Solutions

2.1

- Pearlite $= (0.60 - 0.022)/(0.76 - 0.022) = 0.7832$.
- Ferrite $= 1 - 0.7832 = 0.2168$.

2.2

- $\sigma = 600 \times 0.16^{0.25} = 379.5$ MPa.

2.3

- Austenite (0.76% C) decomposes to ferrite (0.022%) + cementite (6.67%) as lamellar pearlite at 727°C.
- A fast quench gives martensite.

2.4

- The processing state - cold work or heat treatment - sets the properties; the grade only fixes the chemistry.
- Untempered martensite is hard but brittle; tempering restores toughness at some strength cost.

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