# Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#### ECE 6382

#### Engineering Analysis I

**Exam 2**

#### Dec. 13, 2021

1. This exam is open-book and open-notes. Calculators are allowed. Computers are allowed as long as they are not used to communicate in any way with anyone other than the instructor. Cell phones or any other devices that have communication functionality are not allowed.
2. Show all of your work. No credit will be given if the work required to obtain the solutions is not clearly shown.
3. Please perform all your work on the exam in the space allowed if possible, though you can attach extra pages if necessary.
4. Please write neatly. You will not be given credit for work that is not **easily** legible.
5. Circle your final answers.

**Problem 1 (25 pts.)**

a) Find the first two nonzero terms of the asymptotic series for the following integral as Ω gets large:

.

b) Assume we keep only the first term of the asymptotic series. Give a formula that asymptotically predicts what the error is in using this leading term to estimate the integral, as Ω gets large.

**Room for Work**

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**Problem 2 (25 pts.)**

Find the leading term of the asymptotic series for the following integral, as Ω gets large:

.

The original path is along the imaginary axis from  to .

As part of your solution, show what the SDP and SAP paths look like.

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Problem 3 (25 pts.)

Consider the following differential equation:

.

The boundary conditions are:



Find the Green’s function  for this problem using “method 1”.

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Problem 4 (25 pts.)

Consider the following differential equation:

,



a) Solve for the Green’s function , using “method 2” (an eigenfunction expansion).

b) Assume that we now have  (with  being zero for *x* outside this range). Solve for  in the region .

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**Room for Work**