

1CS20 QUIZ 5

Full Name (Printed) _____

Full Name (Signature) _____

Student ID Number _____

- The exam is open-book and open notes. You will probably do better to limit yourself to a single page of notes you prepared well in advance.
- **All work must be your own.** You are not allowed to collaborate with anyone else, you are not allowed to discuss the exam with anyone until all the exams have been submitted (after the close of the submissions window for the exam).
- You have 30 minutes to complete the exam and sufficient time to scan the exam and upload it to GradeScope. The exam *must* be uploaded to GradeScope within the time allotted (that is, by the end of the lecture hour). We will only except submissions through GradeScope and will not accept any exam submitted after the submission window closes (CAE students must contact Corbin for instructions).
- **Given the limits of GradeScope, you must fit your work for each part into the space provided.** You may work on scratch paper, but you will not be able to upload the work you do on scratch paper, so it is essential that you copy your complete solution onto the exam form for final submission. We can only consider the work you submit on your exam form.
- **For full credit the grader must be able to follow your solution from first principles to your final answer. *There is a valid penalty for confusing the grader.***
- It is **YOUR** responsibility to make sure the exam is scanned correctly and uploaded before the end of the submission window. The graders may refuse to grade pages that are significantly blurred, solutions to problems that are not written in the correct place, pages submitted in landscape mode and/or work that is otherwise illegible - if any of this occurs, you may not receive *any* credit for the affected parts.
- Focus on the concepts involved in the problem, the tools to be used, and the set-up. If you get these right, all that's left is algebra.
- **Have Fun!**

The following must be signed before you submit your exam:

By my signature below, I hereby certify that all of the work on this exam was my own, that I did not collaborate with anyone else, nor did I discuss the exam with anyone while I was taking it.

Signature _____

At some point, rather high on the tower, the technician decides to turn on a portable receiver she's brought along. Watching the signal strength climb as she ascends the tower, she makes note of the point at which the signal from Catalina is the strongest and marks the tower.

- 5a) (5 points) Given the distance from the technician to the transmitter site doesn't change significantly as she climbs the tower, how do you account for the change in signal strength that she observes? The more correct, relevant, clear and detailed your answer is, the more points you are likely to receive.
- 5b) (10 points) How much further up the tower will our technician have to climb to find a point where the signal strength drops to its lowest value?

- 5c) (5 points) As the morning warms up, water begins to evaporate and a vapor forms over the surface of the ocean. As our technician descends the tower, will the point at which she observes maximum signal strength be above the mark she made on the way up or below it? Explain.

- 5d) (10 points) If the distance between the original mark made by the technician and the new point at which she observes maximum signal strength is given by δ , how much phase difference did the water vapor introduce into the relevant path?