COMSATS University Islamabad(Abbottabad Campus)

Department of Computer Sciences

Terminal Examination (Spring 2025)

Course: Web Technologies
Class: BCS-5A/BCS-5B
Total Marks: (100)
Name: _____

Date: 18th July, 2025
Instructor: Bushra Mushtaq
Total Time: 180 minutes
Reg. #: _____

Attempt all the following questions:

Q1- **Describe** the use of each of the following CSS selectors by giving example code (including style and related html code on which style will be applied) of each. Also **describe** the output of each example. **[CLO-1,C2]—(30 Marks)**

a) Element Selectors (3 marks)
b) Id Selectors (3 marks)
c) A class selector for multiple elements (3 marks)
d) A class selector for specific element (3 marks)
e) Multiple class selectors for specific element (3 marks)
f) Universal selector (3 marks)
g) Nested Selector (4 marks)
h) Pseudo-element selector(marker or selection) (4 marks)
i) Pseudo-class selector(first-child or last-child or hover) (4 marks)

Q2- **Review** the knowledge of the keyword **"this"** in the working of the **Regular function compare** with the working in the **Arrow Function, Explain** and **write** the output of the sample code in i) and ii). **[CLO-2,C3] (10-Marks)**

i. Use of "this" in regular function **marks(5)**

```
<!DOCTYPE html><html><head>
    <h1>Regular Function</h1>
<input type="button" id="btn" value="Click here"/>
<p id="demo"></p>
    <script>
        class ColorChange {
        constructor() {
        this.color = "Red";
        }
    changeColor = function() {
            document.getElementById("demo").innerHTML += this;  }
        }//end class
    const cchange = new ColorChange();
    window.addEventListener("load", cchange.changeColor);
    document.getElementById("btn").addEventListener("click", cchange.changeColor);
    </script></head><body> </body></html>
```

ii. Use of "this" in arrow function **marks(5)**

```
1   <!DOCTYPE html><html><head>
2       <h1>Arrow Function</h1>
3   <input type="button" id="btn" value="Click here"/>
4   <p id="demo"></p>
5       <script>
6           class ColorChange {
7           constructor() {
8           this.color = "Red";
9           }
10          changeColor = ()=> {
11              document.getElementById("demo").innerHTML += this;
12          }//end class
13          const cchange = new ColorChange();
14          window.addEventListener("load", cchange.changeColor);
15          const btn=document.getElementById("btn");
16          btn.addEventListener("click", cchange.changeColor);
17          </script></head><body></body></html>
```

Q3- In each of the following sub parts i to iv write the missing statements to **complete** the code for the asked task in each sub-parts. **[CLO-2, C3](20-Marks)**

i. In line#6 use the map() to display all the values of myArray in the form of unordered list items. Also write the missing code inside the render() at line#10. **marks(5)**

src > JS index.js > ...

```
1   import React from 'react';
2   import ReactDOM from 'react-dom/client';
3   import './index.css';
4
5   const myArray = ['web tech', 'AI', 'Data Science','data mining'];
6   const myList =
7
8   const root = ReactDOM.createRoot(document.getElementById('root'));
9
10  root.render(        );
```

ii. In line#8 (after return keyword) and line#10, write the missing statements to destructure the given function for the outputs of add, subtract , multiple and divide operations on a=4, b=8. **marks(5)**

```
1  <!DOCTYPE html><html><head></head><body>
2  <script>
3  function calculate(a, b) {
4      const add = a + b;
5      const subtract = a - b;
6      const multiply = a * b;
7      const divide = a / b;
8      return
9  }
10
11 document.write("<p>Sum: " + add + "</p><p>Difference " + subtract + "</p>");
12 document.write("<p>Product: " + multiply + "</p><p>Quotient " + divide + "</p>");
13 </script></body>
14 </html>
```

iii. In the following code sample, write the missing argument at line#12 to capture the object using destructuring property, as well as write the output statement at line#13 to display title, author, edition and year of the book object.**marks(5)**

```
1  <!DOCTYPE html><html><head></head>
2  <body>    <p id="demo"></p>
3  <script>
4  const Book = {
5      title: 'Introduction to Web Technologies',
6      Author: 'Daniel Wayne',
7      Edition: '4th',
8      year: 2022,
9      ISBN: '10023569'
10 }
11 myBook(Book);
12 function myBook(          ) {
13     const message =
14       document.getElementById("demo").innerHTML = message;
15 }
16 </script></body></html>
```

iv. Convert the following partially correct App.js code sample into JSX format also write missing import or export statement. **marks(5)**

```
1
2   import './App.css';
3   function App() {
4     return (
5       <div class="App">
6         <header class="App-header">
7           <img src={  } className="App-logo" alt="logo"  >
8           <p>
9             Edit <code>src/App.js</code> and save to reload.
10          </p>
11          <a  className="App-link" target="_blank"          >
12            Learn React
13          </a>
14
15
16    );
17  }
18
```

Q4 Let in your React app you already created the following navbar.js component:

A B C D

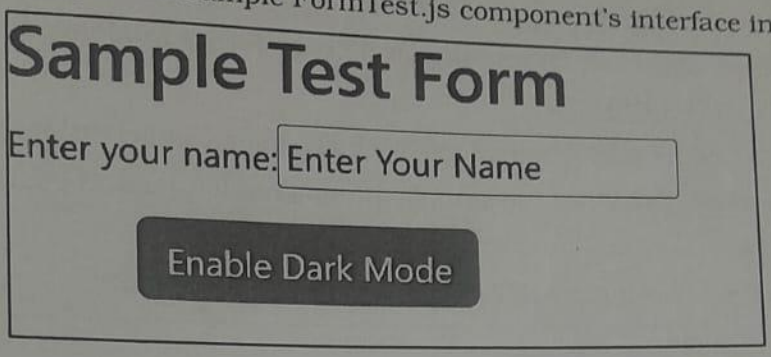
I am component A

Also you have created four components named 1)A.js, 2)B.js, 3)C.js. and 4)D.js. Do not write code for these components.

Set-Up/write the routing implementation steps and implement routing(method-1 or method-2(New)) in this react app(frontend app), for routing/link the A.js with A link, B.js with B link, C.js with C Link and D.js with D link in the navbar component.

[CLO-3, C3] **(10 marks)**

Q5- Let the following is the Sample FormTest.js component's interface in react.



[CLO-3, C3] (20 marks)

As you already that in React you cannot enter the text in the textboxes or any other input controls without onChange event. Also you need hooks and states to update values in textboxes.

Write the complete code of this FormTest component for the following:

i. **Create** the FormTest interface using JSX in the return statement of FormTesr.js component in which put the h1 heading and form controls(label, textbox and button with caption "Enable Dark Mode") inside the outer div tag. **marks(4)**

ii. Hook to maintain the state of Name **textbox** form control. **marks(2)**

iii. Hook to maintain the state of button's caption. Note that button will change its caption from "Enable Dark Mode" to "Enable Light Mode" **marks(2)**

iv. Hook to maintain the style of div, h2,label (background and font-color). **marks(3)**

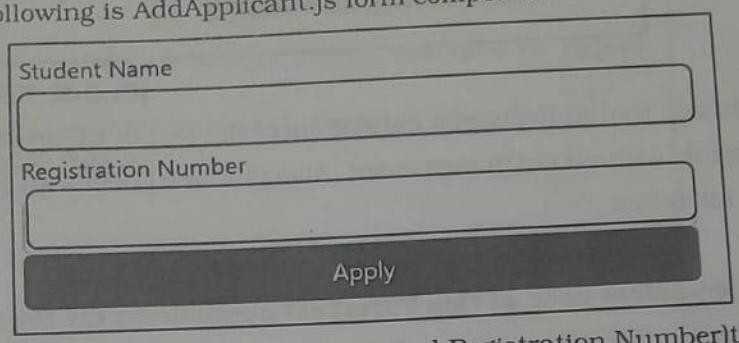
v. onChange event and related event Handling method for Name textbox control **marks(3)**

vi. Write the toggleState method which will be called whenever the button clicked. In this method the background and font color of h1 and form controls will be change from light to dark and from dark to light. Side by side the button caption should also change. **marks(6)**

Q6- Focus/test the knowledge of MERN stack from frontend(ClientSide) to Backend(Server-side NodeJS scripting and Data storage in Mongodb) do as directed in (i) and (ii).**[CLO-3,C3]** **marks(10)**

i. What is the role of axios? In which side(client or server) we write its statement/s? Write the sample statements for get and post requests using axios. **marks(3)**

ii. Let the following is AddApplicant.js form component:



For both textboxes(under label StudentName and Registration Number)the handleChange() called against onChange event, while addDetails() called against Apply button. The complete event handling code of AddApplicant component given below except html form code. **Explain** the purpose of code against given line numbers only: **marks(7)**

```
   import React, { useState } from 'react'
1   import { addApplicant } from '../Service/api';

   export default function AddApplicant() {
2  const [applicantData,setApplicantData]=useState({
3    studentName:"",
4  registrationNumber:""})

5  const {studentName,registrationNumber}=applicantData;

  const handleChange=(e)=>{
6     setApplicantData({...applicantData,[e.target.name]:[e.target.value]})
  }

  const addDetails=async(e)=>{
7    e.preventDefault();
8    await addApplicant(applicantData);
```