4.34 For an ASTM grain size of 6, approximately how many grains would there be per square inch at

(a) a magnification of 100, and

(b) without any magnification?

4.35 Determine the ASTM grain size number if 30 grains per square inch are measured at a magnification of 250.

5.11 Determine the carburizing time necessary to achieve a carbon concentration of 0.30 wt% at a position 4 mm into an iron–carbon alloy that initially contains 0.10 wt% C. The surface concentration is to be maintained at 0.90 wt% C, and the treatment is to be conducted at 1100°C. Use the diffusion data for γ-Fe in Table 5.2.

5.12 An FCC iron–carbon alloy initially containing 0.55 wt% C is exposed to an oxygen-rich and virtually carbon-free atmosphere at 1325 K (1052°C). Under these circumstances the carbon diffuses from the alloy and reacts at the surface with the oxygen in the atmosphere; that is, the carbon concentration at the surface position is maintained essentially at 0 wt% C. (This process of carbon depletion is termed *decarburization*.) At what position will the carbon concentration be 0.25 wt% after a 10-h treatment? The value of D at 1325 K is 4.3×10^{-11} m^2/s.