① We know,

$s = ut - \frac{1}{2}ft^2$

$\Rightarrow 85 = 20t - \frac{1}{2}2t^2$

$\Rightarrow 20t - t^2 = 85$

$\Rightarrow t^2 - 20t + 85 = 0$

$t = 6.125$ or $t \neq 13.87$

$t = (6.12 - 2)$

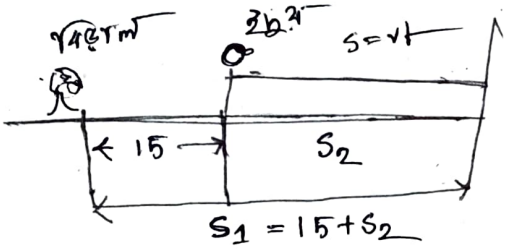
$= 4.12s$

Again,

$s = ut + \frac{1}{2}ft^2$

$\Rightarrow 65 = 4.167 \times 4.12 + \frac{1}{2}f \times (4.12)^2$

$f = 5.63\ ms^{-1}$

② 

2য় ক্ষেত্রে, (স্থির দেয়াল)

$s_1 = ut + \frac{1}{2}ft^2$

$\Rightarrow 15 + s_2 = t^2$ —— (i)

2য় ক্ষেত্রে, (চলন্ত)

$s_2 = vt$

$= 14t$ —— (ii)

(i) ও (ii) নং থেকে পাই,

$15 + 14t = t^2$

$\Rightarrow t^2 - 14t - 15 = 0$

$t = 15s$ (Ans.) or, $t \neq -1$

$\therefore$ ~~$s = ut + \frac{1}{2}$~~ (ii) নং থেকে,

$s_1 = 14 \times 15 = 210\ m$ (Ans.)

③ We know,

$v = u + ft$

$\Rightarrow 39 = 30 + f(3 \times 60)$

$f = 0.05\ ms^{-2}$ (Ans.)

৫ সেকেন্ড পর বেগ,

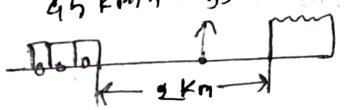
$v = 39 + 0.05 \times 5$

$= 39.25\ ms^{-1}$ (Ans.)

$s = ut + \frac{1}{2}ft^2$

$= 39 \times 5 + \frac{1}{2} 0.05 \times 5^2$

$= 195.625\ m$ (Ans.)

④ 

We know,

$v = u - ft$

$\Rightarrow 0 = 12.5 - f \times 33$

$f = 0.3787\ ms^{-1}$

Now,

$s = ut - \frac{1}{2}ft^2$

$= 12.5 \times 33 - \frac{1}{2} 0.37887 \times 33^2$

$= 206.297\ m$

দ্বিতীয় ট্রেনের বেগে 206.297 m অতিক্রম করতে ট্রেনটির 335 মিটার অতিক্রম করতে হবে।

⑤ We know,

$h = ut + \frac{1}{2}gt^2$

$= 4.9t^2$ —— (i)

t এর ক্ষেত্রে,

$h_1 = u + \frac{1}{2}g(2t - 1)$

$\Rightarrow \frac{1}{2} 4.9t^2 = 9.8t - 4.9$

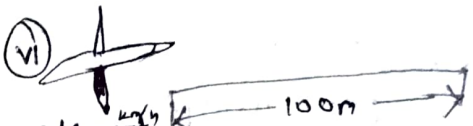
$\Rightarrow 2.45t^2 - 9.8t + 4.9 = 0$

$t = 3.41$ or, $t \neq 0.58$ (Ans.)

(i) নং থেকে,

$h = 4.9 \times (3.41)^2$

$= 57.m$ (Ans.)

⑥ 

We know,

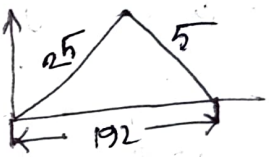
$v^2 = u^2 + 2fs$

$\Rightarrow 60^2 = 0^2 + 2 \times 15 \times s$

$s = 120m$

$100 < 120$

সুতরাং গাড়ি থামবে না।

⑦ 

We know,

1ম ক্ষেত্রে,

$v^2 = u^2 + 2f_1 s_1$

$\Rightarrow v^2 = 2f_1 s_1$

$s_1 = \frac{v^2}{2f_1}$ —— (i)

2য় ক্ষেত্রে,

$v^2 = u^2 - 2f_2 s_2$ ——

$\Rightarrow s_2 = \frac{v^2}{2f_2}$

সমস্যা থেকে,

$s_1 + s_2 = 192$ ——

$\Rightarrow \frac{v^2}{2f_1} + \frac{v^2}{2f_1} = 192$ ——

$\Rightarrow \frac{v^2}{2 \times 25} + \frac{v^2}{2 \times 5} = 192$

$\Rightarrow v = 40\ ms^{-1}$