durable database state.
(D) The ORM will commit automatically to preserve consistency.
3. After completing Task 07, what kind of testing should provide the strongest evidence that the new service layer is correct?
(A) Integration tests that exercise real session behavior against the database.
(B) Only route-level end-to-end tests, because they make lower-level service tests unnecessary once the API appears functional.
(C) Only unit tests with mocked sessions, because touching the real database would mostly repeat FastAPI's own guarantees.
(D) Mostly entity constructor tests, because ORM migrations succeed or fail based on object instantiation rather than query behavior.
4. What is the most specific term for reusable testing setup logic that prepares known state in a test?
(A) Dependency Injection (B) Helper (C) Annotation (D) Fixture (E) Decorator
5. In an ORM, calling `commit()` mainly updates Python objects in memory; durability in the database happens later when the session is closed.
(A) True (B) False
6. When testing a method that writes to the database, when is checking persisted state especially important?
(A) Only in end-to-end browser tests where routes and HTML are both involved.
(B) Whenever the method uses helper functions, since helpers cannot be unit tested directly.
(C) When correctness depends on durable side effects, not just the method's returned value.
(D) Only when the method returns no object to inspect.
7. What term refers to the running or runnable instance created from a Docker image?
(A) Container (B) Layer (C) Image (D) Registry
8. A transaction is especially valuable when several related database changes must either all happen together or none happen at all.
(A) False (B) True
9. `SQLModel` expressions often use normal Python operators like `==` inside `.where()`. What is actually happening?
(A) The equal to operator compares the left and right and evaluates to a `bool` value.
(B) The ORM first executes the query in Python and then mirrors the result in SQL.
(C) Magic mocking.
(D) The operators are overloaded to compose SQL expressions.
10. What is the main role of seed-data helpers and fixtures in database-backed tests?
(A) They replace transactions so test cleanup can be skipped without risk.
(B) They prevent the need for assertions because seeded state defines expected outcomes.
(C) They arrange consistent starting state while keeping setup reusable, explicit, and isolated.
(D) They make tests more production-like by sharing the same mutable dataset everywhere.
11. What is the purpose of creating a fresh schema or otherwise isolating database state per test?
(A) To ensure each test begins from known conditions and cannot be polluted by prior runs.
(B) To make the database reuse the same execution plan for every test query.
(C) To avoid defining fixtures because isolated tests do not need setup code.
(D) To guarantee every test uses production-sized datasets for realistic performance.

12. What term refers to a column that stores a reference to a valid row in another table?
(A) Foreign key (B) Pointer (C) Primary key (D) Unique index (E) Default value
13. Why is `session.get()` especially appropriate for primary-key lookups?
(A) It bypasses transaction management to make repeated lookups always faster.
(B) It directly expresses identity-based retrieval.
(C) It only works for tables without indexes, where scanning is unavoidable.
(D) It automatically loads all relationships so the entity is fully hydrated.
14. In Docker Compose, why can one service often reach another by using the service name in a connection string?
(A) Docker copies host machine DNS records directly into application configuration files.
(B) Service names are compiled into the image so the database address cannot change later.
(C) Compose provides service-name-based hostname resolution within the shared application network.
(D) Each container automatically binds to localhost for every other container in the project.
15. Lazy loading is always a performance enhancing optimization because it avoids loading related data until it is needed.
(A) True (B) False
16. What term describes persistent storage managed outside a Docker container's writable layer?
(A) Volume (B) Kernel (C) Process (D) Cylinder (E) Image
17. What is the key conceptual difference between building a query with `select()` and executing it with `session.exec()`?
(A) One returns rows immediately, while the other uses lazy-loading.
(B) One updates cached entities, while the other serializes them for JSON output.
(C) One creates a transaction boundary, while the other closes the session.
(D) One defines the intended database operation, while the other actually runs it.
18. In Task 07, moving persistence into PostgreSQL means database access is not an in-process function call; each request no longer incurs inter-process communication costs. Therefore, reducing unnecessary database round trips becomes an important performance design concern.
(A) False (B) True
19. Which of the following best describes what `commit()` does in a database-backed application?
(A) It validates that all related tables have matching foreign-key indexes.
(B) It closes the engine connection and prevents further changes in the request.
(C) It reloads the current entities so their attributes match the database automatically.
(D) It finalizes the current transaction so pending changes become durable in the database.
20. What does a foreign key constraint primarily enforce?
(A) That all related tables use the same column names and data types everywhere.
(B) That every child row must contain a unique value across the entire database.
(C) That referenced relationships point to valid rows in another table.
(D) That joined queries execute using indexes instead of sequential scans.
21. What practical value does a named Docker volume provide for a database container?
(A) It preserves durable data outside the container's writable layer across container replacement.
(B) It makes the database schema immutable so migrations cannot accidentally alter tables.
(C) It allows multiple unrelated images to merge their filesystems into one database state.
(D) It guarantees that database writes are faster than writing to the container filesystem.
22. Separating API-facing models from persistence entities can make an application easier to evolve without exposing internal schema changes directly to clients.
(A) False (B) True
23. Why is it misleading to think of containers as miniature virtual machines?
(A) Containers always require a hypervisor even when running on Linux hosts.
(B) Containers isolate processes while sharing the host kernel.
(C) Containers cannot run more than one executable file during their lifetime.
(D) Containers are identical to virtual machines except for networking terminology.

24. What term refers to a reusable packaged data/template from which containers are created?
(A) Container (B) Volume (C) Image (D) Network
25. Why are containers often valuable in team-based software engineering projects?
(A) They replace version control by bundling application code and history into one artifact.
(B) They improve reproducibility by packaging runtime expectations consistently.
(C) They eliminate operating system differences by turning every machine into the same kernel.
(D) They make deployment unnecessary because the development container is already the production server.
26. Containers are best understood as lightweight ways to package and isolate processes, not as full independent machines with their own kernels.
(A) True (B) False
27. Because an ORM abstracts SQL, developers no longer need to think carefully about transaction boundaries in application code.
(A) False (B) True
28. What is the most accurate way to think about a session in ORM-based application code?
(A) Managing the application's low-level connections to the database system.
(B) A web authentication object that stores the current logged-in user's identity.
(C) An object cache that is shared across all requests in the app server.
(D) A unit-of-work workspace for coordinating queries, changes, and transactions.
29. Why is it valuable to test software services against a real database?
(A) It removes the need for unit tests because integration tests already cover internal branches.
(B) It exposes issues in queries and persistence behavior that mocks can hide.
(C) It proves that every route handler is correctly serialized into JSON responses.
(D) It guarantees production performance because test databases behave identically.
30. Which of the following best explains why ORMs are useful in software engineering?
(A) They help map application objects to relational data while reducing repetitive database access code.
(B) They replace the need for database schemas by storing all records as native language objects.
(C) They allow web APIs to avoid persistence concerns by embedding database logic in routes.
(D) They automatically make relational databases faster by bypassing indexes and query planning.
31. In Task 07, why is replacing the JSON-backed store with an ORM best understood as a refactor rather than a full rewrite?
(A) Any change from file storage to relational storage is automatically classified as a refactor regardless of system impact.
(B) The project counts as a refactor mainly because the new database code lives in the same repository as the old code.
(C) The work is a refactor only because we began from starter code, or earlier work, instead of a brand new application.
(D) The system's external behavior and layered design stay largely intact while an underlying persistence mechanism is replaced.
32. Which testing scenario is most clearly an integration test rather than a pure unit test?
(A) A utility test that verifies one helper returns the expected string transformation.
(B) A route test that checks only request model validation without calling services.
(C) A function test that replaces all collaborators with mocks and stubs.
(D) A service test that exercises real application logic against a live database.
33. What term refers to the statement or expression used to request data, with optional filtering or ordering constraints, from a database?
(A) Session (B) Get (C) Exec (D) Commit (E) Query
34. What term describes a group of database operations that should succeed or fail together as one unit?
(A) Constraint (B) Relationship (C) Transaction (D) Migration

35. In a typical web application stack using an ORM, what is the engine primarily responsible for?
- (A) A unit-of-work workspace for coordinating queries, changes, and transactions.
 - (B) Providing an in-memory replacement for the database during development.
 - (C) Tracking changed entities across requests.
 - (D) Managing the application's low-level connections to the database system.
36. What term is used to define a column whose values uniquely identify individual rows in a table?
- (A) Index
 - (B) Foreign key
 - (C) Constraint
 - (D) ID
 - (E) Primary key
37. What term describes the ORM-managed workspace that tracks loaded objects, stages changes, and participates in transaction boundaries?
- (A) Schema
 - (B) Fixture
 - (C) Session
 - (D) Engine
38. Why is distinguishing API-facing models from persistence entities a useful design practice?
- (A) It prevents database structure concerns from leaking directly into external interface contracts.
 - (B) It allows the database schema to change automatically whenever the API changes.
 - (C) It guarantees that every API route can be implemented without a service layer.
 - (D) It removes the need for validation because persistence models already enforce all rules.
39. What term describes a database structure that speeds up lookups by providing an efficient access path to rows?
- (A) Serializer
 - (B) Fixture
 - (C) Index
 - (D) Hash Table
 - (E) Migration
40. A Docker container can be pruned and replaced without data loss only if important state is stored somewhere outside the container's writable layer.
- (A) True
 - (B) False
41. Which of the following changes would most clearly violate the clean separation of responsibilities emphasized in Task 07?
- (A) An entity class models a database table while a route uses API models for request and response validation.
 - (B) A service method constructs HTTP-specific response behavior.
 - (C) A service method reads and writes through a session while remaining independent of FastAPI request and response objects.
 - (D) A route handler validates request data before calling a service method that performs persistence work through a session.
42. Which statement best distinguishes a Docker image from a Docker container?
- (A) An image is a reusable blueprint, while a container is a running or runnable instance.
 - (B) An image is a persistent database disk, while a container is a temporary network.
 - (C) An image is used only in development, while a container is used only in production.
 - (D) An image is the writable process state, while a container is the immutable template.
43. A database session that is shared globally across unrelated web requests is usually safer than creating one session per request.
- (A) False
 - (B) True
44. In Task 07, why should the old `store` layer and its tests be removed completely once services are rewritten around database sessions?
- (A) The store layer must be deleted because `SQLModel` can only run when no other persistence-related modules remain.
 - (B) Because it would lead to unavoidable naming conflicts.
 - (C) Leaving them in place preserves an obsolete architecture and splits persistence responsibility across competing abstractions.
 - (D) Keeping them would make PostgreSQL unable to serialize ORM entities correctly when both storage strategies coexist.
45. Using a real database in tests can reveal problems that mocks miss, such as incorrect assumptions about schema constraints or query behavior.
- (A) True
 - (B) False

46. One reason the N+1 queries problem is easy to miss is that application code can look simple even while triggering many hidden database round trips.
(A) True (B) False
47. If a test passes when run alone but fails in the full suite, hidden shared state between tests is a plausible cause.
(A) False (B) True
48. What technical term describes retrieving related ORM data when a relationship is first accessed?
(A) On-demand fetching (B) Caching (C) Serialization (D) Lazy loading (E) Migration
49. What is the main idea behind the “one container = one primary process” design guideline?
(A) It encourages clear responsibilities, simpler supervision, and composability.
(B) It ensures every process inside a system uses the same programming language runtime.
(C) It guarantees that logs, files, and environment variables stay synchronized across services.
(D) It prevents containers from exposing ports, reducing the attack surface automatically.
50. What term refers to the low-level object responsible for establishing and coordinating communication with the database in an ORM-based application?
(A) Repository (B) Transaction (C) Engine (D) Session