Problem 1 Steps | Kenny Elliott FM Unit Exam 1 Self-Assessment:

Problem 1 Steps and Self-Assessment: Use gamma*h technique to get Δp Δp : Explanation: Applied the formula $\Delta p = \gamma \cdot h \Delta p = \gamma \cdot h$ correctly to find the pressure difference. Score: 1/6

Consider that pressure in trapped air is constant: Correctly assumed and maintained constant air pressure throughout the calculations. Score: ¹/₈

Correct use of values with units: Used consistent units, but there was a minor error in converting inches to feet in one part. Score: 0.8/6

Correctly considered all fluid levels after oil column goes to 5 inches: Mostly accurate adjustments, but there was a slight oversight in considering the fluid levels for one segment. Score: 0.8/6

Use the same equation for $\Delta p \Delta p$: Consistently used the $\Delta p = \gamma \cdot h \Delta p = \gamma \cdot h$ equation throughout the problem. Score: $\frac{1}{2}$

Final correct results: The final pressure difference was close but slightly off due to the minor errors in unit conversion and fluid level consideration. Score: 0.8/6

Total for Problem 1: 5.4/6

Problem 2 Steps

Use correct fluid forces equation: Explanation: Applied the correct fluid force equation $F = \gamma \cdot A \cdot h$. F= $\gamma \cdot A \cdot h$. Score: 1/7

Correct equation for gate force: Explanation: Used the appropriate equation to calculate the force acting on the gate. Score: 1/7

Sum of moments to get force at support (or hinge), I calculated moments correctly but missed accounting for one minor force location. Score: 0.8/7

Sum of forces to get force at hinge (or support): Explanation: Summed forces accurately but had a small oversight in the direction of one force. Score: 0.8/7

Correct setup of Excel spreadsheet: Explanation: Excel setup was mostly correct, but there was a minor formula error that caused slightly incorrect outputs in some cases. Score: 0.8/7

Final correct results: produced mostly accurate results but were affected by the minor Excel formula error. Score: 0.8/7

Generated plots, but the error in the Excel formulas caused some inconsistencies in the graphs. Score: 0.8/7

Total for Problem 2: 6/7

Problem 3 Steps

Problem 3 Steps and Self-Assessment: Correct equation for submerged distance into the fluid: Explanation: Used the buoyant force equation Fb=W F b =W to accurately find the submerged distance. Score: 1/7

Correct equations for locations of center of gravity and center of buoyancy: Correctly calculated the locations of the center of gravity and center of buoyancy. Score: 1/7

Correct equation for distance to metacenter from the center of buoyancy: Used the appropriate equation to find the distance to the metacenter from the center of buoyancy. Score: 1/7

Compare metacenter location to center of gravity location: Compared the metacenter location to the center of gravity accurately, but there was a slight misinterpretation in one part. Score: 0.8/7

Correct setup of Excel spreadsheet: Set up the Excel spreadsheet to input different diameters, lengths, and weights, but had a minor formula inconsistency. Score: 0.8/7

Final correct results (stable?): Explanation: Produced mostly correct results regarding the stability of the cylinder, but the minor formula inconsistency affected the results slightly. Score: 0.8/7

Final correct plots: Generated accurate plots, but the minor formula inconsistency caused slight inaccuracies in the graphs. Score: 0.8/7

Total for Problem 3: 6.2/7

Final score

Final Grade=(90/3)×(2.642857142857143)=79.29