

T3 4-29 A 60 kg BOY ON AN ELEVATOR, WHAT DOES SCALE READ

a) WHEN $v_{\text{ELEV}} = \text{CONSTANT}$

b) $a_{\text{ELEV}} = 2 \text{ m/s}^2 \text{ DOWN}$

c) $v_{\text{ELEV}} = 10 \text{ m/s}$ DECREASING BY 2 m/s/s
UP

APPLY NSL TO THE BOY. HIS FORCE ON THE SCALE IS EQUAL TO THE NORMAL FORCE ON HIM.

$$\sum F_{\text{VERT}} = m_{\text{BOY}} a_{\text{VERT}}$$

$$N - m_{\text{B}} g = m_{\text{B}} a_{\text{ELEV}} \Rightarrow N = m_{\text{B}} (a_{\text{ELEV}} + g)$$

a) IF $v = \text{CONSTANT} \Rightarrow a_{\text{ELEV}} = 0$

$$\Rightarrow N - m_{\text{B}} g = 0$$

$$N = m_{\text{B}} g = (60)(9.8) = \boxed{588 \text{ N} = N}$$

b) For $a_{\text{ELEV}} \text{ DOWN} \Rightarrow a_{\text{ELEV}} = -2$

$$\Rightarrow N = 60(-2 + 9.8)$$

$$\boxed{N = 468 \text{ N}}$$

c) For $v_{\text{ELEV}} \text{ UPWARD, DECREASING BY } 2 \text{ m/s/s} = a_{\text{ELEV}} \text{ IS DOWN}$

$$\Rightarrow \boxed{N = 468 \text{ N LIKE b'}}$$

