Class 38 - Lonsing power plant

1) $Q = T\Delta S = (342+273)(5.3098 - 3.6848) = 10^3$ kJ

2) $Q = \Delta U - W = \Delta U + P\Delta V$ ← for kJ out

$= (3209 - 2456) + 15\,m^3 \times k\,(.02491 - .01034)$

$= 753 + 218 = 971$ kJ

$= \Delta U + P\Delta V$

$= (3297 - 2782) + 1\,m^3 \times k\,(.4011 - .2042)$

$= 515 + 197 = 712$ kJ

3) $Q = \Delta U + \left(\frac{P_1 + P_2}{2}\right)\Delta V = (1586 - 226) + 7.5\,m^3 \times k\,(.00166 - .00101)$

$= 1360 + 5 = 1365$ ← largest Q

total Q = 4048 kJ

4) $|W| = |\Delta U| = 3209 - 2782 = 427$

$2578 - 3297 = 718$

1145

5) $\frac{W}{Q} = \frac{1145}{4048} = 28\%$

Note: System operates at high temps between 600 & 342

$1 - \frac{273+54}{273+600} = 62\%$

not really a high temp