

MAE160
HOMEWORK 2
Due Date: April 17, 2007

- 1) A carbon fiber reinforced epoxy composite consists of unidirectionally aligned fibers and has $V_f = 62\%$. Calculate the longitudinal and transverse Young's modulus of this composite. $E_f = 200\text{GPa}$, $E_m = 5\text{ GPa}$.

- 2) The potential energy U of two atoms, a distance r apart, is

$$U = -\frac{A}{r^m} + \frac{B}{r^n}, \quad m = 2, n = 12.$$

Given that the atoms form a stable molecule at separation of 0.25 nm with an energy of -3.5 eV, calculate A and B. Also find the force required to break the molecule, and the critical separation at which the molecules breaks. Sketch an energy / distance curve for the atom, and sketch beneath this curve the appropriate force/ distance curve.

- 3) Example 6.1 (p.81)