1.3.4
WEB TECHNOLOGIES
TOPIC WISE EXAM QUESTIONS

A-LEVEL OCR

1.3.4 Web Technologies	a) HTML, CSS and JavaScript. See appendix 5d. b) Search engine indexing. c) PageRank algorithm. d) Server and client side processing.	Candidates need to understand the purpose of HTML, CSS and JavaScript. Candidates should have experience of writing webpages using HTML, CSS and JavaScript. Candidates need to be able to recognise the code in Appendix 5d, and be able to read, write, amend and interpret code using HTML, CSS and JavaScript. Candidates should understand how and why search engine results are indexed. They should understand how PageRank ranks these results. Candidates should understand how page rank works at a high level but are not expected to be able to code the algorithm. Candidates need to understand the difference between server and client side processing, and should be aware of examples (for example Javascript code vs PHP code) of processing on both sides. Candidates should be aware of the benefits and drawbacks of both types of processing.

4 A team of programmers create a robot that will be used in a factory. The robot will be able to do the work of multiple humans.

(d) The robot provides a web-based interface for users. The home screen webpage for this interface is shown in **Fig. 4**.

```
Robot User Interface

Robot prime directives

  • Serve the company trust
  • Protect data
  • Uphold standards

Updates

Login

Password  [_____]   [ Submit ]
```

Fig. 4

(i) Complete this HTML code that will display the webpage shown in **Fig. 4**.

```
<html>
    <head>
        <title>Robot User Interface</title>
    </head>
    <body>
        <h1>Robot prime directives</h1>

        ...........................................
            <li>Serve the company trust</li>
            <li>Protect data</li>
            <li>Uphold standards</li>

            ...........................................
    <a ........................... = "updates.html">Updates</a>
    <p>...........................................</p>
    <form action="dologin.php">
        Password
        <input type = "..............................." name="pw">
        <input type = "...............................">
    </form>
    </body>
</html>
```

[5]

(ii) Write CSS code that could be used in an external stylesheet to format all text using the <h1> tag as white with a red background.

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.... **[3]**

3 A website sells tickets for sporting events. The website uses HTML, CSS and JavaScript.

(a) Describe the purpose of HTML and CSS within the code of the website.

HTML ....

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CSS ....

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[4]

(b) One page in the website contains a hyperlink on an image. When the image stored as "ticket.png" is clicked, the user is hyperlinked to the page stored as "booking.htm".

Write the HTML code to implement this hyperlink.

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.... **[3]**

The website charges a booking fee of £2.99 on each ticket sold. In addition, if the tickets are purchased from outside of the UK, £4.99 is added to the booking fee. The booking fee is calculated using a JavaScript function named bookingfee().

(c) Complete the definition of the bookingfee() function below.

```
function bookingfee(numtickets, country) {

    var nonUKprice = 4.99;

    var perTicketPrice = ..........................................;

    var total = 0;

    if (country!="UK") {

        total = total + ..........................................;

    }

    total = total + (.......................................... * perTicketPrice);

    .......................................... total;

}
```

[4]

(d) The JavaScript function above is used to show users the booking fee. When users click to buy the tickets, the booking fee is calculated again on the server.

    (i) Explain why server side processing is used to recalculate the booking fee.

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       .... **[3]**

    (ii) Explain **one** advantage of client side processing to either the customer buying the tickets, or to company who own the website.

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       .... **[2]**

(e) Users are able to search for and find the ticket website using a search engine. Search engines can use indexing and ranking.

    (i) Describe how a website is indexed by a search engine.

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       .... **[4]**

A search engine can use the PageRank algorithm to determine a website's ranking. The PageRank algorithm utilises a damping factor.

    (ii) State what is meant by the term 'damping factor'.

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       .... **[1]**

    (iii) Give **two** other factors that affect the output value given by the PageRank algorithm for a website.

       1 ....

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       2 ....

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       [2]

4 (c) Shreya has received a webpage written in HTML shown in **Fig. 2.1**.

```html
<html>
    <head>
        <title>BBC Computer</title>
        <link rel="stylesheet" type="text/css" href="BBC.css">

    </head>
    <body>
        <h1 id="Beeb">History of the BBC Micro Computer</h1>

        <h2>BBC Micro Models</h2>
        <ul>
            <li class="model">Model A</li>
            <li class="model">Model B</li>
        </ul>

    </body>
</html>
```

Fig. 2.1

Some of the formatting requirements for this webpage are shown in **Fig. 2.2**.

Class/ID	Text	Formatting Requirements	
		font-family	colour
Beeb	History of the BBC Micro Computer	times	green
model	Model A Model B	arial	red

Fig. 2.2

Write the CSS Shreya needs to display the webpage so that it meets the formatting requirements stated in **Fig 2.2**. [6]

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11 A web development company makes its money building websites for other companies.

(a)* The web development company is looking to recruit a programmer to build websites.

Discuss the technologies the programmer would need to know and use and the importance of each one. [9]

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(b) Part of a website's code is shown below.

```
<head>
    <title>Orville's Oranges</title>
    <link rel="stylesheet" type="text/css" href="mainStyle.css">
</head>
```

Explain the meaning of the code.

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.... [2]

(c) The site also contains the following code.

```
<div class="offer">All oranges 50% off.</div>
```

Complete the CSS code that would make any div elements of the class offer have an orange border.

```
.......................................... {

            border-style: solid;

            ..........................................
    }
```

8 A theatre has a website showing its productions and allowing people to make bookings.

Part of the site is shown below. The words 'Book tickets' link to the page 'bookings.html'.

Upcoming productions:
1. Macbeth
2. Blood Brothers
3. An Inspector Calls

Book tickets

(a) Write the HTML code for the extract above.

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.... [3]

The theatre website also uses CSS.

(b) Give an example of why the theatre website might use CSS.

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.... [1]

The theatre offers price reductions on Tuesdays and Wednesdays.

The theatre manager wants some text on the website to display "Midweek Special – tickets £15 tonight" on Tuesdays and Wednesdays, and "Tickets £20 tonight" on all other nights.

The website coders will use a div tag with the id 'prices' to do this. The Javascript code to change the contents of the div tag has been started below. The variable dayCode holds a number representing the current day of the week (0 for Sunday, 1 for Monday, 2 for Tuesday and so on).

(c) Complete the Javascript code below so the correct message is displayed in a div tag with the id 'prices'.

```
var date = new Date();
var dayCode = date.getDay();
//0 is Sunday, 1 Monday, 2 Tuesday etc
var priceText="";
```

```
                                         = priceText;
```

[4]

2 **(b)** The company sets up a website to promote the watch. Part of the website is shown below. The sentence 'Download The Factsheet' is a hyperlink to the file factsheet.pdf which is stored in the same folder as the HTML file for the webpage.

Features

The new OCR Smart Watch:

1.   Uses the CB2 RISC processor for long battery life
2.   Stores up to 20hrs of music
3.   Tracks fitness

Download The Factsheet

(i)   Write the HTML to produce the extract from the webpage above. You can assume it will be placed within the `<body>` tags of a pre-existing page. You do **not** need to specify the font.

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.... **[5]**

(ii)   Explain what happens when a search engine indexes the page. You do **not** need to discuss ranking.

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.... **[3]**

2 An electricity company is looking at ways of getting meter readings from its customers. It releases an application for smartphones which allows users to submit their meter reading (a 6 digit number).

(a) Describe **one** method in which a user could enter the meter reading into the smartphone application.

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    .... [2]

(b) JavaScript is used to check that a reasonable value is being entered before a meter reading is sent to a server. When the user enters a meter reading number, the function `validateReading` is called. If the number entered is a valid number between 1 and 999999 inclusive, it returns `true` otherwise it returns `false`.

You will need to use the JavaScript function `isNaN()` standing for "is not a number". This returns `true` if the value it is given is not a number and `false` if it is.

```
isNaN(computer4) returns true
isNaN(203) returns false
```

Complete the function

```
function validateReading(reading)
{



}
```

[4]

9   A website contains the following HTML:

```
<html>
<head>
   <title>Boris' Cake Shop</title>
   <link rel="stylesheet" type="text/css" href="style.css">
</head>
<body>
   <h1>Boris' Cake Shop</h1>
   <p id="intro">
      Welcome to Boris' cake shop.
      <script>
         var hour = new Date().getHours();//gets the hour value of the
current time
         if(hour>9 && hour<17)
         {
            document.write("We are currently open.");
         }
         else
         {
            document.write("We are closed, come visit us when we are
open (09:00 - 17:00).");
         }
      </script>
   </p>
   <div class="customerQuote">
      Boris makes the best cupcakes I have ever tasted.
   </div>
</body>
</html>
```

(a)   Explain the difference between a HTML id attribute and a HTML class attribute.

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.... [2]

(b) The html file is linked to the CSS file `style.css`

Text between `h1` tags should be in the font Arial.

The customer quote should be on a background with the colour E8C3E1.

The introduction text should be dark red (using the named colour darkRed).

Write the code that should go in `style.css` to give this formatting.

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.... **[6]**

(c) The code between the `script` tags is supposed to display a different message during the shop's opening hours of 09:00 and 17:00.

(i) State the name of the language used between the `script` tags.

.... **[1]**

Some users have reported that there is a bug and the site says the shop is closed when they log on between 9 and 10 in the morning.

(ii) Explain how this bug can be fixed.

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.... **[1]**

(iii) Give **one** disadvantage of this code being run client side rather than server side.

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.... **[1]**

3 The following JavaScript has been found to crash certain web browsers.

```
Line    Code
1       var total = "";
2       for(var j = 0; j < 200000; j++)
3       {
4           total = total + j.toString();
5           history.pushState(0,0, total);
6       }
```

`j.toString()` converts `j` to a string. It is the JavaScript equivalent to `str(j)`.

(a) Complete the table below.

Line	Effect of Code
1	
2	
3	
4	
5	Pushes `total` onto a stack that holds the browser's history.
6	

[2]

[1]

[1]

8* Many websites try to ensure they are accessible to all visitors regardless of disability, language spoken or the device being used to access it. Discuss the technical and design measures that can be taken to ensure a website is accessible. [9]

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2   Elegant Bags is a company that makes designer handbags. It has decided it wants to sell its products online.

The company's handbags come in a variety of materials. It would like visitors to its website to be able to select different materials in their browser and for the image shown to then instantly change to one of a handbag made of the selected material.

(b) Explain how the website developer would implement this. You are not expected to write any code.

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.... **[4]**

The coding team are looking at writing a new closed source version of the application that converts audio and image files in addition to video. They intend to sell copies of the program when it is complete. They investigate three programming languages they could use, including:

*   **C++**, which is compiled to machine code

*   **Java**, which compiles to an intermediate code that then runs off a virtual machine

*   **JavaScript**, which runs from an interpreter in a web browser.

(d)* Discuss the benefits and drawbacks of the three options above and justify which option you would recommend.   [9]

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1(a). A website has the following code.

```
<p>
<form action="checkUser.php">
    Username:<br>
    <input type="text" name="username">
    <br>
    Password:<br>
    <input type="password" name="password">
    <br><br>
    <input type="submit" value="Submit">
</form>

<p id="warning">Unauthorised access to this system will be
prosecuted</p>
```

The page is linked to a style sheet. The message Unauthorised access to this system will be prosecuted is red with a monospace font. (Note this is the only text on the page that has this formatting)

Write the segment of CSS code that would appear on the style sheet to make the message appear in the way described.

-- [3]

(b). Explain the meaning of the HTML line `<input type="text" name="username">`

-- [2]

(c). *The line `<form action="checkUser.php">` sends the contents of the form to be processed by the server. This is done by code written in a language called PHP which is designed for server side processing. Conversely JavaScript is traditionally used for client side processing.

Discuss the difference between server and client side processing with respect to webpages. You should refer to the advantages, drawbacks and best uses of both approaches.

---[9]

2. A website has the following HTML code.

```
<html>
<head>
<title>My Stamp Collection - European Stamps</title>
</head>
<body>
<h1 style="font-family:Arial; color:darkGreen">United
Kingdom</h1>
<p>These are my stamps from the uk.</p>
<!-- Code A -->


<!-- Code B -->

</body>
</html>
```

the site's owner wants to add the photo UKstamps.jpg in place of the comment
```
<!-- Code A -->
```

The site's owner notices that his site doesn't come up high in the results from a search engine that uses the PageRank algorithm. State what would affect his site's ranking.

---[2]

If you found this useful, drop a follow to help me out!

THANK YOU!

GCST