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A pulley is driven by the flat belt running at speed of.....

Question:
A pulley is driven by the flat belt running at speed of 600m/min. and transmit 4 kW. The coefficient of friction between belt and pulley is 0.3 and angle of lap is 160°. Find maximum tension in the belt.

Answer:
Flat belt speed = V = 600 m/min = 600/60 m/sec = 10 m/sec;

Power transmitted = P = 4 kW ;

Coefficient of friction =μ = 0.3;

Angle of lap = θ =1600

Belt tension ratio = T1/ T2 = eμθ = e 0.3(160x π/180) = 2.31; T1/ T2 = 2.31;

T1= T2 x 2.311----------(1)

P = (T1 - T2) x V ; ----------(2)

P = (T2 x 2.31- T2)x 10; Putting value of power

P = 4 kW 4 x1000 = (T2 x 2.31 - T2)x 10;

T2 = 305.34 N

T1 = 705.34N
