*Back to the Arabian Science Future*

Minia University
Faculty of Eng.
CSE Dept.
Lab. 4
Total Marks: 120

4ᵗʰ Year
Final Exam
Jun. 2018
Code: CSE411
Time: 3:00 hrs

1. **[30 Points]** The Internet of Things will forever change our personal and professional lives. By 2020, there will be 50 billion connected devices communicating through the Internet.

   a. What is the hardware utilized in Internet of Things (IoT)?
   b. What is the IoT Layered Architecture?
   c. What are the Open Problems and Challenges for IoT?
   d. What are the differences between SoC and Microcontroller?
   e. Discuss this statement "The IoT operates at machine scale"?

2. **[30 Points]** JavaScript, often abbreviated as JS, is a high-level, interpreted programming language. It is a language which is also characterized as dynamic, weakly typed, prototype-based and multi-paradigm. Choose the answer from the multiple choice questions bellow.

   i. Which statement about the Document Object Model (DOM) is *false*?
   a) A tag and the HTML it encloses is one example of a DOM node.
   b) Every node in the DOM, including text nodes, may have child nodes.
   c) The DOM regards the document as a hierarchical tree of objects.
   d) Each node of the DOM is an object with attributes and methods.

   ii. When scripts are placed in the head section of a document, it is common practice to place statements attaching event handlers to document elements inside an event handler for window.onload. The reason is
   a) this is the only way parameters can be passed to the event handler.
   b) this is necessary in order for the page to pass the W3C validator.
   c) although not necessary, it is considered good coding style.
   d) the document elements do not exist at the time the code is read and executed by the browser.

   iii. Suppose a div element in a document has id="answerbox". If a JavaScript function sets d=document.getElementById("answerbox"), then which of the following is the preferred (best style) way to add a paragraph containing the word "Hello" as a child of that div?
   a) d.innerHTML = "<p>Hello</p>";
   b) p = createElement("p");
      p.innerHTML = "Hello";
      d.appendChild(p);
   c) answerbox.innerHTML = "Hello";
   d) d.appendChild("<p>Hello</p>");

   iv. Which statement about the name and id attributes of form fields is false?
   a) the id attribute is what is sent when the form is submitted.
   b) the name attribute can be used to access the field using getElementsByName().
   c) it is customary to give form fields both attributes, with the same value if possible.
   d) either attribute may be omitted if it is unused.

   v. Which statement is false?
   a) CSS style rules can be limited to apply to an element with a specific id.
   b) Two different elements of a page may have the same name attribute.
   c) Two different elements of a page may have the same id attribute.
   d) Elements do not need to be part of a form in order to have a name attribute.

   vi. Suppose an element of a document containing some text is referenced in JavaScript using a variable e. Which of the following JavaScript statements would cause the text to be bold-faced?
   a) e.style.font-weight : bold;
   b) e.font-weight : bold;

c) e.fontWeight = "bold";

d) e.style.fontWeight = "bold";

3. [*30 Points*] HTML is the markup language that you surround content with, to tell browsers about headings, lists, tables, etc.

   a. What's the difference between margin and padding in CSS?

   b. Draw a picture of how the following HTML/CSS code in Fig. 1 will look when the browser renders it on-screen. Assume that the HTML is wrapped in a valid full page with a head and body. Indicate a non-white background by shading lightly or by drawing diagonal lines like this. It is possible that some CSS rules shown will not apply to any elements.?

```
<div>
  <div class="id">A A A A</div>
  <div>
    <span>B B
        B B</span>
    <span id="id">C C C C</span>
    <span class="class">D D D D</span>
  </div>

  <div class="class">
    <span>E E E E</span>
    <div class="id">F F<br />F F</div>
    <div id="class">G G<br />G G</div>
    <div id="H">H H H H</div>
  </div>
</div>
```

```
div { border: 2px solid black;
      padding: 1em;
      background-color: white;
      overflow: hidden; }
div div > div { background-color: red; }
div > div .class { text-decoration: underline; }

#id { padding: .9em;
      border: 2px dashed black; }
.id { float: right; }
.class #class { float: left; }
```

Fig. 1

4. [*30 Points*] Magnetic levitation system is one of good example of control systems.

   a. Indicate why each of the following are needed in relation to Control Systems Modeling, Operating point, Simulink, and Step response

   b. What is controller emulation, and How to verify performance of controllers?

   c. Find the Simulink model of the magnetic levitation system shown in Fig. 2. Define and write all the requirements to calculate and compute the following terms using Equations and Matlab.

      i. Gain crossover frequency

      ii. Phase crossover frequency,

      iii. Gain margin,

      iv. Phase margin,

      v. Bandwidth,

      vi. Settling time,
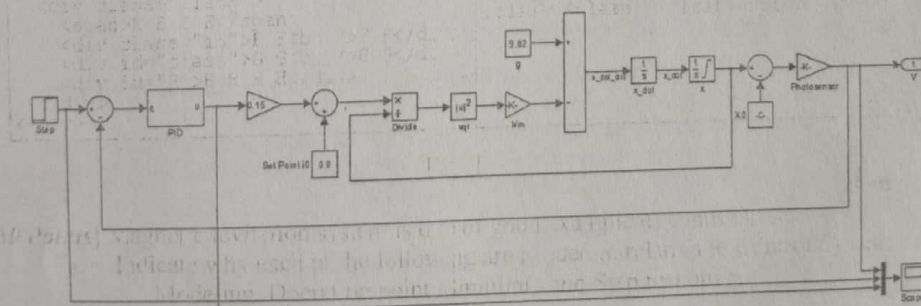
      vii. Rise time,

      viii. Steady state error.

Fig. 2. Simulation of the Mag Lev System with PID Controller.

Good luck

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