

"Problem 3.6"

ChemIn = 190
 eta_m = 0.8
 eta_f = 0.3
 eta_c = 0.94

"[kW] Chem energy input"

"Brake Power"

P_b = eta_f * ChemIn
 P_b = eta_m * P_i

"Friction Power"

P_f = P_i - P_b

"Heat Transfer to Coolant and Oil"

Qdot = 60

"[kW]"

"Exhaust Chemical Energy"

eta_c = ChemRel/ChemIn
 ChemEx = ChemIn - ChemRel

"First Law"

ChemIn - Qdot - P_b - P_f - ChemEx - SensEx = 0

"Percentages"

a = P_b/ChemIn * 100
 b = P_f/ChemIn * 100
 c = Qdot/ChemIn * 100
 d = ChemEx/ChemIn * 100
 e = SensEx/ChemIn * 100

"Brake Power %"

"Friction Power %"

"Heat transfer %"

"Exhaust Chem Energy %"

"Exhaust Sensible Energy %"

Unit Settings: [kJ]/[K]/[kPa]/[kg]/[radians]

a = 30

b = 7.5

c = 31.58

ChemEx = 11.4 [kW]

ChemIn = 190 [kW]

ChemRel = 178.6 [kW]

d = 6

e = 24.92

eta_c = 0.94

eta_f = 0.3

eta_m = 0.8

P_b = 57 [kW]

P_f = 14.25 [kW]

P_i = 71.25 [kW]

Qdot = 60 [kW]

SensEx = 47.35