Problems on Trains

Q1 $S_1 - S_2 = \frac{240}{30}$

$S_1 + S_2 = \frac{240}{10}$

$S_1 - S_2 = 8$

$S_1 + S_2 = 24$

$2S_1 = 32$

$\boxed{S_1 = 16}$

$16 - S_2 = 8$

$\boxed{S_2 = 8}$

(B) Speed of each train is $\boxed{16, 8 \text{ m/sec}}$ Ans

Q2 Relative speed $= (50+60)$ km/hr

$= 110$ km/hr

$= 110 \times \frac{5}{18} = 30\frac{5}{9}$

$(140+160)$ m at $30\frac{5}{9}$ m/sec

$\frac{306 \times 9}{275} = 10.01$ sec

$\boxed{(2)\ 10 \text{ sec}}$ Ans

Q3 $T = \frac{D}{S} = \frac{36x + 26y}{x+y}$

$30 = \frac{36x+26y}{x+y}$

$6x = 4y$

$\frac{x}{y} = \frac{4}{6}$

Ratio $\Rightarrow$ $\boxed{4:6.}$

(A) Ans

Q4 Speed $= \frac{240}{12} = 20$ m/sec.

Total $D = 240 + 400 = 600$ m

$T = \frac{D}{S} = \frac{640}{20} = \boxed{32 \text{ sec}}$.

Ans

Q5 Speed $= 108 \times \frac{5}{18}$ m/sec

$= 30$ m/sec

1 sec $\Rightarrow$ 30 m

30 sec $\Rightarrow$ 900 m

(Train + Platform) $= 900$ m

Relative Speed $= 108 - 12$

$= 96$ km/hr

$96 \times \frac{5}{18} = \frac{80}{3}$ m/sec

$D = S \times T = \frac{80}{3} \times 9$

$D = \frac{80}{3} \times 9 = 240.$

$\boxed{\text{Length of Train} = 240 \text{ m}}$

$\boxed{\text{Length of Platform} = 660 \text{ m}}$

(C) Ans

Q6 $S \Rightarrow 40 : 45$

$S \Rightarrow 8 : 9$

$D \rightarrow 8 : 9$

1 unit $= 20$

160 180

Speed & Distance are directly proportional

Distance b/w P & Q station

$= 160 + 180$

$= \boxed{340 \text{ km}}$

(C) Ans

Q7 Speed
$S_1, S_2 = x \& y$ m/sec.

$D_1 = 28x$

$D_2 = 18y$

$T = \frac{D}{S}$

Relative Speed $= (x+y)$ m/sec

$$30 = \frac{28x + 18y}{(x+y)}$$

$30x + 30y = 28x + 18y$

$2x = 8y$

$\frac{x}{y} = \frac{4}{1}$

$\boxed{x : y = 4 : 1}$

(D) ans

Q8 $S_1 : S_2$

$\sqrt{6} : \sqrt{a}$

$\sqrt{16} : \sqrt{9}$

(B) $\boxed{4:3}$

ans

Q9

$T = \frac{D}{S} = \frac{x}{y}$

$8 = \frac{x}{y}$

$\boxed{x = 8y}$

$\frac{x+264}{20} = y$

$\frac{8y+264}{20} = y$

$8y + 264 = 20y$

$y = 22$ m/sec

(D) $\boxed{y = 79.2 \text{ km/hr}}$ ans

Q10

$D = x$ m

$T = \frac{D}{S_1}$

$\boxed{S_1 = \frac{x}{18}}$

$\boxed{S_2 = \frac{x}{12}}$

Relative speed $= S_1 + S_2$

$T = \frac{D}{S}$

$T = \frac{2x}{S_1 + S_2}$

$T = \frac{2x}{\frac{x}{18} + \frac{x}{12}}$

$T = \frac{2x \times 12 \times 18}{30x}$

$T = \frac{72}{5}$

(A) $\boxed{T = 14.4 \text{ sec}}$

ans

Q11 Relative speed $= S_1 + S_2$

$= 120 + 80$

$= 200$ km/hr

$200 \times \frac{5}{18}$ m/sec

$\frac{500}{9}$ m/sec

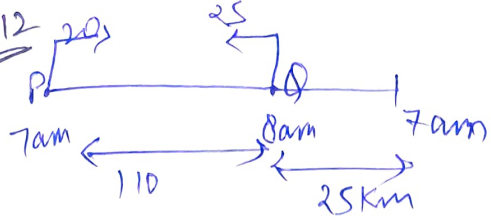
$\frac{x+270}{9} = \frac{500}{9}$

$x + 270 = 500$

(A) $\boxed{x = 230 \text{ m}}$

ans

Q12



Q speed = 25 Km/hr

1 hr → 25 Km

$T = \frac{110+25}{20+25}$

$T = \frac{135}{45}$

T = 3 hrs

7am + 3hrs

(B) = 10 am.

Q13

T ⇒ 45 : 48

T ⇒ 15 : 16 (Time & Speed are inversely proportional)

S ⇒ 16 : 15

1 unit = 5 Km/hr

80 Km/hr, 75 Km/hr

1 hr = 80 Km

60 min = 80 Km

1 min = $\frac{80}{60}$ Km

45 min = $\frac{80}{60} \times 45$

= 60 Km

Distance b/w station A & B = 60 Km

(C)

Q14

Average speed = $\frac{D}{T}$

$= \frac{2 * 126 * 90}{126+90}$

$= \frac{2*126*90}{216}$

S = 105 Km/hr

Time = $\frac{\text{Distance}}{\text{Speed}}$

$= \frac{525}{105} = 5$ hrs

Time taken = 5 hrs

(A)

Q15

S ⇒ 72 : 60

6 : 5

T ⇒ 5 : 6 (Speed & time are inversely proportional)

1 unit = stoppage

$\frac{1}{6} * 60 = 10$ min

(C) Train stops for 10 min on an average per hour