1. There exists a triangle ABC satisfying the conditions

(a) $b \sin A = a, A < \pi/2$ *(1986 - 2 Marks)*

(b) $b \sin A > a, A > \pi/2$

(c) $b \sin A > a, A < \pi/2$

(d) $b \sin A < a, A < \pi/2, b > a$

(e) $b \sin A < a, A > \pi/2, b = a$

Solution: -

1. **(a, d)** We have

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

(a) $b \sin A = a \Rightarrow a \sin B = a$

$\Rightarrow \sin B = 1 \Rightarrow B = \pi/2$

Since $A < \pi/2$, the ΔABC is possible.

(b) $b \sin A > a \Rightarrow a \sin B > a \Rightarrow \sin B > 1$

Which is impossible. Hence the possibility (b) is ruled out.

Similarly (c) can be shown to be impossible.

(d) $b \sin A < a \Rightarrow a \sin B < a \Rightarrow \sin B < 1$ so value of $\angle B$ exists.

Now, $b > a \Rightarrow B > A$. Since $A < \pi/2$

The ΔABC is possible when $B >$ or $< \pi/2$.

(e) Since $b = a$, we have $B = A$. But $A > \pi/2$

$\therefore B > \pi/2$. But this is not possible for any triangle.