ERRATA for

PE Mechanical Engineering: Thermal and Fluid Systems Practice Exam

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Errata posted 4/4/2022

Revisions are shown in red.

Question 32, p. 28

A centrifugal pump is sized to deliver 200 gpm of liquid with a specific gravity of 0.7 and a total differential head of 60 ft.

Question 43, p. 36

- A. 1.2×10^6
- B. 1.0×10^6
- C. 1.0×10^5
- D. 8.3×10^4

Question 47, p. 37

A submarine is traveling straight and level at a speed of 34.5 mph.

Solution 26, p. 68

The last line of the solution should be:

$$\text{whp} = \frac{105.88 \text{ ft } (50 \text{ gal/min})(0.13368 \text{ ft}^3/\text{gal})(62.4 \text{ lb/ft}^3)}{33,000 \text{ ft-lb/(min-hp)}} = 1.34 \text{ hp}$$

THE CORRECT ANSWER IS: A

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Solution 47, p. 76

Stagnation pressure, $p = \rho g\ SG\ h + \frac{1}{2}\rho\ SG\ v^2$

Density of water, $\rho = 62.4\ \text{lbm/ft}^3$

Specific gravity, SG = 1.03

Depth, h = 165 ft

$$\begin{aligned} p_1 &= \rho g\ SG\ h \\ &= 62.4\frac{\text{lbm}}{\text{ft}^3} \times \left(\frac{1}{32.174}\right)\frac{\text{slug}}{\text{lbm}} \times 32.174\frac{\text{ft}}{\text{sec}^2} \times 1.03 \times 165\ \text{ft} \\ &= 10,604\ \text{lbf/ft}^2 \\ &= 73.65\ \text{psi} \end{aligned}$$

$$\begin{aligned} \text{Velocity, } v &= 34.5\ \text{mph} \times \frac{1\ \text{hr}}{3,600\ \text{sec}} \times \frac{5,280\ \text{ft}}{1\ \text{mile}} \\ &= 50.6\ \text{ft/sec} \end{aligned}$$

$$\begin{aligned} p_2 &= \frac{1}{2}\rho\ SG\ v^2 \\ &= \frac{1}{2} \times 62.4\frac{\text{lbm}}{\text{ft}^3} \times \left(\frac{1}{32.174}\right)\frac{\text{slug}}{\text{lbm}} \times 1.03 \times \left(50.6\frac{\text{ft}}{\text{sec}}\right)^2 \\ &= 2,557\ \text{lbf/ft}^2 \\ &= 17.76\ \text{psi} \end{aligned}$$

Stagnation pressure

P = 73.65 psi + 17.76 psi

= 91.41 psi

THE CORRECT ANSWER IS: D