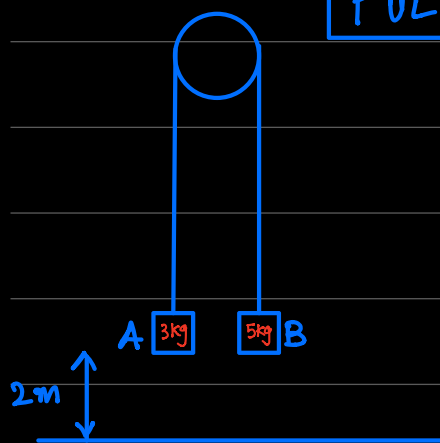


PULLEYS

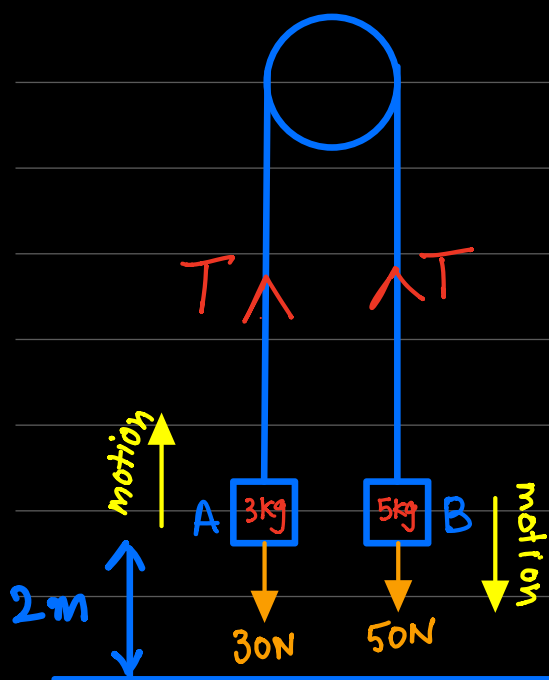
Tension is always equal & towards pulley.

Mass of 3kg and 5kg are held at rest

The system is released and objects start to move.



(i) Find the acceleration of both particles and tension in string.



[A]

$$F_{wd} - B_{wd} = ma$$

$$T - 30 = 3a$$

$$T = 30 + 3a$$

$$30 + 3a = 50 - 5a$$

$$8a = 20$$

$$a = 2.5$$

$$T = 30 + 3(2.5) = 37.5$$

[B]

$$F_{wd} - B_{wd} = ma$$

$$50 - T = 5a$$

$$T = 50 - 5a$$

(ii) Find speed with which B hits ground.

[B]

$$u = 0, v = ?$$

$$s = 2, a = 2.5$$

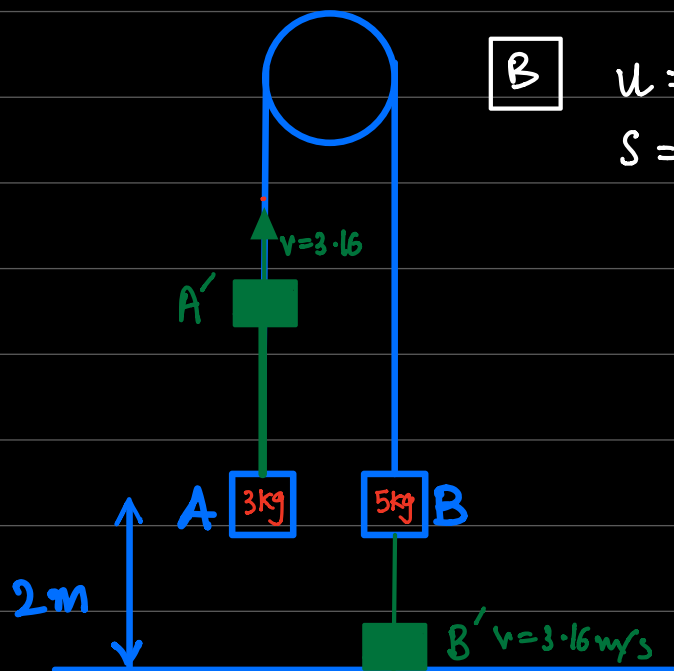
$$2as = v^2 - u^2$$

$$2(2.5)(2) = v^2 - 0^2$$

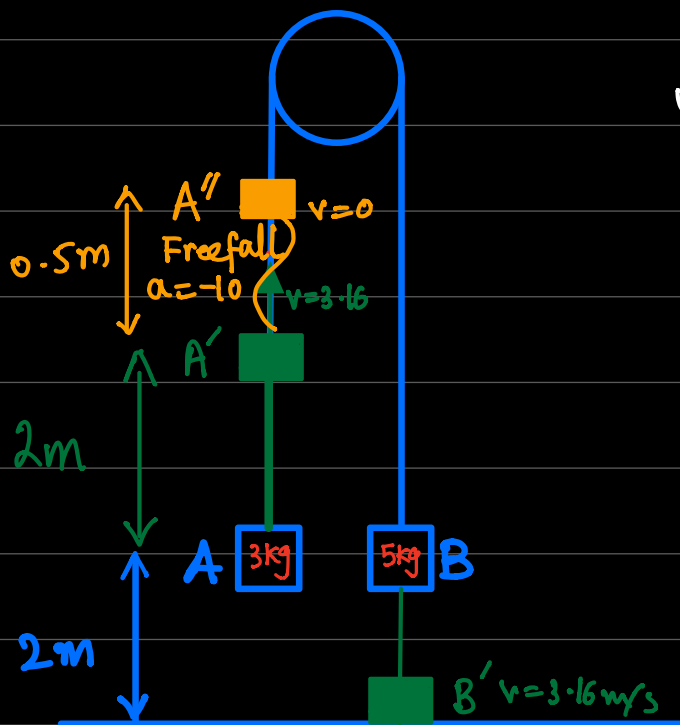
$$v^2 = 10$$

$$v = \sqrt{10}$$

$$v = 3.16 \text{ m/s}$$



(iii) Find greatest height above ground reached by A (5)



$$A' \longrightarrow A''$$

$$u = 3.16, \quad a = -10, \quad v = 0, \quad s = ?$$

$$2as = v^2 - u^2$$

$$2(-10)(s) = 0^2 - 3.16^2$$

$$s' = 0.5$$

$$\text{greatest height} = 2 + 2 + 0.5 = 4.5 \text{ m.}$$

VARIATIONS

Find:

(a) Max height above ground reached by A.

$$2 + 2 + 0.5 = 4.5 \text{ m}$$

(b) Distance travelled by A to reach max height.

$$2 + 0.5 = 2.5 \text{ m}$$

(c) Distance travelled by A from start of journey till it comes to rest again.

$$A \longrightarrow A' \longrightarrow A'' \longrightarrow A'$$

$$2 + 0.5 + 0.5 = 3 \text{ m.}$$