ERRATA for
FE Chemical Practice Exam

ISBN: 978-1-947801-03-5

Errata posted 09/07/2022

Revisions are shown in red.

Question 24, p. 20:
The balanced equation and molecular weights for reactants and products in the anaerobic digestion of an organic material are as follows:

$C_{60}H_{95}O_{38}N + 18\ H_2O \rightarrow 32\ CH_4 + 28\ CO_2 + NH_3$

Compound	MW
$C_{60}H_{95}O_{38}N$	1,437
H_2O	18
CH_4	16
CO_2	44
NH_3	17

The weight (lb) of methane produced per 2,000 lb of organic material would be most nearly_____.

Question 35, p. 24:
- ○ A. 160
- ○ B. 250
- ○ C. 300
- ○ D. 420

Solution Table, p. 60:
Number 24 in the table should be 712–713.

Solution 4, p. 62:
Volume = 100.1 ml, 4 significant figures
Weight = 100.1 g, 4 significant figures
Pipette = 1.01 ml, 3 significant figures

THE CORRECT ANSWER IS: C

Solution 16, p. 67:
Refer to the Relationship Between Hardness and Tensile Strength section in the Materials Science/Structure of Matter chapter of the *FE Reference Handbook.*

By definition, a metal with high hardness has a high tensile and yield strength, as well as strong intermolecular bonding, with high impact, rebound, and scratch resistance strength.

THE CORRECT ANSWERS ARE: B, C, D, AND F

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Solution 17, p. 67:

Refer to the Corrosion section in the Materials Science/Structure of Matter chapter of the *FE Reference Handbook.* Aluminum is anodic relative to copper and therefore will corrode to protect the copper.

THE CORRECT ANSWER IS: B

Solution 24, p. 69:

$$\underbrace{C_{60}H_{95}O_{38}N}_{1{,}437} + 18\ H_2O \rightarrow \underbrace{32\ CH_4}_{(32)(16)=512} + 28\ CO_2 + NH_3$$

$$CH_4\ \text{lb} = 2{,}000\ \text{lb}\left(\frac{512}{1{,}437}\right) = 712.6\ \text{lb}$$

THE CORRECT ANSWER IS: 712–713

Solution 35, p. 73:

Refer to the P-*h* diagram for Refrigerant HFC-134a in the Thermodynamics chapter of the *FE Reference Handbook*.

The enthalpy at 0.1 quality and 20°C = 250 kJ/kg.

The enthalpy at saturated vapor and 20°C = 410 kJ/kg.

410 – 250 = 160 kJ/kg

THE CORRECT ANSWER IS: A

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Solution 60, p. 85:

The Dimensionless Group equation (Sherwood) is given in the Chemical Engineering section of the *FE Reference Handbook*.

$$\frac{k_m D}{D_m} = 0.023\left(\frac{DV\rho}{\mu}\right)^{0.8}\left(\frac{\mu}{\rho D_m}\right)^{1/3}$$

Using the definitions of the Reynolds and Schmidt numbers, the following form of the equation is obtained:

$$\frac{k_m D}{D_m} = 0.023\,\mathrm{Re}^{0.8}\,\mathrm{Sc}^{1/3}$$

$$\frac{k_m D}{D_m} = 0.023(30{,}000)^{0.8}\,(6)^{1/3} = 159.52$$

$$k_m = 159.52\,\frac{D_m}{D} = 159.52\,\frac{1\times10^{-5}\,\frac{\mathrm{cm}^2}{\mathrm{s}}}{5\,\mathrm{cm}} = 3.19\times10^{-4}\,\frac{\mathrm{cm}}{\mathrm{s}} = 3.19\times10^{-4}\,\frac{\mathrm{mol}}{\mathrm{cm}^2\cdot\mathrm{s}\cdot\frac{\mathrm{mol}}{\mathrm{cm}^3}}$$

Assume that liquid in contact with the surface of the tube is at equilibrium concentration.

$$\mathrm{Flux} = k_m(C_{\mathrm{surface}} - C_{\mathrm{bulk}}) = 3.19\times10^{-4}\,\frac{\mathrm{mol}}{\mathrm{cm}^2\cdot\mathrm{s}\cdot\frac{\mathrm{mol}}{\mathrm{cm}^3}}\left(2\times10^{-4}\,\frac{\mathrm{mol}}{\mathrm{cm}^3} - 0\,\frac{\mathrm{mol}}{\mathrm{cm}^3}\right)$$

$$= 6.38\times10^{-8}\,\frac{\mathrm{mol}}{\mathrm{cm}^2\cdot\mathrm{s}}\left(\frac{100\ \mathrm{cm}}{1\ \mathrm{m}}\right)^2 = 6.38\times10^{-4}\ \mathrm{mol/(s\cdot m^2)}$$

THE CORRECT ANSWER IS: A