"Turbo"
"Zhaoyi Jiang (.1364)"
"HW4"
"P4"

```
va=12[m/s]
N=60
rt=5.2[m]
rh=0.4[m]
c=0.4[m]
cl=0.3
cd=0.018
beta_2=60[degree]

c1=va
omega=pi*60/30
lambda=omega*rt/va
rm=(rt+rh)/2
um=omega*rm
beta_1=arctan(um/c1)
w1=(c1^2+um^2)^0.5
w2=w1*cos(beta_1)/cos(beta_2)
cz2=w1*cos(beta_1)
ca2=w2*sin(beta_2)-um
alpha_2=arctan(ca2/cz2)
c2=(ca2^2+cz2^2)^0.5
tan(beta_m)=0.5*(tan(beta_1)+tan(beta_2))
wm=cz2/cos(beta_m)
Fum=0.5*(1.2[kg/m^3])*wm^2*c*(cl*sin(beta_m)-cd*cos(beta_m))
Fzm=0.5*(1.2[kg/m^3])*wm^2*c*(cl*cos(beta_m)-cd*sin(beta_m))
zb=12/lambda
w_dot=zb*Fum*um*(rt-rh)
Od=(rt^2-rh^2)*pi
cp=2*w_dot/(1.2[kg/m^3]*Od*va^3)
```

SOLUTION

Unit Settings: SI C bar kJ mass deg

α_2 = 14.89 [degree]	β_1 = 55.7 [degree]
β_2 = 60 [Degree]	β_m = 57.98 [degree]
c = 0.4 [m]	c1 = 12 [m/s]
c2 = 12.42 [m/s]	ca2 = 3.192 [m/s]
cd = 0.018	cl = 0.3
cp = 0.1279	cz2 = 12 [m/s]
Fum = 30.09 [N/m]	Fzm = 17.68 [n/m]
λ = 2.723	N = 60
Od = 84.45 [m^2]	ω = 6.283 [rad/s]
rh = 0.4 [m]	rm = 2.8 [m]
rt = 5.2 [m]	um = 17.59 [m/s]
va = 12 [m/s]	w1 = 21.3 [m/s]
w2 = 24 [m/s]	wm = 22.63 [m/s]
$\dot{w}$ = 11201 [W]	zb = 4.407

No unit problems were detected.