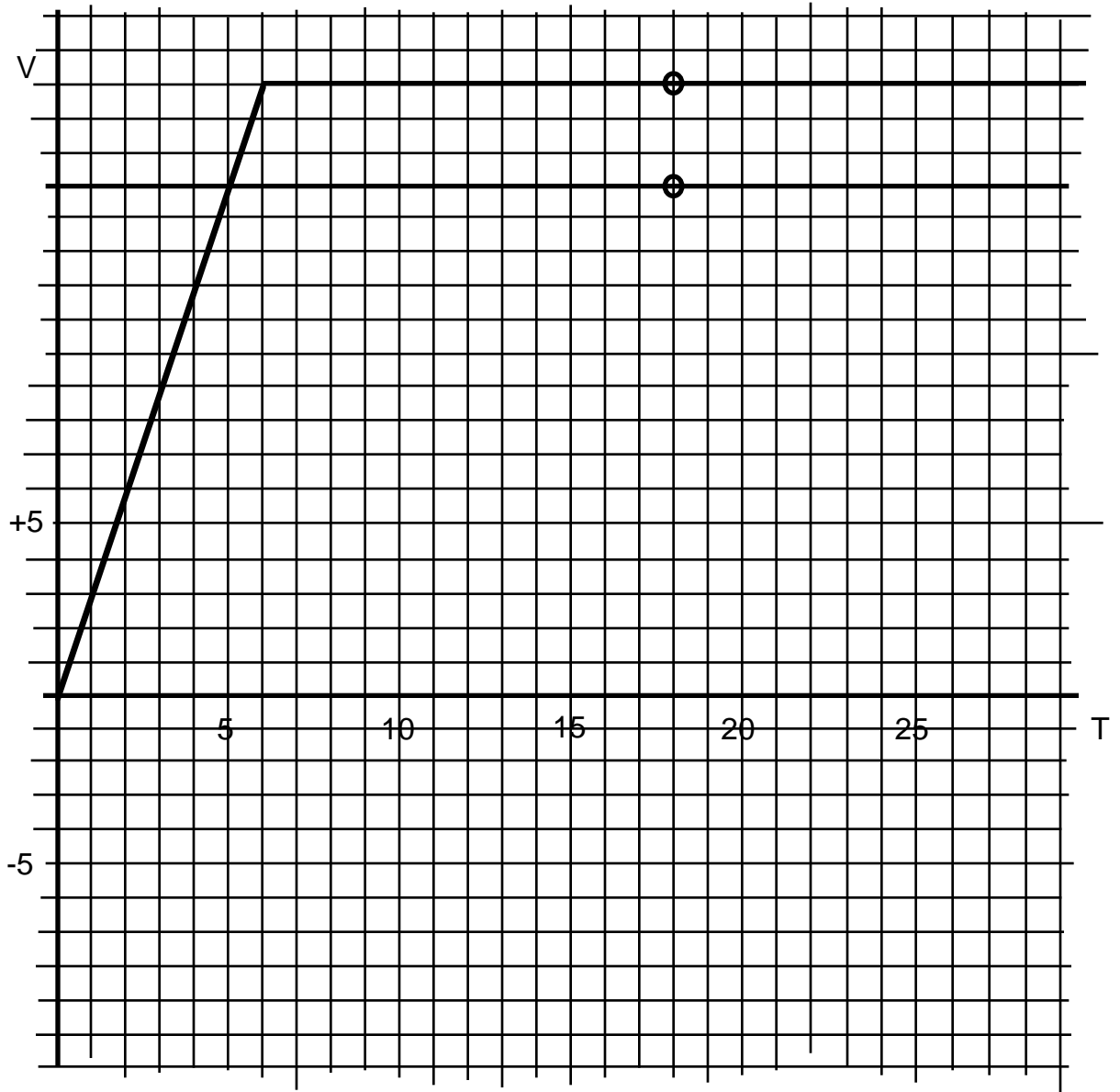


Phys11 V-T Pursuit Problem : W.S.-130

Answer

At $t = 0.0$ s a zebra runs past a lion. The zebra's velocity (+X direction) is a constant 15 m/s. At $t = 0.0$ s a lion (initially at rest) starts to chase the zebra. The lion's velocity increases with an acceleration of $+3.0$ m/s² for 6.0 s. It then moves at a constant velocity. Sketch the two graphs. (vertical axis is velocity (in +X direction) in m/s, horizontal axis is time in s).

- 1) Give the equations of motion during the first 6.0 seconds for : a) the zebra, b) the lion.
- 2) At what time are both moving at the same velocity?
- 3) At what time and displacement does the lion catch the zebra? (assume the lion is at $d = 0.0$ m to start),(hint : the area under a V-T graph equals the displacement)



Answers : 1)a) $V = 15 \text{ m/s}$, b) $V = 3.0 \text{ T}$, 2) 5.0 s , 3) 18 s , 270 m .