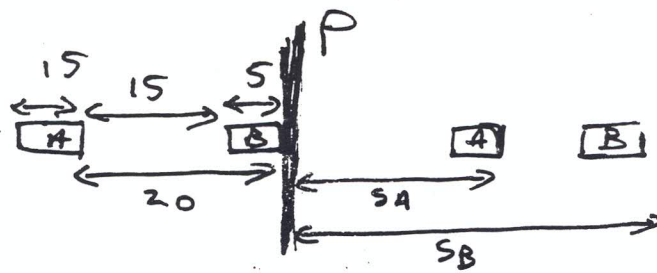


Kine.
(1989 Q1)



After reaching P, [start clock when B reaches P].

(B) $u = 20$
 $a = -4$

$S_B =$ Dist from P of front of Car B
 $t = T$

(A) $u = 20$
 $a = -4$

$S =$ Dist from P of front of Car A
 $t = t - 1$ — time for A to reach P.
[= time to go 20m at 20ms⁻¹]

$\Rightarrow t = t - 1$

(i) A collides with B: $S_A = S_B - 5$ has a real solution
(ASK)

KEY LINE

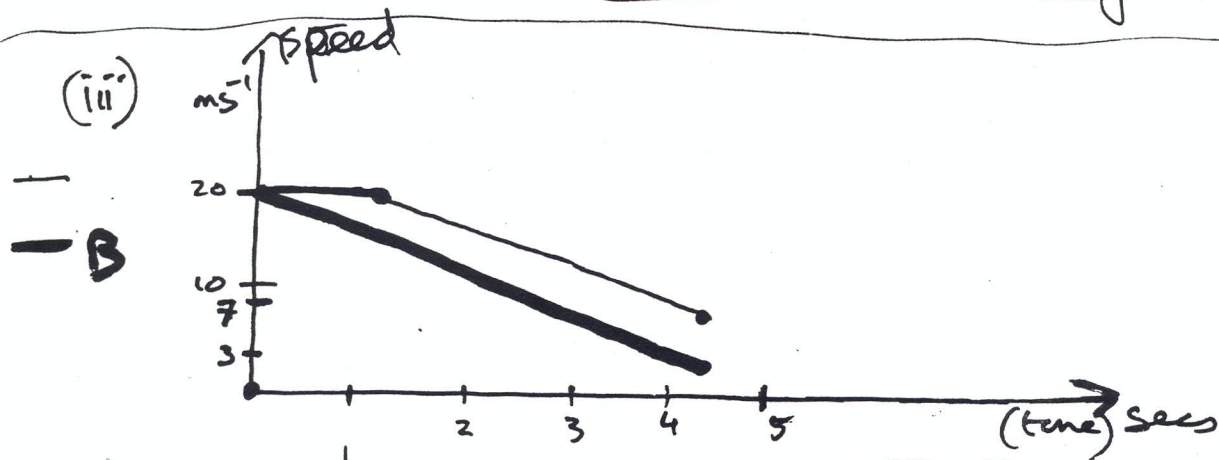
$S_B = 20t - \frac{1}{2}(4)t^2$ and $S_A = 20(t-1) - \frac{1}{2}4(t-1)^2$

$S_A = S_B - 5 \Rightarrow 20(t-1) - \frac{1}{2}4(t-1)^2 = 20t - \frac{1}{2}4t^2 - 5$
 $\Rightarrow 20 - 2(t^2 - 2t + 1) = 20t - 2t^2 - 5$
 $\Rightarrow 20t - 20 - 2t^2 + 4t - 2 = 20t - 2t^2 - 5$
 $\Rightarrow 4t - 22 = -5$
 $4t = 17$

Collision occurs $\Rightarrow 4.25 = t$ secs.
4.25s after B is at P and 3.25s after A is at P.

(ii) Distance from P = $S_A(t-1) = 20(3.25) - 2(3.25)^2$
 $= 65 - 21.125$

Distance = 43.875m from P.



At $t = 4.25$ secs, $v_A = u + a(t-1) = 20 - 4(3.25) = 7 \text{ ms}^{-1}$

$v_B = u + at$
 $= 20 - 4(4.25) =$