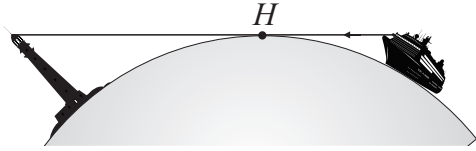


SAMPLE PAPER 3: PAPER 2

QUESTION 8 (75 MARKS)

Question 8 (a) (i)



Question 8 (b) (i)

$$d = 3.57\sqrt{h}$$

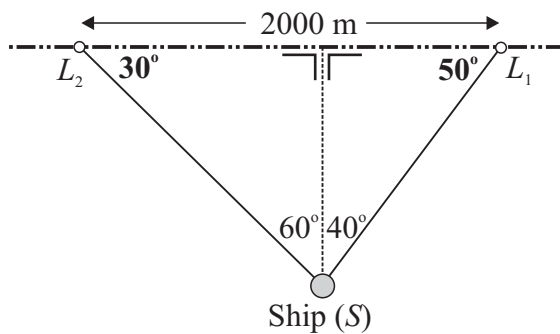
$$\therefore d = 3.57\sqrt{1.7} = 4.65 \text{ km}$$

Question 8 (b) (iii)

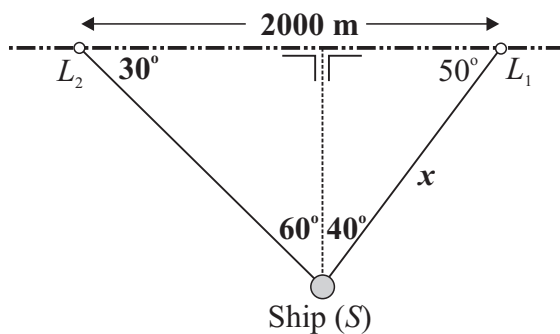
$$d = 3.57\sqrt{h}$$

$$\therefore d = 3.57\sqrt{35} = 21.12 \text{ km}$$

Question 8 (c) (i)



Question 8 (c) (ii)

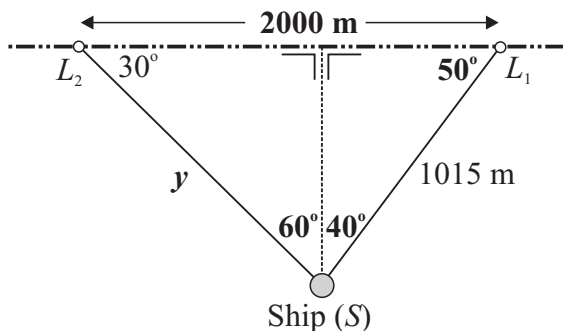


$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\frac{x}{\sin 30^\circ} = \frac{2000}{\sin 100^\circ}$$

$$x = \frac{2000 \sin 30^\circ}{\sin 100^\circ} \approx 1015 \text{ m}$$

Question 8 (c) (iii)



$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\frac{y}{\sin 50^\circ} = \frac{2000}{\sin 100^\circ}$$

$$y = \frac{2000 \sin 50^\circ}{\sin 100^\circ} \approx 1556 \text{ m}$$

Question 8 (a) (ii)

The first part of the lighthouse that Julie sees is the top of the lighthouse, because the other points are below the horizon.

Question 8 (b) (ii)

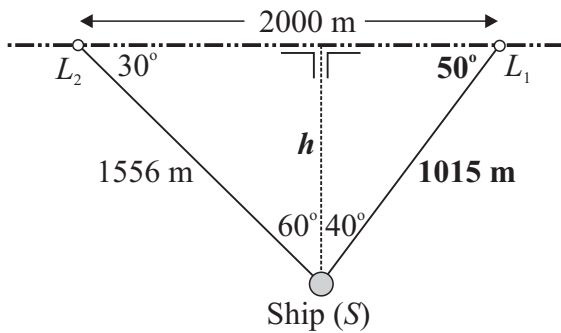
$$d = 3.57\sqrt{h}$$

$$\therefore d = 3.57\sqrt{20} = 15.97 \text{ km}$$

Question 8 (b) (iv)

Distance of ship to Paradise Island
 = 15.97 km + 21.12 km = 37.09 km \approx 37 km

Question 8 (c) (iv)



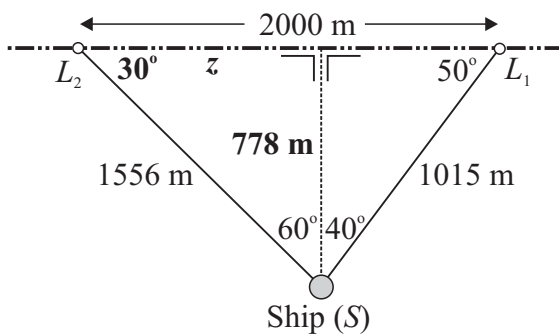
$$\sin A = \frac{\text{Opposite}}{\text{Hypotenuse}}$$

$$\sin 50^\circ = \frac{h}{1015}$$

$$\therefore h = 1015 \sin 50^\circ \approx 778 \text{ m}$$

Yes, it is further than 500 m from the shore.

Question 8 (d) (i)



$$\tan A = \frac{\text{Opposite}}{\text{Adjacent}}$$

$$\tan 30^\circ = \frac{778}{z}$$

$$\therefore z = \frac{778}{\tan 30^\circ} = 1347.5 \text{ m} = 1.3475 \text{ km}$$

Speed = 20 km/h

Distance = 1.3475 km

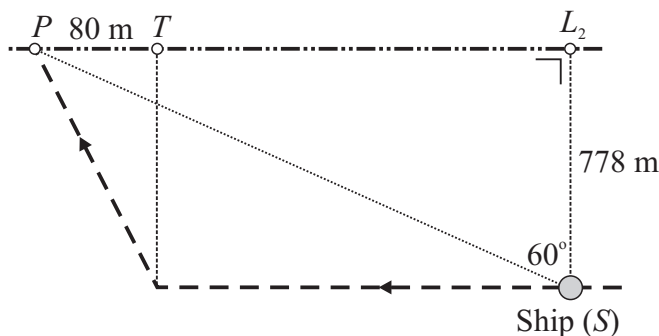
Time = $t = ?$

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

$$20 = \frac{1.3475}{t} \Rightarrow t = \frac{1.3475}{20} \times 60 \approx 4 \text{ minutes}$$

The ship is directly opposite the second lighthouse at 12.04 pm.

Question 8 (d) (ii)

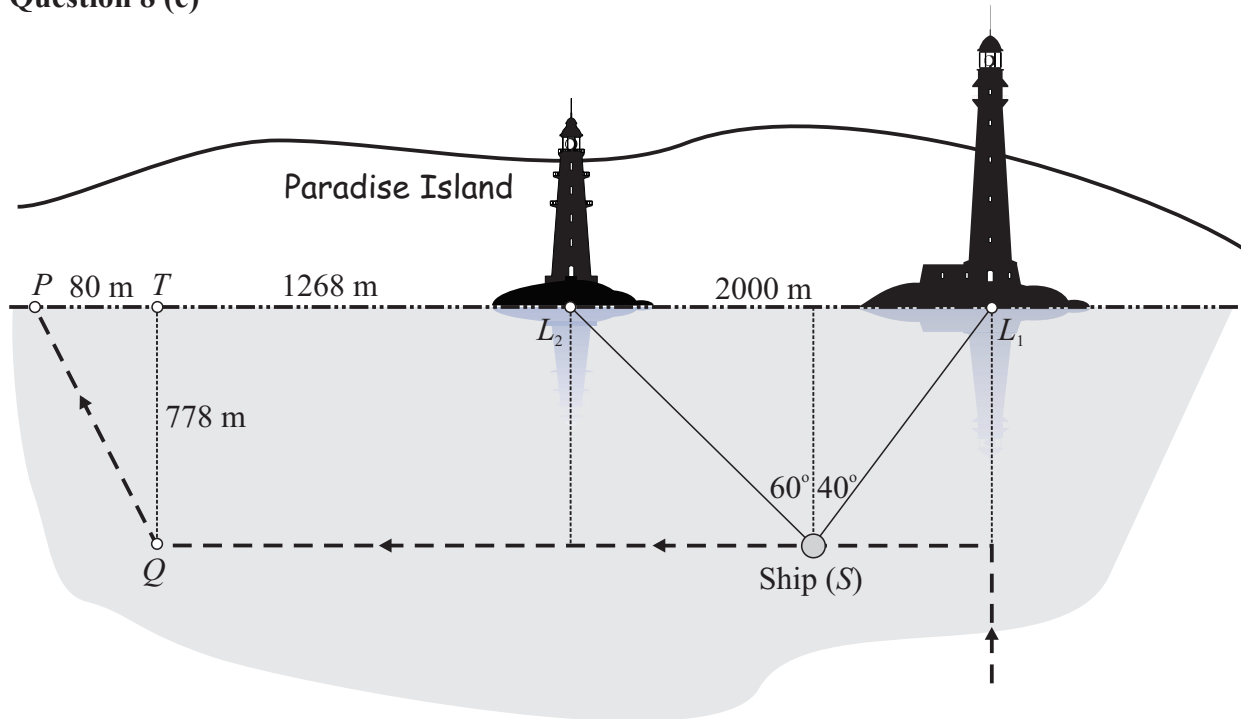


$$\tan A = \frac{\text{Opposite}}{\text{Adjacent}}$$

$$\tan 60^\circ = \frac{|PL_2|}{778}$$

$$\therefore |PL_2| = 778 \tan 60^\circ \approx 1348 \text{ m}$$

Question 8 (e)



$$|TL_2| = 1348 - 80 = 1268 \text{ m}$$

$$|PQ|^2 = 80^2 + 778^2$$

$$\therefore |PQ| = \sqrt{80^2 + 778^2} \approx 782 \text{ m}$$

Total distance travelled by ship parallel to coast and into the port = $2000 + 1268 + 782 = 4050 \text{ m}$
