

34

**ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)**  
**ORGANISATION OF ISLAMIC COOPERATION (OIC)**  
**Department of Computer Science and Engineering (CSE)**

SEMESTER FINAL EXAMINATION  
 DURATION: 3 HOURS

WINTER SEMESTER, 2022-2023  
 FULL MARKS: 150

**CSE 4581: Web Programming**

Programmable calculators are not allowed. Do not write anything on the question paper.  
 Answer all **6 (six)** questions. Figures in the right margin indicate full marks of questions whereas corresponding CO and PO are written within parentheses.

1. You are given an HTML body shown in Code Snippet 1.

```

1 <body>
2   <h1>A Collection of the best recipes ever</h1>
3   <article id="recipe-list">
4     <ul>
5       <li>Holiday Cookies</li>
6       <li>Lasagna</li>
7     </ul>
8   </article>
9   <article id="recipe-area">
10    <h2>Holiday Cookies</h2>
11    <article id="ingredients">
12      <ul>
13        <li>flour</li>
14        <li>sugar</li>
15      </ul>
16    </article>
17    <p class="instruction">Combine all the ingredients.</p>
18    <p class="instruction">Wish on a shooting star.</p>
19  </article>
20 </body>
  
```

**Code Snippet 1:** Body part of an HTML for Question 1.

- a) What are tags and attributes in HTML? Explain in detail with the help of Code Snippet 1. 5  
(CO1)  
(PO1)
- b) Draw the Document Object Model (DOM) tree based on Code Snippet 1 that corresponds to the hierarchy of the body HTML (ignore the text, text nodes, and tag attributes - just refer to tag names in boxes and parent/child relationships with lines between boxes). 10  
(CO2)  
(PO2)
- c) Style the Code Snippet 1 with the following requirements: 5 × 2  
(CO2)  
(PO2)
- i. The background of the entire page should be #123456.
  - ii. The color of the text for all the headings should be green.
  - iii. Every element with the class *instruction* should have a border that is 2 pixels and red.
  - iv. The text in the list inside the article with the id *ingredients* should have a font preference of Arial, Helvetica, or any other sans-serif font.

2. You are given an HTML body shown in Code Snippet 2.

```
1 <body>
2   <main id="main">
3     <div id="div-1">
4       <h2 id="h21">Main Content Area</h2>
5       <p id="p1">First paragraph.</p>
6       <p id="p2">Second paragraph.</p>
7       <ul id="d-ul1">
8         <li id="ul-li-11"><a href="#" id="hr-11">Link 1</a></li>
9         <li id="ul-li-21"><a href="#" id="hr-21">Link 2</a></li>
10      </ul>
11    </div>
12    <p id="mid">Middle</p>
13    <div id="sidebar">
14      <h2 id="s-h">Sidebar</h2>
15      <ul id="d-ul">
16        <li id="ul-li-1"><a href="#" id="hr-1">Link 1</a></li>
17        <li id="ul-li-2"><a href="#" id="hr-2">Link 2</a></li>
18        <li id="ul-li-3"><a href="#" id="hr-3">Link 3</a></li>
19      </ul>
20    </div>
21  </main>
22  <footer id="footer">
23    <p id="f-p-1">All Rights Reserved</p>
24    <p id="f-p-2">IUT, CSE</p>
25  </footer>
26 </body>
```

Code Snippet 2: Body part of an HTML for Question 2.

a) Briefly discuss CSS combinators with the help of Code Snippet 2.

5

(CO1)

(PO1)

b) Write the ID's with justification of the elements selected by each of the given selectors listed in Code Snippet 2.

8 × 2.5

(CO2)

(PO2)

- i. main > div
- ii. main > div h2
- iii. main > div p:nth-of-type(2)
- iv. body > #f-p-1
- v. div + div
- vi. div + p
- vii. main ul li:nth-of-type(2)
- viii. li ~ li

3. a) Write a function that takes a string as input and prints whether it is palindrome or not. Palindrome is a sequence that can be read backward and forward as the same, such as MADAM, and KANAK. 10  
(CO2)  
(PO1)
- b) Assume, you visited an online bookstore and ordered some books. A book has three properties, such as name, author, and category. 5+10  
(CO1)  
(PO1)
- i. Write different ways to create a book object in JavaScript.
  - ii. Write a function that takes an array of books as input and determines whether there are any duplicate books within the array.
4. You are given an HTML body of a user registration form shown in Code Snippet 3.

```

1 <form id="registrationForm">
2   <label for="username">Username:</label>
3   <input type="text" id="username" name="username">
4   <span id="usernameError" class="error"></span>
5
6   <label for="email">Email:</label>
7   <input type="email" id="email" name="email">
8   <span id="emailError" class="error"></span>
9
10  <label for="password">Password:</label>
11  <input type="password" id="password" name="password">
12  <span id="passwordError" class="error"></span>
13
14  <label for="confirmPassword">Confirm Password:</label>
15  <input type="password" id="confirmPassword" name="confirmPassword">
16  <span id="confirmPasswordError" class="error"></span>
17
18  <button type="submit">Register</button>
19 </form>

```

**Code Snippet 3:** Body part of an HTML for Question 4.

- a) How would you dynamically change the styles of an input field when there is a validation error? 10  
(CO2)  
(PO1)
- b) Add a single action listener for the submit button and implement the following JavaScript functions. If all the functions return true, the form will be submitted, otherwise, it will be returned to the user with proper error messages. 5 × 3  
(CO3)  
(PO3)
- i. `FetchUserData()`: Collect user data from the form.
  - ii. `isValidName()`: The length of the `username` will be between 5 and 10. It contains only letters (A-Z, a-z) and numbers(0-9).
  - iii. `isValidEmail()`: Valid email address.
  - iv. `isValidPassword()`: The length of the `password` will be between 5 and 10. It must contain at least one letter (A-Z, a-z), a number(0-9), and a special character.
  - v. `isMatchedPassword()`: the values of `password` and `confirmPassword` must be the same.

5. a) What are the core modules in Node.js? Give examples. 5  
(CO1)  
(PO1)
- b) What is JSON Web Token (JWT)? How do you use it to enhance security in user authentication? 10  
(CO2)  
(PO1)
- c) How would you implement JWT as middleware for a particular page? 10  
(CO1)  
(PO1)
6. Suppose you are building a blog application where users can view blog posts and create new ones. Your application has the following pages:
- Home page: Displays a list of all blog posts
  - Single post page: Displays a single blog post with comments
  - Create post page: Allows users to create a new blog post
- a) What are the differences among local storage, session storage, and cookies? 5  
(CO1)  
(PO1)
- b) Analyze the above scenario and implement the routing in Express.js. 10  
(CO2)  
(PO2)
- c) Analyze the above scenario and implement the three components of the home, single post and create post pages. 10  
(CO2)  
(PO2)