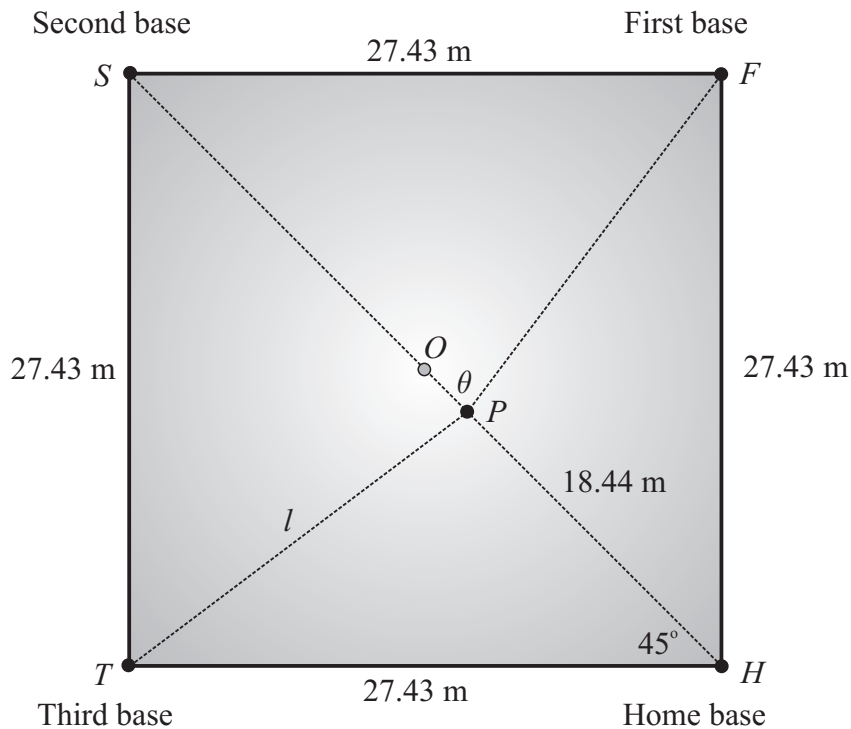


## SAMPLE PAPER 5: PAPER 2

### QUESTION 9 (45 MARKS)



#### Question 9 (a)

Length of diagonal  $|HS| = \sqrt{27 \cdot 43^2 + 27 \cdot 43^2} = 38 \cdot 79$  m  
 $|PS| = 38 \cdot 79 - 18 \cdot 44 = 20 \cdot 35$  m

#### Question 9 (b)

Let  $O$  be the point where the diagonals of the square bisect each other.

$$|PO| = |HO| - |PH| = \frac{38 \cdot 79}{2} - 18 \cdot 44 = 0 \cdot 96 \text{ m}$$

#### Question 9 (c)

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$l^2 = 27 \cdot 43^2 + 18 \cdot 44^2 - 2(27 \cdot 43)(18 \cdot 44) \cos 45^\circ$$

$$|PT| = l = \sqrt{27 \cdot 43^2 + 18 \cdot 44^2 - 2(27 \cdot 43)(18 \cdot 44) \cos 45^\circ} = 19 \cdot 42 \text{ m}$$

**Question 9 (d)**

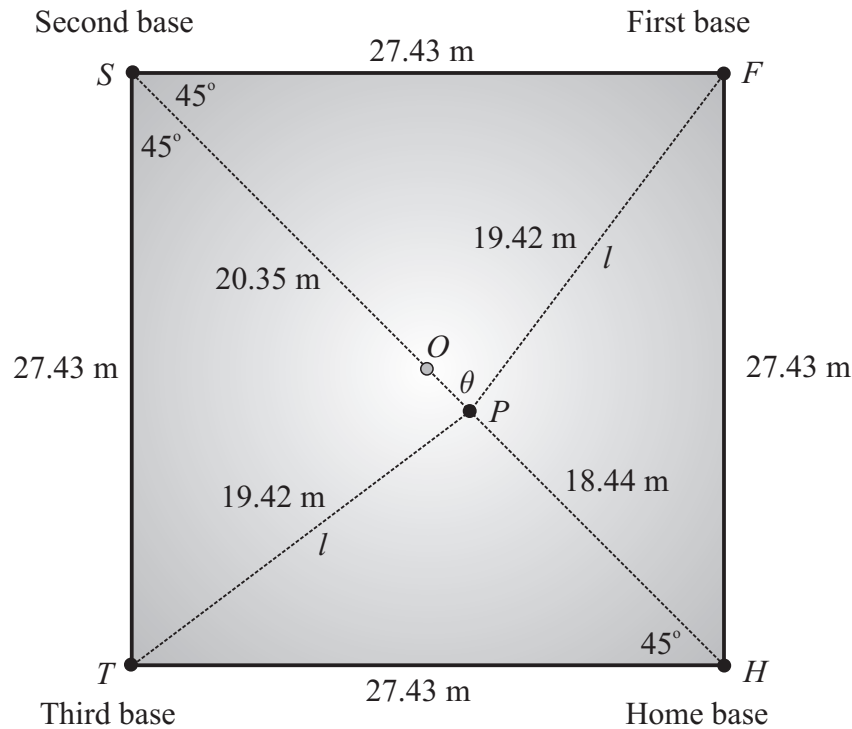
$\triangle SPF$  and  $\triangle SPT$  are congruent (SAS) because:

$$|SF| = |ST| = 27.43 \text{ m}$$

$$|SP| = |SP| \text{ [Common]}$$

$$|\angle FSP| = |\angle TSP| = 45^\circ$$

Therefore,  $|FP| = |TP| = l = 19.42 \text{ m}$



$$27 \cdot 43^2 = 20 \cdot 35^2 + 19 \cdot 42^2 - 2(20 \cdot 35)(19 \cdot 42) \cos \theta$$

$$2(20 \cdot 35)(19 \cdot 42) \cos \theta = 20 \cdot 35^2 + 19 \cdot 42^2 - 27 \cdot 43^2$$

$$\cos \theta = \frac{20 \cdot 35^2 + 19 \cdot 42^2 - 27 \cdot 43^2}{2(20 \cdot 35)(19 \cdot 42)}$$

$$\theta = \cos^{-1} \left( \frac{20 \cdot 35^2 + 19 \cdot 42^2 - 27 \cdot 43^2}{2(20 \cdot 35)(19 \cdot 42)} \right) \approx 87^\circ$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

**Question 9 (e)**

$$24 \text{ km h}^{-1} = \frac{24 \text{ km}}{1 \text{ h}} = \frac{24 \text{ 000 m}}{3600 \text{ s}} = \frac{20}{3} \text{ s}$$

$$s = 4 \times 27 \cdot 43 \text{ m} = 109 \cdot 72 \text{ m}$$

$$v = \frac{20}{3} \text{ m s}^{-1}$$

$$t = ?$$

$$t = \frac{s}{v} = \frac{109 \cdot 72}{\frac{20}{3}} = 16 \cdot 5 \text{ s}$$

$$v = \frac{s}{t}$$