

參考用

根據 Fe-Fe<sub>3</sub>C 相圖 (圖 1)，請回答下列問題 (1) ~ (5) (20%)

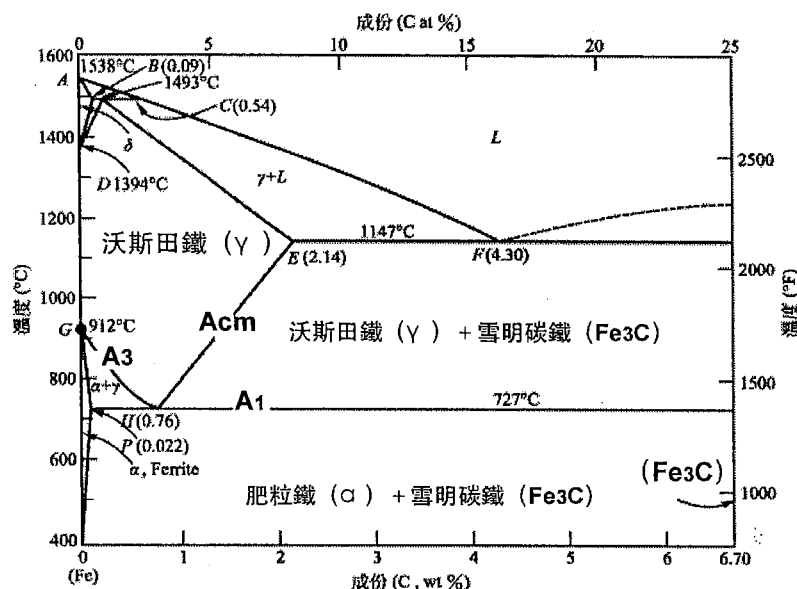


圖1 Fe-Fe<sub>3</sub>C 二元相圖

- (1) 在共晶反應 (eutectic reaction) 點，寫出其反應式，及對應的碳含量(wt%)和溫度(°C)
- (2) 在共析反應 (eutectoid reaction) 點，寫出其反應式，及對應的碳含量(wt%)和溫度(°C)
- (3) 在包晶反應 (peritectic reaction) 點，寫出其反應式，及對應的碳含量(wt%)和溫度(°C)
- (4) 沃斯田鐵可以溶解的最大碳含量(wt%)? 肥粒鐵可以溶解的最大碳含量(wt%)?
- (5) 波來鐵 (pearite) 中是由肥粒鐵與雪明碳鐵所構成，寫出肥粒鐵與雪明碳鐵的重量比。
- (6) On the basis of microstructure, briefly explain why gray iron is brittle and weak in tension. (5%)
- (7) How would you expect a decrease in the austenite grain size to affect the hardenability of a steel alloy? Why? (5%)
- (8) If copper (which has a melting point of 1085 °C) homogeneously nucleates at 850 °C, calculate the critical radius given values of  $-1.77 \times 10^9 \text{ J/m}^3$  and  $0.200 \text{ J/m}^2$ , respectively, for the latent heat of fusion and the surface free energy. (5%)
- (9) Briefly explain why there is no bainite transformation region on the continuous cooling transformation diagram for an iron-carbon alloy of eutectoid composition.. (5%)
- (10) Compute the mass fraction of eutectoid ferrite in an iron-carbon alloy that contains 0.45 wt% C. (5%)
- (11) Briefly describe the primary difference between addition and condensation polymerization techniques. (5%)

注意：背面有試題

參考用

- (12) 試列舉五種切削刀具磨耗產生的機制，並說明之。(10%)
- (13) 試比較並說明以下三種加工方法的特點。(15%)  
(a) lapping (b) buffing (c) honing
- (14) Briefly describe the photolithography processes and list three factors that affect the resolution of photolithography processes. (10%)
- (15) Briefly describe the chemical vapor deposition processes and list two applications of chemical vapor deposition. (10%)
- (16) Assume your future research topic involves making microstructures on silicon wafers. You can either use wet etching or dry etching. What is your consideration? (5%)

注意：背面有試題