1.1) \( W = F \times s \)  
   Work is done when an object is moved at a distance

1.2) \( W = F \times s \)  
   \( = 100 \times 0 \)  
   \( = 0 \) Joules

1.3.1) \( W = F \times s \)  
   \( = (60 \times 98) \times 52 \)  
   \( = 30576 \) J  
   \( = 30.576 \) KJ

1.3.2) \( P = \frac{W}{t} \)  
   \( = \frac{30576}{45} \)  
   \( = 679.47 \) kWatt

1.3.3) \( \eta = \frac{\text{Output}}{\text{Input}} \)  
   \( = \frac{679.47}{1000} \)  
   \( = 0.679 \)  
   \( = 67.9\% \)

1.4) \( W = F \times s \)  
   \( = 80 \times \pi \times 0.3 \times 1 \)  
   \( = 75.398 \) J
**Question 2:**

2.1) \( F_c = \omega C \cos \theta \)
    \[ = (120 \times 9.8) \cos 48^\circ \]
    \[ = 1038.346 \text{ N} \]

2.2) \( F_p = \omega C \sin \theta \)
    \[ = (120 \times 9.8) \times \sin 28^\circ \]
    \[ = 552.1 \text{ N} \]

2.3) \( F_u = \mu \omega C \cos \theta \)
    \[ = 0.33 \times (120 \times 9.8 \cos 28^\circ) \]
    \[ = 0.33 \times 1038.346 \]
    \[ = 342.64 \text{ N} \]

2.4) \( F_{up} = F_u + \omega C \sin \theta \)
    \[ = 342.64 + 552.1 \]
    \[ = 894.75 \text{ N} \]

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**Question 3**

![Diagram of a mechanical system with a load at the bottom and a sequence of coils and springs labeled as \( d_1 \) and \( d_2 \).]
3.2.1) \[ V = \pi DN \]
\[ = \pi \times 0.35 \times \frac{1500}{60} \]
\[ = 27.48 \text{ m/s} \]  

3.2.2) \[ \frac{T_1}{T_2} = \frac{3.8}{1} \]
\[ \frac{2400}{T_2} = \frac{2.8}{1} \]
\[ T_2 = \frac{2400 \times 1}{2.8} \]
\[ T_2 = 857.143 \text{ N} \]  

3.2.3) \[ P = (T_1 - T_2) V \]
\[ = (2400 - 857.143) \times 27.48 \]
\[ = 42,397.71 \text{ kWatt} \]
\[ = 42,397 \text{ kWatt} \]  

3.3) Illustories could be far apart
Give step in starting and jamming
Change direction by using belts
Pulleys can be misaligned or close spaces
Run quiet
Velocity Ratio's can be changed by pulleys
Output could be varied.
41). 1) \( N_A T_A = N_B T_B \)
   \( N_A + 80 = 120 \times 120 \)
   \( N_A = 180 \text{ RPM} \)

41b) \( N_D T_D = T_c N_c \)
   \( 132 \times T_D = 55 \times 120 \)
   \( T_D = 50 \text{ T} \)

4.2). 1) True
   2) False
   3) False/True for high velocities
   4) False

Total = [33]