

# Take Home Exam03AB: Modes of Fracture & the Energy Approach

Assigned: 03/05/2022 (Saturday)

Due (as pdf by email) 03/09/2022 (Wednesday)

You may submit your answers in one of two ways:

(i) •For typed answers: as a .docx file (as is) or converted into a pdf file. (DO NOT SEND GOOGLE DOC)

•For handwritten answers: Please scan as images, and group together into one pdf file. Or you may hand them manually to my office (ECME-212)

(ii) Please send your submission via email starting with HWExam03AB1 in the subject line.

## HW 03AB.1

How do you think information obtained from experiments of ductile fracture be useful in understanding semi-brittle fracture?.

## HW 03AB.2

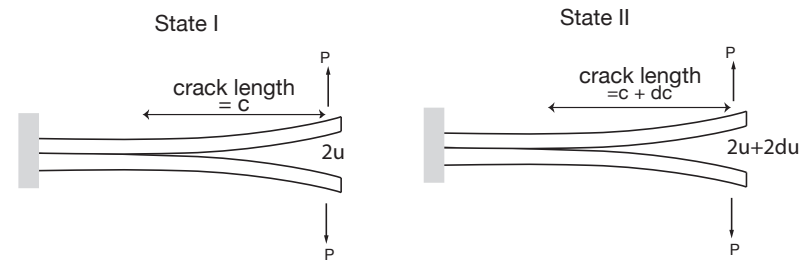
What will be the hierarchy (magnitude) of the work of fracture ( $2\gamma_F$ ) among brittle, semi-brittle fracture in metals, and semi-brittle fracture in polymers?

## HW 03AB.3

In class we discussed the change in potential and stored elastic energy if the crack should advance incrementally.

This experiment was carried out under constant load. And it was concluded that the total mechanical work done was equal to either the area of the triangle  $abf$  or  $\frac{P2\delta u}{2}$

(they are equal to each other in magnitude).



Now consider that the experiment is carried out at constant displacement (instead of constant load).

Show that the mechanical work available to advance the crack will still as was the case for the experiment under constant load.

