

Lecture 04

- * EQUILIBRIUM OF A PARTICLE
- * THE FREE-BODY DIAGRAM

Section 3.1, 3.2

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EQUILIBRIUM OF A PARTICLE, THE FREE-BODY DIAGRAM

Objectives:

Students will be able to :

- a) Draw a free body diagram (FBD), and,
- b) Apply equations of equilibrium to solve a 2-D problem.



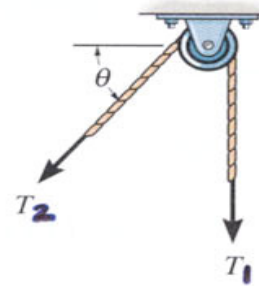
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READING QUIZ

- 1) When a particle is in equilibrium, the sum of forces acting on it equals ____ . (Choose the most appropriate answer)
- A) a constant B) a positive number C) zero
D) a negative number E) an integer.

- 2) For a frictionless pulley and cable, tensions in the cable (T_1 and T_2) are related as _____ .

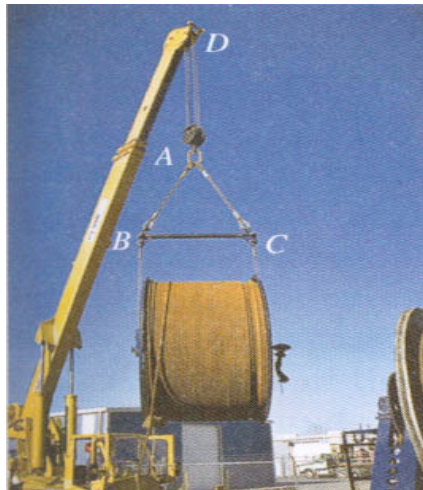
- A) $T_1 > T_2$
B) $T_1 = T_2$
C) $T_1 < T_2$
D) $T_1 = T_2 \sin \theta$



Cable is in tension

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APPLICATIONS



For a spool of given weight;
what are the forces in cables AB and AC ?

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APPLICATIONS

(continued)

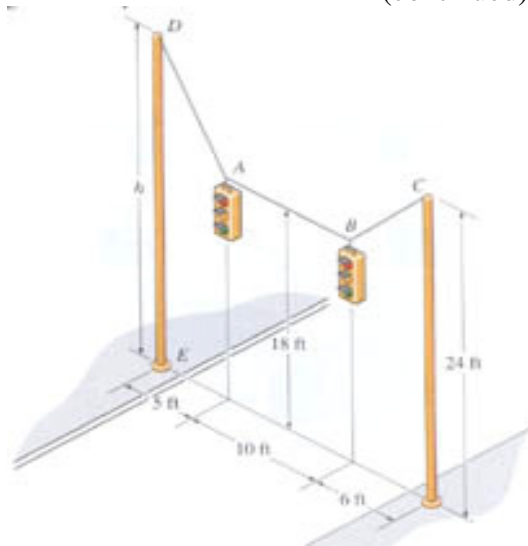


For a given cable strength;
what is the maximum
weight that can be lifted ?

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APPLICATIONS

(continued)



For a given weight of the
lights;

what are the forces in the
cables?

What size of cable must
you use ?

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