**Java-script Theory**

**1.What is JavaScript? Explain the role of JavaScript in web development.**

**Ans.** JavaScript is a high-level, interpreted programming language primarily used to create interactive effects and enhance the functionality of web pages. It is one of the core technologies of the World Wide Web, alongside HTML (HyperText Markup Language) and CSS (Cascading Style Sheets).Originally developed by Netscape in the mid-1990s, JavaScript has evolved significantly and is now standardized by the ECMAScript specification.

**2. How is JavaScript different from other programming languages like Python or Java?**

**Ans.**

**3. Discuss the use of <script > tag in HTML. How can you link an external JavaScript file to an HTML document?**

**Ans.** The <script> tag in HTML is used to add JavaScript code to a web page. JavaScript is a scripting language that adds interactivity, dynamic behavior, and functionality to static HTML content. The <script> tag can either include JavaScript code directly inside the HTML file or link to an external JavaScript file.

This tag plays a crucial role in web development as it enables client-side programming, allowing developers to create interactive features like sliders, form validation, content updates without page reloads (AJAX), and more.

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

**Ans.** Variables in JavaScript are containers for storing data values. They allow programmers to store, retrieve, and manipulate data within a program. A variable can hold various types of data such as numbers, strings, objects, arrays, and more. JavaScript is a dynamically typed language, so variables do not need a fixed data type and can hold different types of values at different times.

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

**Ans. 1. Primitive Data Types**

**Primitive data types are basic, immutable values. They are stored directly in the variable and not as references.**

* **String:** Represents a sequence of characters used for textual data. Strings are written inside quotes, either single or double.
* **Number:** Represents both integers and floating-point numbers. JavaScript does not differentiate between integers and decimals.
* **Boolean:** Represents logical values – either true or false.
* **Undefined:** A variable that has been declared but not assigned a value is of type undefined.
* **Null:** A special data type that represents the intentional absence of any object value. It means "no value".
* **Symbol:** Introduced in ES6, it is used to create unique identifiers, often for object properties.
* **BigInt:** Introduced to represent integers that are too large for the Number type.

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

**Ans.** **Type:** undefined (primitive)

**Definition:** Represents the absence of a value — typically when a variable is declared but not assigned a value.

Automatically assigned by JavaScript.

**Common Cases:**

* Uninitialized variables
* Missing function parameters
* Missing object properties
* Return value of functions with no return

**null**

* **Type**: object (this is a known historical bug in JavaScript)
* **Definition**: Represents the **intentional absence of any object value**.
* **Explicitly assigned** by the programmer.
* **Common Cases**:
  + Resetting a variable
  + Representing an empty object reference
  + Placeholder for a value that will be later assigned

**7. What are the different types of operators in JavaScript? Explain with examples.**

**Ans. a) Arithmetic operators :**

**Definition:** Arithmetic operators are used to perform basic mathematical operations like addition, subtraction, multiplication, etc.

**Operators & Purpose:**

* **+ :** Adds two numbers.
* **- :** Subtracts the second number from the first.
* **\* :** Multiplies two numbers.
* **/ :** Divides the first number by the second.
* **% :** Returns the remainder after division.
* **\*\* :** Performs exponentiation (power).
* **++ :** Increments a number by 1.
* **-- :** Decrements a number by 1.

**b) Assignment operators :**

**Definition:** Assignment operators are used to assign values to variables. They can also perform operations before assignment.

**Operators & Purpose:**

* **= :** Assigns a value to a variable.
* **+= :** Adds a value and assigns the result.
* **-= :** Subtracts a value and assigns the result.
* **\*= :** Multiplies and assigns the result.
* **/= :** Divides and assigns the result.
* **%= :** Takes modulus and assigns the result.

**c) Comparison operators :**

**Definition:** Comparison operators are used to compare two values and return a Boolean result (true or false).

**Operators & Purpose:**

* **== :** Equal to (loose comparison, type conversion allowed).
* **=== :** Strict equal to (no type conversion).
* **> :** Greater than.
* **< :** Less than.
* **>= :** Greater than or equal to.
* **<= :** Less than or equal to.

**d) Logical operators :**

**Definition:** Logical operators are used to combine or invert Boolean expressions.

**Operators & Purpose:**

* **&& (AND) :** Returns true only if both conditions are true.
* **|| (OR) :** Returns true if at least one condition is true.
* **! (NOT) :** Inverts the Boolean value (true becomes false, and vice versa).

**8.What is the difference between == and === in JavaScript?**

**Ans.**

**9.What is control flow in JavaScript? Explain how if-else statements work with an example.**

**Ans.**

**10.Describe how switch statements work in JavaScript. When should you use a switch statement instead of if-else?**

**Ans.**

**11.Explain the different types of loops in JavaScript (for, while, do-while). Provide a basic example of each.**

**Ans.**

**12.What is the difference between a while loop and a do-while loop?**

**Ans.**

**13.What are functions in JavaScript? Explain the syntax for declaring and calling a function.**

**Ans.**

**14.What is the difference between a function declaration and a function expression?**

**Ans.**

**15. Discuss the concept of parameters and return values in functions.**

**Ans.**

**16. What is an array in JavaScript? How do you declare and initialize an array?**

**Ans.**

**17. Explain the methods push(), pop(), shift(), and unshift() used in arrays.**

**Ans.**

**18. What is an object in JavaScript? How are objects different from arrays?**

**Ans.**

**19. Explain how to access and update object properties using dot notation and bracket notation.**

**Ans.**

**20. What are JavaScript events? Explain the role of event listeners.**

**Ans.**

**21. How does the addEventListener() method work in JavaScript? Provide an example.**

**Ans.**

**22. What is the DOM (Document Object Model) in JavaScript? How does JavaScript interact with the DOM?**

**Ans.**

**23. Explain the methods getElementById(), getElementsByClassName(), and querySelector() used to select**

**elements from the DOM.**

**Ans.**

**24. Explain the setTimeout() and setInterval() functions in JavaScript. How are they used for timing events?**

**Ans.**

**25. Provide an example of how to use setTimeout() to delay an action by 2 seconds.**

**Ans.**

**26. What is error handling in JavaScript? Explain the try, catch, and finally blocks with an example.**

**Ans.**

**27. Why is error handling important in JavaScript applications?**

**Ans.**