PHYS1169 PHYSICS 1(Chemical, Mechanical & Mining Engineering)

FORMULA SHEET

Some of these formulae may be referred to in some of the test questions. They will also help you answer some questions. You should know what quantities the symbols represents.

Empirical model: $V(r) = \frac{-A}{r^n} + \frac{B}{r^m}$

$r_o^{m-n} = \frac{mB}{nA}$

$r_c^{m-n} = \frac{m(m+1)B}{n(n+1)A}$

$T = \frac{N_B A(m-n)}{4mr_o^{n+2}}$

Young's modulus: $E = \frac{\sigma}{\varepsilon} = \frac{(F/A)}{(\delta l/l)}$

Rigidity modulus: $G = \frac{\tau}{\gamma}$

Bulk modulus: $K = \frac{-P}{(\Delta V/V)}$

$K_{ad} = \gamma P$

Poisson's ratio: $\nu = \frac{(-\delta d/d)}{(\delta l/l)}$

Viscosity: $\eta = \frac{\tau\, l}{v}$

$F_R = 6\pi\eta v r$

Stress concentration factor: $K = \frac{2c}{b} = 2\sqrt{c/r}$

Fracture stress (cleavage): $\sigma_F = \left(\frac{\gamma E}{r_o}\right)^{1/2}$

Fracture stress (Griffith's Theory): $\sigma_F = \left(\frac{4\gamma E}{\pi c}\right)^{1/2}$

Energy per unit length of a dislocation is Gb^2

Doppler effect $f' = f_0 \left(\frac{v + v_0}{v - v_s}\right)$