Question: Question 3 Find the angle the surface tension film leaves the …

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Question 3
Find the angle the surface tension film leaves the glass for a vertical tube immersed in water if the diameter is 0.25 in and the capillary rise is 0.08 in. Use $\sigma = 0.005$ lb/ft. Use mass density, $\rho = 1.94$ slugs/ft^3 and gravity acceleration, $g = 32.2$ ft). (Answer: $\theta = 64.3°$)

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Expert Answer

ROUSHAN answered this
957 answers

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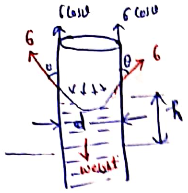

at equilibrium.

Surface tension force = weight of water.

$\sigma \cos\theta (\pi d) = \rho g (\frac{\pi}{4} d^2 \times h)$

$\therefore h = \frac{4\sigma \cos\theta}{\rho g d}$ — (1)

data given in question is —

diameter $(d) = 0.25$ in $= \frac{0.25}{12}$ ft $(1 ft = 12 inch)$

$h = 0.08$ in $= \frac{0.08}{12}$ ft.

$\sigma = 0.005$ lb/ft

$\rho = 1.94$ slugs/ft^3

$g = 32.2$ ft.

put all value in equation (1)

$h = \frac{4\sigma \cos\theta}{\rho g d}$

$\therefore \cos\theta = \frac{\rho g d h}{4\sigma} = \frac{(1.94) \times (32.2) (\frac{0.25}{12}) (\frac{0.08}{12})}{(4 \times 0.005)}$

$\cos\theta = 0.4338$

$\theta = \cos^{-1}(0.4338) = 64.3°$

Hence, angle of contact is 64.3° Ans.

an upvote would be appreciated.

Thank You.

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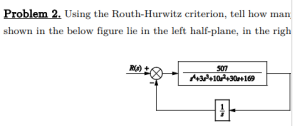
Problem 2. Using the Routh-Hurwitz criterion, tell how many closed-loop



See answer

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A: See step-by-step answer 100% (2 ratings)

Q: 2 Find the angle the surface tension film leaves the glass for a vertical tube immersed in water if the diameter is 0.25 inch and the capillary rise is 0.08 inch. Use surface tension - 0.005 lb/ft. 3A force of 460 Nis exerted on lever AB as shown in

A: See answer

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