Q1. What are variables in JavaScript? How do you declare a variable using var, let, and const?

Ans: Variables in JavaScript are used to store data values such as numbers, strings, objects, or arrays. These values can be reused and changed throughout the program, making code flexible and easier to manage.

Declaring Variables in JavaScript

JavaScript provides three main keywords to declare variables: var, let, and const.

1. var

- Introduced in older versions of JavaScript.
- Has function scope.
- Variables declared with var can be redeclared and updated.

Example:

```
var name = "Nagesh";

var age = 23;
```

2. let

- Introduced in ES6 (2015).
- Has block scope.
- Variables declared with let can be updated but not redeclared in the same scope.

Example:

```
let city = "Navsari";

city = "Surat"; // allowed
```

3. const

- Also introduced in ES6.
- Has block scope.
- Variables declared with const cannot be updated or redeclared.
- Must be assigned a value at the time of declaration.

Example:

```
const pi = 3.14;
```

Q2. Explain the different data types in JavaScript. Provide examples for each.

Ans: Data types in JavaScript define the type of data that a variable can store. JavaScript has two main categories of data types: Primitive and Non-Primitive data types.

(1). Primitive Data Types

Primitive data types store single values.

1. Number

Used for integers and floating-point numbers.

```
let age = 21;
```

```
let price = 99.99;
```

2. String

Used to store text. Strings can be written using single or double quotes.

```
let name = "Nagesh";
```

```
let city = 'Navsari';
```

3. Boolean

Represents logical values: true or false.

```
let isLoggedIn = true;
```

```
let isAdmin = false;
```

4. Undefined

A variable declared but not assigned a value.

```
let result;
```

5. Null

Represents an intentional empty value.

```
let data = null;
```

6. BigInt

Used to store very large numbers beyond the safe integer limit.

```
let bigNumber = 12345678901234567890n;
```

7. Symbol

Used to create unique identifiers.

```
let id = Symbol("userId");
```

2. Non-Primitive (Reference) Data Types

These data types can store multiple values or complex data.

1. Object

Used to store data in key-value pairs.

```
let student = {
  name: "Nagesh",
  age: 23,
  course: "Front-End"
};
```

2. Array

Used to store multiple values in a single variable.

```
let subjects = ["HTML", "CSS", "JavaScript"];
```

Q3. What is the difference between undefined and null in JavaScript?

Ans: In JavaScript, undefined and null both represent the absence of a value, but they are used in different situations.

undefined

- Means a variable has been declared but not assigned a value.
- It is automatically assigned by JavaScript.
- Indicates that a value is missing or not yet defined.

Example:

```
let x;
console.log(x); // undefined
```

null

- Represents an intentional empty value.
- It is manually assigned by the programmer.
- Indicates that a variable is empty on purpose.

Example:

```
let y = null;

console.log(y); // null
```