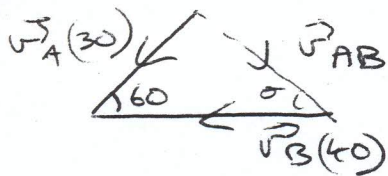


8202(H) (Ala 1990)



$$\vec{v}_{AB} = \vec{v}_A - \vec{v}_B$$

$$\vec{v}_A = 30 \cos 60^\circ \hat{i} - 30 \sin 60^\circ \hat{j} = 15\hat{i} - 15\sqrt{3}\hat{j}$$

$$\vec{v}_B = 40\hat{i}$$

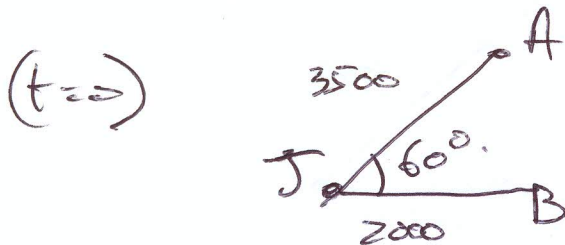
$$\vec{v}_{AB} = 25\hat{i} - 15\sqrt{3}\hat{j}$$

$$\text{mag}^n |\vec{v}_{AB}| = \sqrt{(25)^2 + (-15\sqrt{3})^2} = \sqrt{625 + 675} = \sqrt{1300} = 36.06 \text{ ms}^{-1}$$

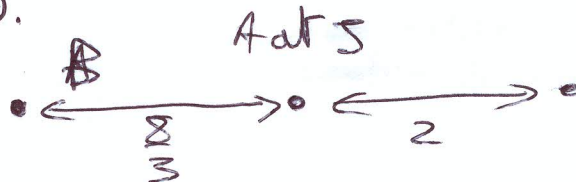
Dirⁿ θ when $\theta = \tan^{-1} \frac{15\sqrt{3}}{25} = \tan^{-1} \frac{3\sqrt{3}}{5} = \tan^{-1}(1.0392) = \underline{46.1^\circ}$

E 46.1° S.

Present (at instant of question)



For future (A at junction).



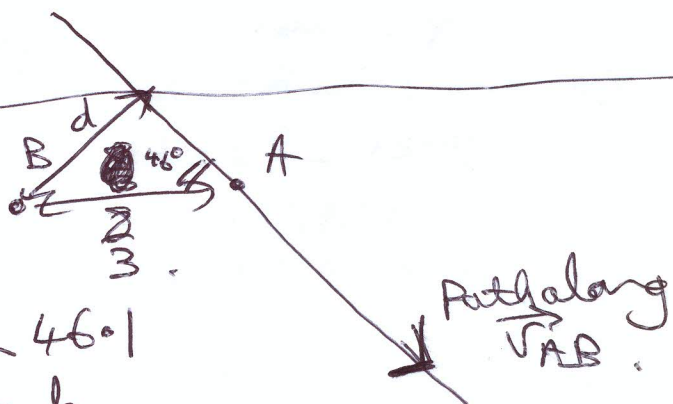
$$t = \frac{3500}{30} = \frac{3.5}{30}$$

$$\text{B has travelled} = 40 \left(\frac{3.5}{30} \right) = \frac{14}{3}$$

$$\therefore \text{B is } \frac{14}{3} - 2 = \frac{8}{3} \text{ km}$$

past the junction

Position diagram:



$$\therefore d = \frac{8}{3} \sin 46.1^\circ$$

$$d = 1.92 \text{ km.}$$