國立屏東科技大學　九十四 學年度　碩士班甄試招生考試

材料科學導論　試題

1. Calculate the atomic packing factor (APF) for FCC.　(20%)

2. A piece of aluminum originally 100mm long is pulled in tension with a stress 138MPa. What will be the resultant elongation?(Young's modulus E_{Al}=69GPa)　(20%)

3. The diffusion coefficients for iron in nickel are given at two temperatures :

T(K)	D(m^2/s)
1273	$9.4x10^{-16}$
1473	$2.4\ x10^{-14}$

Determine the values of D_0(a temperature-independent preexponential, m^2/s) and the activation energy Q_d(KJ/mol).(the gas constant R=8.31J/mole-K)　(25%)

4. For BCC iron, compute (a) the interplanar spacing, and (b) the diffraction angle for the (220) set of planes. The lattice parameter for Fe is 0.2866nm. Assume that monochromatic radiation having a wavelength of 0.1790nm is used, and the order of reflection is 1.　(20%)

5. Briefly explain following terms:(15%)
   (a) solid-solution strengthening
   (b) strain hardening
   (c) the glass transition temperature