"Turbo"
"Zhaoyi Jiang (.1364)"
"HW4"
"P1"

```
H=300[m]
Q=4.2[m^3/s]
r2=0.75[m]
rpm=450
phi=0.98
beta_3=65[degree]
psi=0.9
g=9.81[m/s^2]

c1_th=(2*g*H)^0.5
c1=phi*c1_th
u=450/60[s]*r2*2*pi
W=u*(c1-u)*(1+sin(beta_3))
eta_h=W/(g*H)

Wt_dot=1000[kg/m^3]*Q*W
Weff_dot=Wt_dot*0.9

Q/5=pi*r^2*c1
d=r*2
```

SOLUTION

Unit Settings: SI C kPa kJ mass deg

β_3 = 65 [Degree]
$c1_{th}$ = 76.72 [m/s]
η_h = 0.9121
H = 300 [m]
ψ = 0.9
r = 0.05963 [m]
rpm = 450 [rpm]
W = 2684 [m^2/s^2]
$\dot{W}t$ = 1.127E+07 [w]

c1 = 75.19 [m/s]
d = 0.1193 [m]
g = 9.81 [m/s^2]
ϕ = 0.98
Q = 4.2 [m^3/s]
r2 = 0.75 [m]
u = 35.34 [m/s]
$\dot{W}eff$ = 1.015E+07 [w]

No unit problems were detected.