Part 1: Multiple Choice (96 points - 3 points per question)

(B) 1. Which is a SQL DCL command? (A) delete (B) grant (C) update (D) none of the above

(C) 2. Which SQL command is used to empty a table? (A) delete table (B) drop table (C) truncate table (D) none of the above

(A) 3. Which is used to to sort the result set in SQL? (A) order by (B) group by (C) sort by (D) having

(D) 4. In MySQL which command can show the schema of a table? (A) show (B) display (C) present (D) describe

(A) 5. Which returns the number of rows in SQL? (A) count() (B) number() (C) num() (D) none of the above

(A) 6. Which is not a SQL aggregate function? (A) average() (B) count() (C) last() (D) sum()

(B) 7. In the like operator of SQL, which can represent any string? (A) ; (B) % (C) * (D)

(D) 8. Which SQL aggregate function returns the largest value? (A) first() (B) largest() (C) maximum() (D) max()

(C) 9. When you log into Facebook, which SQL command will be used? (A) insert (B) grant (C) select (D) delete

(B) 10. What is a virtual table in SQL? (A) vision (B) view (C) screen (D) None of the above

(B) 11. In MySQL which is used to execute a SQL script? (A) use (B) source (C) \e (D) none of the above

(C) 12. Which is the rule activated by updates to the table? (A) constraint (B) business rule (C) trigger (D) none of above

(D) 13. Which is not a meaning for null values?
   (A) Attribute does not apply to this tuple. (B) Value exists but is not available.
   (C) Attribute value is unknown. (D) The value is beyond the domain range.

(C) 14. Which is true?
   (A) A super key is a key. (B) A superkey should be minimal.
   (C) Candidate keys can be designated as unique keys. (D) none of the above

(A) 15. Which represents all attributes of a table in a SQL statement? (A) * (B) <> (C) = (D) &

(B) 16. Which is an entity in a gallery? (A) Open hours (B) Exhibition items (C) Ticket price (D) none of the above

(C) 17. Which does double ovals represent in ER diagram?
   (A) composite attribute (B) derived attribute (C) multi-valued attribute (D) none of the above

(A) 18. Which is usually to represent a relationship in an ER diagram? (A) verb (B) noun (C) adjective (D) proposition

(D) 19. Which entity's existence depends on another entity? (A) codependent (B) variant (C) strong (D) weak

(D) 20. The _______ of a relationship type is the number of participating entity instances.
   (A) participation (B) degree (C) identification (D) cardinality

(D) 21. Which is the cardinality ratio between an item and a bid?
   (A) one-to-one (B) many-to-many (C) many-to-one (D) one-to-many

(B) 22. Which rule states that an entity instance can simultaneously be a member of two (or more) subtypes
   (A) partial specialization (B) overlap (C) disjoint (D) total specialization

(C) 23. Which of the following is false?
   (A) The EER is a type of conceptual data models. (B) E. F. Codd first proposed the relation model.
   (C) An entity can exist in the database merely by being a member of a subclass. (D) none of the above

(C) 24. Which is persistent data? (A) SQL statements (B) work queues (C) HTML documents (D) none of the above

(A) 25. Which constraint may the delete operation violate?
   (A) referential constraint (B) entity constraint (C) key integrity (D) none of the above

(B) 26. In the following EER diagram, which is true?

   (A) A person must be a camper, a biker, and a runner. (B) A person can be a camper and a runner.
   (C) A person must be a camper, a biker, or a runner. (D) None of the above

(B) 27. Which of the following finds those groups meeting stated conditions?
   (A) group by (B) having (C) using by (D) none of the above

(D) 28. Which is used to eliminate duplicate rows in a SQL query? (A) specific (B) check (C) alter (D) distinct

(D) 29. Which integrity constraints can trigger a sequence of operations? (A) restrict (B) set default (C) set null (D) cascade

(B) 30. Which is the process of defining a set of subtypes of a supertype?
   (A) generalization (B) specialization (C) aggregation (D) identification

(C) 31. Which is a DBMS? (A) Adobe Photoshop (B) Appserv (C) Microsoft Access (D) none of the above
Refer to the following figure, which following statement is true?

(A) Child is a strong entity. (B) An employee can have only one child. (C) Employee_ID in Employee is a foreign key. (D) none of the above

Part 2: Questions and Answers (104 points)

1. (20 points) Briefly explain these terminologies. If they are acronyms, also write what they stand for.
   (a) entity instance (b) UML (c) degree of relationships (d) identifying relationship (e) ontology
   (a) An entity (instance) is a specific object or thing in the mini-world that are represented in the database.
   (b) Unified Modeling Language (UML) is an object modeling and specification language used in software engineering.
   (c) The degree is the number of entity types that participate in a relationship.
   (d) An identifying relationship is the relationship between a weak entity type and its owner.
   (e) Ontology means using conceptual modeling and other tools to develop a specification of a conceptualization.

2. (a) (4 points) What does SQL stand for? Explain it.
   (b) (6 points) Based on the functions how can SQL be classified into three categories?
   (a) Structured Query Language (SQL) is a standard language used to retrieve, update and delete data from relational database management systems (DBMS).
   (b) Data Definition Language (DDL) is used to define databases.
   Data Manipulation Language (DML) is used to manipulate databases.
   Data Control Language (DCL) is used to control databases.

3. (30 points) Consider the following relations and using SQL to answer the following questions.

   course (course_no, course_title, credit)
   book_adoption(course_no, isbn, semester, year)
   book (isbn, title, author, year)

   (a) (2 points) Insert a tuple of ('CS220', 'Database System', 3) into the course table.
   (b) (2 points) Modify the title to 'XML Technologies and Applications' of the course number of 'CS366'.
   (c) (2 points) Add an attribute publisher to the book table.
   (d) (2 points) Specify the foreign key (course_no) in the book_adoption table references to the course table.
   (e) (3 points) Create the book table and indicate the primary key and necessary constraints.
   (f) (3 points) List the titles and credits of courses from the highest to the lowest credits.
   (g) (3 points) Specify a constraint year > 1990 in the book table.
   (h) (4 points) List titles of courses and books that are adopted in the Spring semester of 2013.
   (i) (4 points) List the course title and the number of books adopted in each course.
   (j) (5 points) Remove all books that was adopted in the course 'DBMS Administration'.

   (a) insert into course values ('CS220', 'Database Design', 3);
   (b) update product set course_title = 'XML Technologies and Applications' where course_no = 'CS366';
   (c) alter table book add publisher varchar(20);
   (d) alter table book_adoption add foreign key (course_no) references course (course_no);
   (e) create table book (isbn char(13) primary key not null,
   title varchar(50),
   author varchar(40),
   year int);
   (f) select title, credit from course order by credit desc;
   (g) alter table book add constraint year_constraint check (year > 1900);
(h) select c.title, b.title from course c, book_adoption ba, book b
     where c.course_no = ba.course_no and ba.isbn = b.isbn and semester = 'Spring' and year = 2013;
(i) select c.title, count(b.isbn) from course c, book_adoption ba, book b
     where c.course_no = ba.course_no and ba.isbn = b.isbn group by c.title;
(j) delete from book where isbn in
     (select b.isbn from course c, book_adoption ba, book b
     where c.course_no = ba.course_no and ba.isbn = b.isbn and c.title = 'DBMS Administration');

4. (a) (5 points) Explain the entity and referential integrity constraints in the relational model.
(b) (8 points) Briefly explain the four constraints on specialization and generalization.
(c) (2 points) What is difference between a shared class and a category?
   (a) • The entity integrity indicates the values of primary key attributes in a relation cannot be null.
       • The referential integrity constraints indicate any attribute of a foreign key in a table can contain only either values
         from the corresponding parent table’s primary key or the null value.
   (b) • The disjointness constraint specifies that the subclasses of the specialization must be disjoint.
       • The overlapping specialization specifies that the subclasses of the specialization can be overlapping.
       • The total specialization specifies that every entity in the superclass must be a member of some subclass.
       • The partial specialization specifies that an entity in the superclass is allowed not to belong to any of the subclasses.
   (c) A shared class is the intersection of the superclasses while a category is the union of the superclasses.

5. (16 points) Consider the following relations for the world classic baseball.
   player(player_no, name, country, birthday, position)
   team(country, coach, group)
   math(country, match_country, date, time, location)
   (a) (8 points) Draw the ER diagram.
   (b) (8 points) Show the relation schema and indicate the functional dependency.

(a)

(b)

player: | player_no | country  | name    | birthday | position |
       ↓        |          |         |          |          |

   team: | country  | coach   | group   |
       ↑        |          |         |          |

   match: | country  | date    | match_country | time    | location |
         ↑        |          |          |          |          |

6. (13 points) Consider the Happy Enterprise that requires modeling information about the different type of people involved
   in the movie production. Draw a EER diagram for the Happy Enterprise.
   • Each person should have person ID, name, phone, gender, and address.
   • There are two main groups of persons: Movie professionals and celebrity. Each movie professionals work on some company.
• A movie professionals can be either a director or an agent. Each director has her or his popularity and can direct a number of movies. Each agent has the agent fee.

• A celebrity can be a movie star, a model, or both. Each movie star has her or his movie style and play in some movies. Each model has her or his preferences.

• Each movie has the information about the title, released date, and language.