

Show all work – No work, No credit!!!

Grade _____

If you have not already done so, download this assignment in *.doc or *.odt format from the Forums and use that file to record your answers using MSWord or compatible word processor. When you begin this assignment, put a post in the form of a Reply on the forums (in the thread containing the download) stating such. Be sure to answer each question completely and in your own words. Any signs of academic dishonesty will result in a grade of 0 for all involved. If you have any questions, please ask. Neatness counts – hand written submissions will not be accepted. Be sure to do your own work. Each correctly completed problem is worth 12 points. As a guide, each completed question should be at least 2-3 paragraphs in length.

When you have completed the assignment, you can either submit a hardcopy or an electronic version. To e-mail a copy to me, send it to Jagodowski@stcc.edu in Microsoft Word *.doc *.docx, OpenOffice *.odt or *.pdf format from your @student.stcc e-mail address. Your e-mail MUST HAVE the Subject: **EET-255-D01 2019SP Final Assignment** or I may not see it. Once you send the e-mail & attachment edit your first post to state you have completed the assignment. I will confirm receipt of your e-mail & attachment on your Forum post. **DO NOT POST** your completed assignment on the forums. You DO NOT have to submit a hard copy. The e-mail attachment is sufficient. **Paper or electronic submission is due on or before 9:00 a.m. on Friday, May 17th.** Make your Forum posts here: <https://cset.stcc.edu/forums/viewtopic.php?f=330&t=2024&p=4564#p4564> Good Luck.

- 1.) List the 6 steps of *problem solving* as presented in class and supply a brief description of each step. (See the pdf entitled 6StepSolvingProcess.pdf found on the Forums at Week #9 at the following address: <https://cset.stcc.edu/forums/viewtopic.php?f=330&t=1949>)
- 2.) What does the acronym *DMAIC* represent? Describe what each letter in the acronym means. Describe the relationship between *DMAIC* and *Six Sigma*.
- 3.) What is LEAN manufacturing? Explain in detail.
- 4.) Explain why it is important & beneficial for a technician working in the Engineering or Manufacturing areas of a corporation to have an understanding of *Lean* and *Six Sigma* philosophies? Describe how these philosophies can help a company to be competitive, and then list a few possible problems with regards to *Six Sigma* or *Lean* implementations.
- 5.) What is a Gantt chart? Describe the advantages and disadvantages of a Gantt Chart schedule. In your answer include at least 2 software products which will help with project scheduling.
- 6.) Using the Electromagnetic Compatibility handout present in presented in Week #10 on the forums <https://cset.stcc.edu/forums/viewtopic.php?f=330&t=1964> as a guide, explain how the frequency behavior of an electrical conductor changes from D.C. (0 Hz) to Megahertz (and beyond). Be as detailed as you can in your description. Use this link http://www.allaboutcircuits.com/vol_2/chpt_14/3.html as an additional reference. At the end of this link there is a formula defining the characteristic impedance, Z_0 , of a transmission line. Describe how this characteristic impedance is related to the frequency behavior of a conductor described above, and determine Z_0 for a cable which has an inductance of 500 nH/m and a capacitance of 50 pF/m.
- 7.) In reference to the *Basic Laser Principles* pdf posted in Week #15 <https://cset.stcc.edu/forums/viewtopic.php?f=330&t=2022>, determine the frequency (in Hz) and energy (in *Joules*) of photons with wavelengths (λ) of: a.) 405 nm (Blue-Ray) b.) 632.6 nm (HeNe red) c.) 1.06 μm (Nd:YAG) and d.) 10.6 μm (CO₂). Assume Planck's Constant is 6.63×10^{-34} *Joules-secs* and the speed of light is 3×10^8 *meters/sec*. Use an online converter to convert each photon energy above from *Joules* to *electron-volts* (eV). What happens to the energy of the photon as the wavelength gets longer? What happens to the energy of the photon as the frequency gets higher?
- 8.) A term which is beginning to gain traction in automation discussions is *Industry 4.0*, as presented in Week #7: <https://cset.stcc.edu/forums/viewtopic.php?f=330&t=1924> In your own words, explain what *Industry 4.0* is all about and how you think it might impact Automation Technicians preparing for the future. In addition, which topics we've discussed this semester give you some background to the wide encompassing net included in discussions of *Industry 4.0*.