```
CREATE DATABASE CollegeDB;
USE CollegeDB;
CREATE TABLE Department (
DeptID INT PRIMARY KEY AUTO_INCREMENT,
DeptName VARCHAR(50) NOT NULL UNIQUE,
Location VARCHAR(50)
);
CREATE TABLE Student (
StudentID INT PRIMARY KEY AUTO_INCREMENT,
Name VARCHAR(50) NOT NULL,
Gender CHAR(1) CHECK (Gender IN ('M', 'F')),
DOB DATE NOT NULL,
DeptID INT,
Email VARCHAR(100) UNIQUE,
Phone VARCHAR(15) DEFAULT 'N/A',
FOREIGN KEY (DeptID) REFERENCES Department(DeptID)
ON DELETE SET NULL
ON UPDATE CASCADE
);
CREATE TABLE Course (
CourseID INT PRIMARY KEY AUTO_INCREMENT,
CourseName VARCHAR(100) NOT NULL,
Credits INT CHECK (Credits BETWEEN 1 AND 6),
DeptID INT NOT NULL,
FOREIGN KEY (DeptID) REFERENCES Department(DeptID)
```

ON DELETE CASCADE

);

CREATE TABLE Enrollment (

EnrollmentID INT PRIMARY KEY AUTO_INCREMENT,

StudentID INT NOT NULL,

CourseID INT NOT NULL,

EnrollDate DATE DEFAULT (CURRENT_DATE),

Grade CHAR(2) CHECK (Grade IN ('A', 'B', 'C', 'D', 'F', 'NA')),

FOREIGN KEY (StudentID) REFERENCES Student(StudentID)

ON DELETE CASCADE,

FOREIGN KEY (CourseID) REFERENCES Course(CourseID)

ON DELETE CASCADE,

UNIQUE (StudentID, CourseID)

);

◆ Part A: Database Design & Constraints (1–10)

1. Which column is the **primary key** in the `Department` table?
A) DeptName
B) DeptID
C) Location
D) CourseID
✓ **Answer:** B) DeptID
Explanation: `DeptID` uniquely identifies each department.

---

2. The `Student` table has a `Gender` column with a CHECK constraint. Which values are valid?
A) 'M' and 'F'
B) 'Male' and 'Female'
C) Any single letter
D) Only 'F'
✓ **Answer:** A) 'M' and 'F'
Explanation: Constraint defined as `CHECK (Gender IN ('M','F'))`.

---

3. What happens if a Department is deleted that still has students linked to it?
A) Error occurs
B) Student records are deleted
C) Student DeptID becomes NULL
D) No effect
✓ **Answer:** C) Student DeptID becomes NULL
Explanation: Defined as `ON DELETE SET NULL`.

---

4. Which constraint ensures no two students enroll in the same course twice?
A) PRIMARY KEY
B) UNIQUE
C) CHECK
D) DEFAULT
✓ **Answer:** B) UNIQUE
Explanation: `UNIQUE (StudentID, CourseID)` prevents duplicate enrollment pairs.

---

5. Which table has both `StudentID` and `CourseID` as foreign keys?
A) Course
B) Department
C) Enrollment
D) Student
✓ **Answer:** C) Enrollment
Explanation: Enrollment table connects students and courses.

---

6. The default value of `Phone` in the `Student` table is:
A) NULL
B) 'Unknown'
C) 'N/A'
D) Empty string
✓ **Answer:** C) 'N/A'
Explanation: Defined using `DEFAULT 'N/A'`.

---

7. The `Course` table has a CHECK constraint on credits. Which entry is invalid?
A) 3
B) 5
C) 6
D) 8
✓ **Answer:** D) 8
Explanation: `CHECK (Credits BETWEEN 1 AND 6)`.

---

8. If the Department name must not be repeated, which constraint is used?
A) NOT NULL
B) UNIQUE
C) DEFAULT
D) FOREIGN KEY
✓ **Answer:** B) UNIQUE
Explanation: Ensures no duplicate department names.

---

9. Which constraint ensures that no NULL values are allowed in `DeptName`?
A) UNIQUE
B) NOT NULL
C) CHECK
D) FOREIGN KEY
✓ **Answer:** B) NOT NULL

---

10. Which of the following is a **referential integrity constraint**?
A) UNIQUE
B) CHECK
C) FOREIGN KEY
D) DEFAULT
✓ **Answer:** C) FOREIGN KEY

◆ Part B: Query-based (11–20)

11. To get all students from the "Computer Science" department:

```
SELECT Name
FROM Student S JOIN Department D ON S.DeptID = D.DeptID
WHERE D.DeptName = 'Computer Science';
```

What type of join is used here?
A) INNER JOIN
B) LEFT JOIN
C) CROSS JOIN
D) RIGHT JOIN
✓ **Answer:** A) INNER JOIN

---

12. To find students who have **not enrolled in any course**, which join would be most suitable?

A) INNER JOIN
B) LEFT JOIN with WHERE EnrollmentID IS NULL
C) CROSS JOIN
D) RIGHT JOIN
✓ **Answer:** B) LEFT JOIN with WHERE EnrollmentID IS NULL

---

13. To count total courses offered by each department:

```
SELECT DeptID, COUNT(*)
FROM Course
GROUP BY DeptID;
```

What SQL clause ensures results are grouped by department?
A) HAVING
B) WHERE
C) GROUP BY
D) ORDER BY
✓ **Answer:** C) GROUP BY

---

14. To show students born after 2002:

```
SELECT Name FROM Student
WHERE DOB > '2002-12-31';
```

This query filters records using:
A) GROUP BY
B) HAVING
C) WHERE
D) ORDER BY
✓ **Answer:** C) WHERE

---

15. What is returned by:

```
SELECT COUNT(*) FROM Enrollment;
```

A) Number of students
B) Number of courses
C) Total enrollment records
D) Total departments
✓ **Answer:** C) Total enrollment records

---

16. To change a student's department, which command is used?
A) ALTER TABLE
B) UPDATE
C) INSERT
D) RENAME
✓ **Answer:** B) UPDATE

---

17. Which SQL keyword is used to prevent duplicate rows in query output?
A) DISTINCT
B) UNIQUE
C) CHECK
D) GROUP BY
✓ **Answer:** A) DISTINCT

---

18. To delete a department permanently:
A) DROP DATABASE
B) DELETE FROM Department
C) TRUNCATE Department
D) ALTER TABLE Department
✓ **Answer:** B) DELETE FROM Department

---

19. What happens when we insert a student with duplicate email?
A) Inserts successfully
B) Fails due to UNIQUE constraint
C) Replaces old record
D) Sets email to NULL
✓ **Answer:** B) Fails due to UNIQUE constraint

---

20. Which query lists all courses with 4 credits?
A) `SELECT * FROM Course WHERE Credits = 4;`
B) `SELECT CourseName FROM Course HAVING Credits = 4;`
C) `SELECT * FROM Course GROUP BY Credits = 4;`
D) `SELECT Credits = 4 FROM Course;`
✓ **Answer:** A) `SELECT * FROM Course WHERE Credits = 4;`

◆ Part C: Advanced & Logical (21–30)

21. If you delete a course, what happens to enrollments linked to it?
A) They remain

B) They are also deleted
C) Set to NULL
D) Database error
✓ **Answer:** B) They are also deleted
Explanation: `ON DELETE CASCADE` in Enrollment table.

---

22. Which SQL statement adds a new column “Address” to the Student table?
A) `ADD COLUMN Address VARCHAR(100)`
B) `ALTER TABLE Student ADD Address VARCHAR(100);`
C) `UPDATE Student ADD Address VARCHAR(100);`
D) `INSERT COLUMN Address VARCHAR(100);`
✓ **Answer:** B) ALTER TABLE Student ADD Address VARCHAR(100);

---

23. Which of the following is NOT a DML command?
A) SELECT
B) INSERT
C) DELETE
D) CREATE
✓ **Answer:** D) CREATE
Explanation: CREATE is a DDL command.

---

24. Which command removes all data from `Course` but keeps the structure?
A) DROP TABLE
B) DELETE FROM Course
C) TRUNCATE TABLE Course
D) REMOVE TABLE Course
✓ **Answer:** C) TRUNCATE TABLE Course

---

25. To change the default phone value from 'N/A' to 'Unknown':
A) ALTER TABLE Student MODIFY Phone DEFAULT 'Unknown';
B) UPDATE Student SET DEFAULT 'Unknown';
C) CHANGE DEFAULT Phone TO 'Unknown';
D) INSERT DEFAULT 'Unknown';
✓ **Answer:** A) ALTER TABLE Student MODIFY Phone DEFAULT 'Unknown';

---

26. Which query lists the number of students per department?

```
SELECT DeptID, COUNT(*)
FROM Student
```

```
GROUP BY DeptID;
```

What does COUNT(*) represent?
A) Number of departments
B) Number of students in each department
C) Total rows in database
D) Number of courses
✓ **Answer:** B) Number of students in each department

---

27. Which of these ensures data consistency between tables?
A) DEFAULT
B) FOREIGN KEY
C) CHECK
D) UNIQUE
✓ **Answer:** B) FOREIGN KEY

---

28. Which of these will violate referential integrity?
A) Deleting a department having students (ON DELETE SET NULL)
B) Inserting student with non-existing DeptID
C) Updating department name
D) Viewing data
✓ **Answer:** B) Inserting student with non-existing DeptID

---

29. To display department names and number of courses per department:

```
SELECT D.DeptName, COUNT(C.CourseID)
FROM Department D JOIN Course C ON D.DeptID = C.DeptID
GROUP BY D.DeptName;
```

What is this query showing?
A) Students per course
B) Courses per department
C) Enrollments per student
D) Courses with no department
✓ **Answer:** B) Courses per department

---

30. Which of the following ensures **automatic date entry** in `Enrollment` table?
A) DEFAULT constraint
B) CHECK constraint
C) UNIQUE constraint
D) PRIMARY KEY

✅ **Answer:** A) DEFAULT constraint
Explanation: `EnrollDate DATE DEFAULT (CURRENT_DATE)` auto-fills the date.