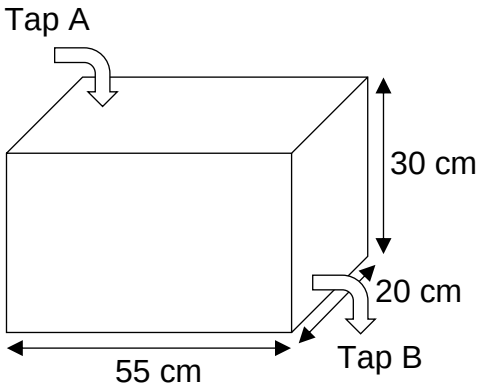
A Maths Question, PSLE 2021

An empty water tank has an inner measurement of 55 cm × 20 cm × 30 cm. Water flows into the tank from Tap A while water flows out of the tank form Tap B at a constant rate each. At 2.00 p.m., Tap A started filling up the tank at a rate of 4.2 litres per minute. 5 minutes later, Tap B was turned on. At 2.15 p.m., the tank was half filled with water.

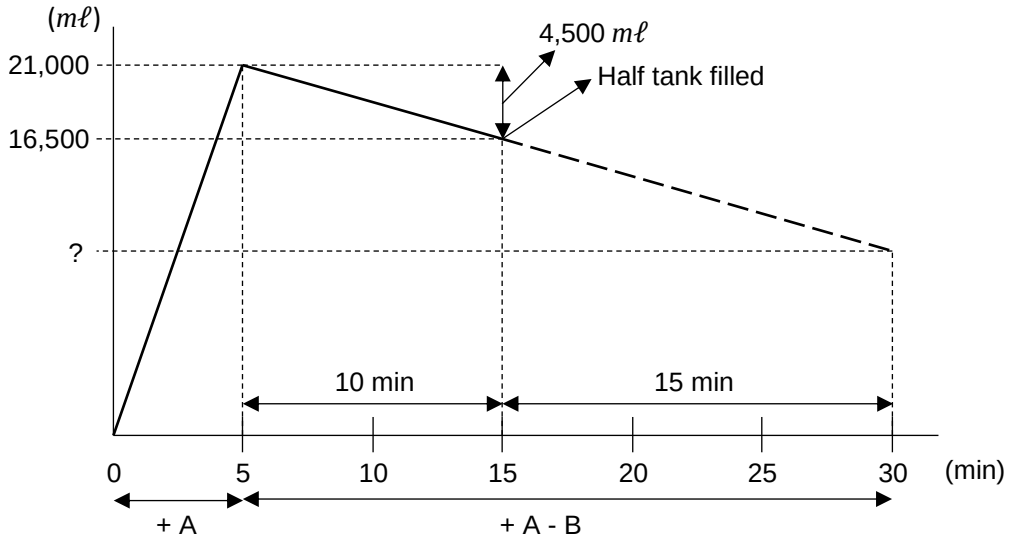
(a) What was the rate of water flowing out from Tap B?

(b) What fraction of the tank will be filled by 2.30 p.m.?



<< Volume >>

<Graph>



<Writing>

(a) 4200 × 5 = 21000 ($m\ell$) → filled by Tap A in 5 min
55 × 20 × 30 ÷ 2 = 16500 ($m\ell$) → left in the tank at 2.15 p.m.
21000 – 16500 = 4500 ($m\ell$) → decreased in 10 min
4500 ÷ 10 = 450 ($m\ell/min$) → decreased in 1 min
4200 + 450 = 4650 ($m\ell/min$) → flow out from Tap B

Only A opens → 4200 *ml* in
Only B opens → 4650 *ml* out
Both A & B open → 450 *ml* decrease

(b) From 2.15 pm to 2.30 p.m. → 15 (min)
450 × 15 = 6750 ($m\ell$) → decrease in 15 min
16500 – 6750 = 9750 ($m\ell$) → left in the tank at 2.30 p.m.
$\frac{9750}{55 \times 20 \times 30} = \frac{13}{44}$

Answer (a) 4.65 ℓ/min (b) $\frac{13}{44}$