

INSTRUCTIONS:

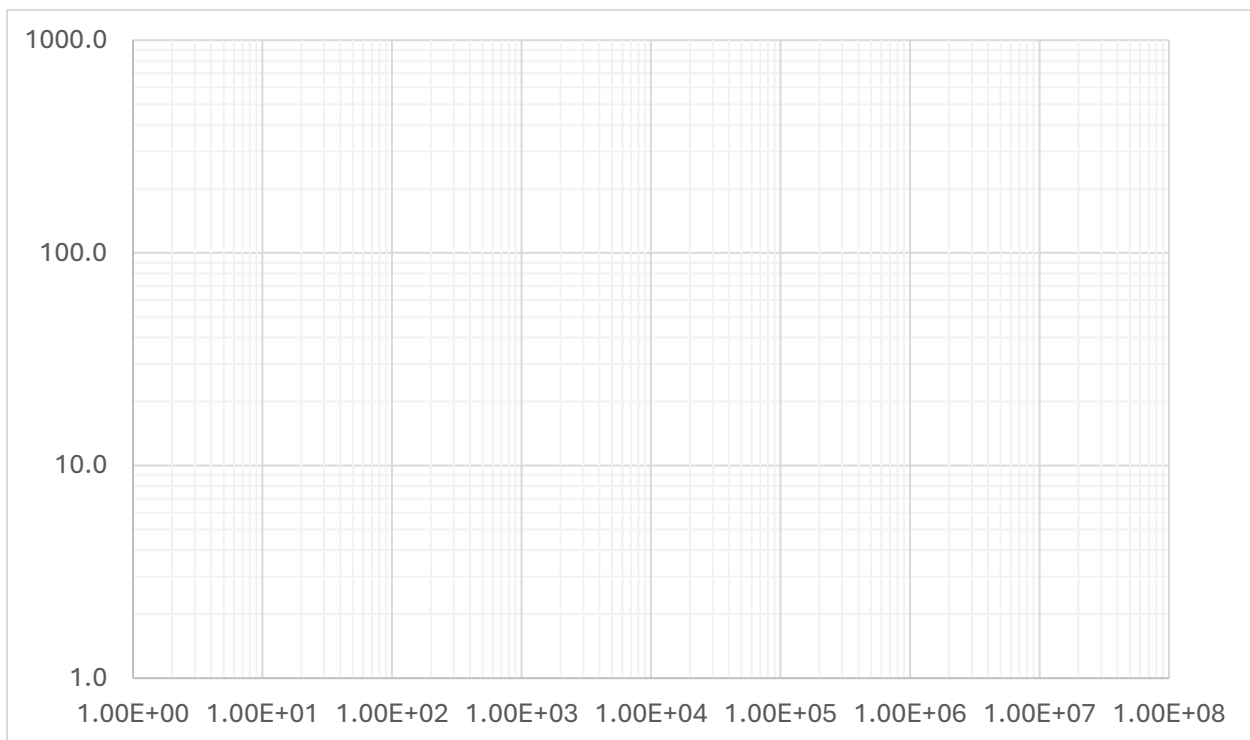
This quiz is open-book and open-note, and you may work with your classmates. Please answer all questions and show all of your work.

GIVEN:

A 1.5-in-diameter rod has a tensile strength of 150 ksi and is loaded in rotating bending. The surface finish is ground.

FIND:

- 1) The fully corrected endurance limit for the rod, S_e .
- 2) Sketch and label the S-N diagram using the axes provided below.
- 3) The life of the rod if it is loaded in completely reversed bending with a maximum stress of 70 ksi. If infinite life is predicted, what is the factor of safety?
- 4) The life of the rod if it is loaded in completely reversed bending with a maximum stress of 30 ksi. If infinite life is predicted, what is the factor of safety?



BONUS:

- a) How would the rod's life change if the surface was machined instead of ground? Briefly justify your choice.
- ☐ The rod's life would decrease
 - ☐ The rod's life would remain the same.
 - ☐ The rod's life would increase.
- b) How would the rod's life change if the diameter was decreased to 1 inch? Briefly justify your choice.
- ☐ The rod's life would decrease
 - ☐ The rod's life would remain the same.
 - ☐ The rod's life would increase.