



2nd Class • Code Calculations and Legislation

PART A1

End of Chapter Answer Guide: Numerical Answers



CHAPTER 1 - ASME CODE CALCULATIONS: CYLINDRICAL COMPONENTS

1. 1.84 mm
2. thickness of boiler steam header = 15.18 mm
 $d_{\max} = 29 \text{ mm}$
 $d_{\text{opening}} = 100 \text{ mm}$
Because $d_{\text{opening}} > d_{\max}$ the head requires additional compensation.
3. 8.37 mm
4. 26.55 mm
5. Because the finished opening d is 93 mm, which is less than d_{\max} (110.08 mm), the opening is inherently compensated, and no additional reinforcement is necessary.
6. 4.208 MPa



CHAPTER 2 - ASME CODE CALCULATIONS: STAYED SURFACES, PRESSURE RELIEF VALVES AND FURNACES

1. 193.2 mm
2. 5395.2 m³
3. 15.85 mm



CHAPTER 8 - LINEAR MOTION

1. Final velocity = 110 m/s, Total distance = 1200 m
2. 50 N
3. b) 500 kg m/s
4. 50 kJ
5. 674 mm
6. 75 m/s
7. a) 227.42 m
b) 11.91 seconds
c) 1031.4 m



CHAPTER 9 - ANGULAR MOTION

1. 20.94 rad/s
3. 50 Nm
4. 150 rpm = 2468 J, 350 rpm = 13 399 J
5. 94.9%
6. 7.476 kW
8. 77.6 mm
9. $r = 50$ mm, The compensating mass is placed in the opposite direction to the unbalance mass.



CHAPTER 10 - FRICTION

3. 98.1 N

6. $F = W \tan(\alpha + \phi)$



CHAPTER 11 - STATIC AND DYNAMIC FORCES

1. $R_1 = 2300 \text{ N}$, $R_2 = 1700 \text{ N}$
3. 1591.09 kPa
4. a) 89.286 MPa
b) 3.968×10^{-4}
c) 1.984 mm
d) 517.86 MPa
5. a) 19.35 kN
b) 30 studs
6. Steel = 30.29 MPa, Copper = 60.58 MPa
7. 6 kN load at free end, 8 kN load at midpoint
8. 149.7 RPM
9. 7 bolts required



CHAPTER 12 - FLUID MECHANICS

1. 6.28 m^3
2. Force on the bottom of tank = 58.86 kN , force on the long side of tank = 14.715 kN , force on short side of tank = 9.81 kN
3. 5.45 m^3
4. $603 \text{ m}^3/\text{min}$
5. b) 7.95 m/s
6. 19.90 m/s
7. 217.9 L/s
8. 0.88
9. The centre of pressure is 3.414 m measured from the surface of the water.
10. 517 kg