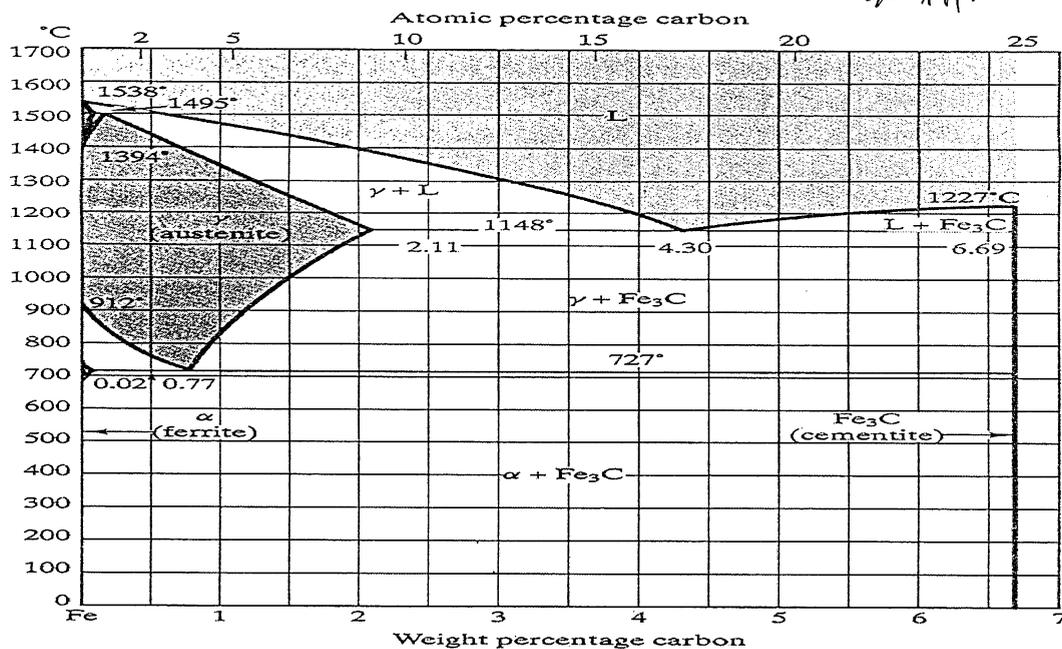


大同大學 九十一 學年度 轉學考試 試題

考試科目：材料導論 系別：材料工程學系 級別：三年級 第 | 頁，共 | 頁

註：本次考試不可以參考自己的書籍及筆記； 不可以使用字典； 可以使用計算器。

- Briefly describe the ionic bond, covalent, metallic and van der Waals bonds, respectively. (10%)
- Classify and define the imperfection of crystalline solids. (10%)
- Describe (a) the strengthening mechanisms in metals by grain boundary, solid-solution, precipitation and strain hardening, and (b) recovery, recrystallization and grain growth. (10%)
- Plane-stress fracture toughness (K_{IC}) is sensitive function of specimen thickness. Plan-strain conditions generally prevail when thickness $\geq 2.5 (K_{IC}/Y.S.)^2$. How to calculate the size of a surface crack that lead to catastrophic failure at an applied stress. (10%)
- For 0.5 wt. % C steel, calculate the relative amount of proeutectoid α at the grain boundaries and the relative amounts of the phases present just below the eutectoid temperature. (10%)



- How to evaluate the microstructure after some cooling processes by TTT or CCT diagrams. (10%)
- Explain the following terms: (a) Martensitic transformations, (b) Tempering, (c) Martempering, (d) Austempering, and (e) Hardenability. (10%)
- How does the conductivity vary with temperature for intrinsic, n-type and p-type extrinsic semiconductors? (10%)
- Explain the following terms: (a) thermal couples, (b) superconductors, (c) dielectric, and (d) piezoelectrics. (10%)
- Describe the following nouns: (a) diode, (b) transistor, (c) ferromagnetism, (d) ferrimagnetism. (10%)

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