

PHYS 212 James Scholar Assignment #3

The problems are to be done on paper, **showing all work**. Again, *the presentation should be neat, legible, and easy to follow*.

Each page of your submission must contain: your name, discussion section, netid, and the assignment number

This assignment must be submitted to Gradescope by 5 pm on the due date.

1. Many crystals display the phenomenon of 'piezoelectricity.' Using the web, textbooks, or other articles, explain what this phenomenon is and why it occurs.
2. Give 3 practical applications of the piezoelectric effect (in addition to ink-jet printing).
3. Explain the two main methods to produce the ink droplets. (Look at the following link: <http://computer.howstuffworks.com/inkjet-printer.htm>)

Now we want to examine a few more details, and totally unique applications of inkjet printer technology. Consult this article

(<http://courses.physics.illinois.edu/phys212/fa2021/JamesScholars/03/inkjet.pdf>) and others, if necessary, to answer the questions below.

4. Explain the difference between 'continuous-mode' and 'demand-mode' technologies.
5. What are the main advantages and disadvantages of each one?
6. What is the minimum droplet size?
7. What is the minimum resolution (i.e., the smallest linewidth)?
8. Why is the resolution bigger than the droplet size?
9. What is one reason we don't yet make printed circuit boards using ink jet printers? (Hint: What is the difficulty in directly writing conductive tracks?)
10. Describe in several sentences one of the other possible applications of ink-jet printing technologies.