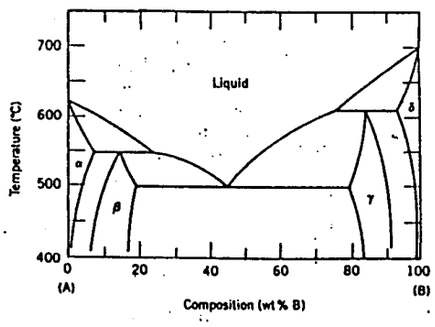
Materials Science and Engineering Test

1. Briefly explain: (a) Toughness (b) Fatigue (c) Crevice Corrosion (d) Ductile-to-Brittle Transition (e) Fiber-Reinforced composite.
2. Describe to the three strengthening mechanisms for single-phase metals by (a) Grain Size Reduction (b) Solid Solution Alloying (c) Strain Hardening with Dislocation Concept.
3. Make comparisons of Thermoplastic and Thermosetting polymers (a) on the basis of mechanical characteristics upon heating and (b) according to possible molecular structures.
4. Why are ceramic materials generally weak in tension and high in shear strengths?
5. This is a phase diagram for hypothetical metals A and B; the single-phase regions are already labeled.



(a) Label all two-phase regions

(b) For an alloy of 85 wt% B – 15 wt% A at equilibrium at 625°C
(i) Name the phase(s) present.
(ii) Give the composition(s) of the phase(s)
(iii) Give the relative amount(s) of the phase(s).