Revisions are shown in red.

Question 3, p. 9:
This item was replaced as follows.

At 1,000°C, the diffusivity of carbon in 1010 steel is $2.311 \times 10^{-7}$ cm²/s. A carburizing process generates a constant surface concentration of 0.6 wt% C on a 1010 steel surface. Assume diffusivity is a constant. The concentration of carbon at a depth of 3 mm below the surface after 50 hours is most nearly:

- A. 0.1 wt% C
- B. 0.15 wt% C
- C. 0.25 wt% C
- D. 0.475 wt% C

Question 67, p. 44:
After 10 years, a continuously operated, ultra-high-pressure boiler suffers from a superheater tube failure. The tube is composed of ASME SA 304 stainless steel, and the tube was at a temperature of 1,600°F (871°C). Use the stress-LMP curve for 304 stainless steel shown, and assume the LMP constant related to the stainless steel is equal to 20. The stress (ksi) on the tube at failure is most nearly:

![Graph of Stress vs. Larson-Miller Parameter](image-url)

Based on the graph, the stress (ksi) on the tube at failure is most nearly:
Solution 3, p. 54:

\[ C_0 = 0.1 \text{ wt\% C} \]
\[ C_s = 0.6 \text{ wt\% C} \]
\[ D = 2.311 \times 10^{-7} \text{ cm}^2/\text{s} \]
\[ x = 3 \text{ mm} = 0.3 \text{ cm} \]
\[ t = 50 \text{ hours} = 180,000 \text{ s} \]
\[ C_x = ? \]

Governing equation:

\[
\frac{C_x - C_0}{C_s - C_0} = 1 - \text{erf}\left(\frac{x}{2\sqrt{Dt}}\right)
\]

\[
\frac{C_x - 0.1}{0.6 - 0.1} = 1 - \text{erf}\left(\frac{0.3}{2\sqrt{2.311 \times 10^{-7} \text{ cm}^2/\text{s} \times 180,000 \text{ s}}}\right) = 1 - \text{erf}(0.7355) \approx 1 - 0.7 = 0.3
\]

\[ C_x = 0.1 \times 0.3 = 0.15 \]

\[ C_x = 0.25 \text{ wt\% C} \]

**THE CORRECT ANSWER IS: C**

Solution 23, p. 60:

**THE CORRECT ANSWER IS: C**