Exercise 6.3

Question 7:

In Fig. 6.14, DE || QR and AP and BP are bisectors of ∠EAB and ∠RBA, respectively. Find ∠APB.

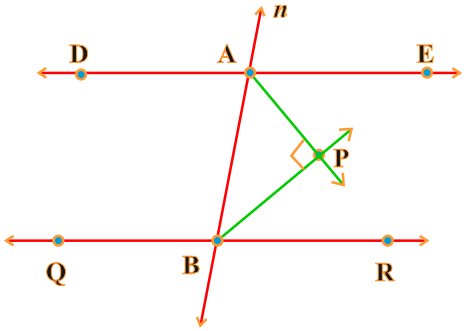

Fig. 6.14

Answer 7:

Given:

DE‖ QR, and AP and PB are the bisectors of ∠EAB and ∠RBA, respectively.

To find:

∠APB

Solution:

We know that, the interior angles on the same side of transversal are supplementary.

$\therefore \quad \angle EAB + \angle RBA = 180°$

$\Rightarrow \quad \frac{1}{2}\angle EAB = \frac{1}{2}\angle RBA = \frac{180^0}{2}$

[dividing both sides by 2]

$\Rightarrow \quad \frac{1}{2}\angle EAB + \frac{1}{2}\angle RBA = 90°$ … (i)

Since AP and BP are the bisectors of ∠EAB and ∠RBA respectively.

$\therefore \quad \angle BAP = \frac{1}{2}\angle EAB$ … (ii)

and $\quad \angle ABP = \frac{1}{2}\angle RBA$ … (iii)

On adding equations (ii) and (iii), we get

$$\angle BAP + \angle ABP = \frac{1}{2}\angle EAB + \frac{1}{2}\angle RBA$$

Using equation (i), we get

$\Rightarrow$ $\angle BAP + \angle ABP = 90°$ ... (iv)

In ΔAPB, $\angle BAP + \angle ABP + \angle APB = 180°$

[sum of cointerior angles is 180°]

$\Rightarrow$ $90° + \angle APB = 180°$

[from equation (iv)]

$\Rightarrow$ $\angle APB = 180° - 90° = 90°$

Hence, $\angle APB = 90°$