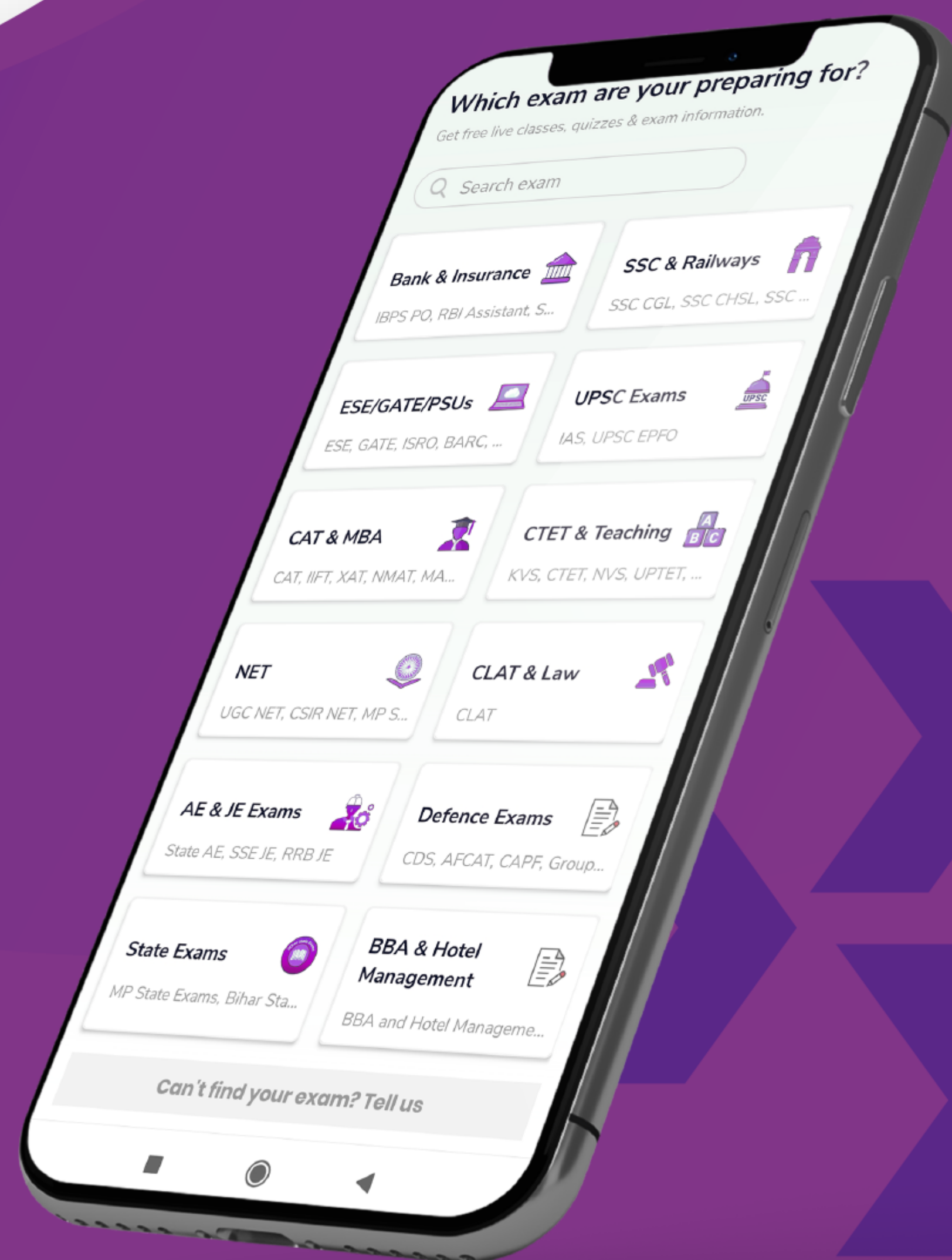


# Formula Sheet On Boat & Stream

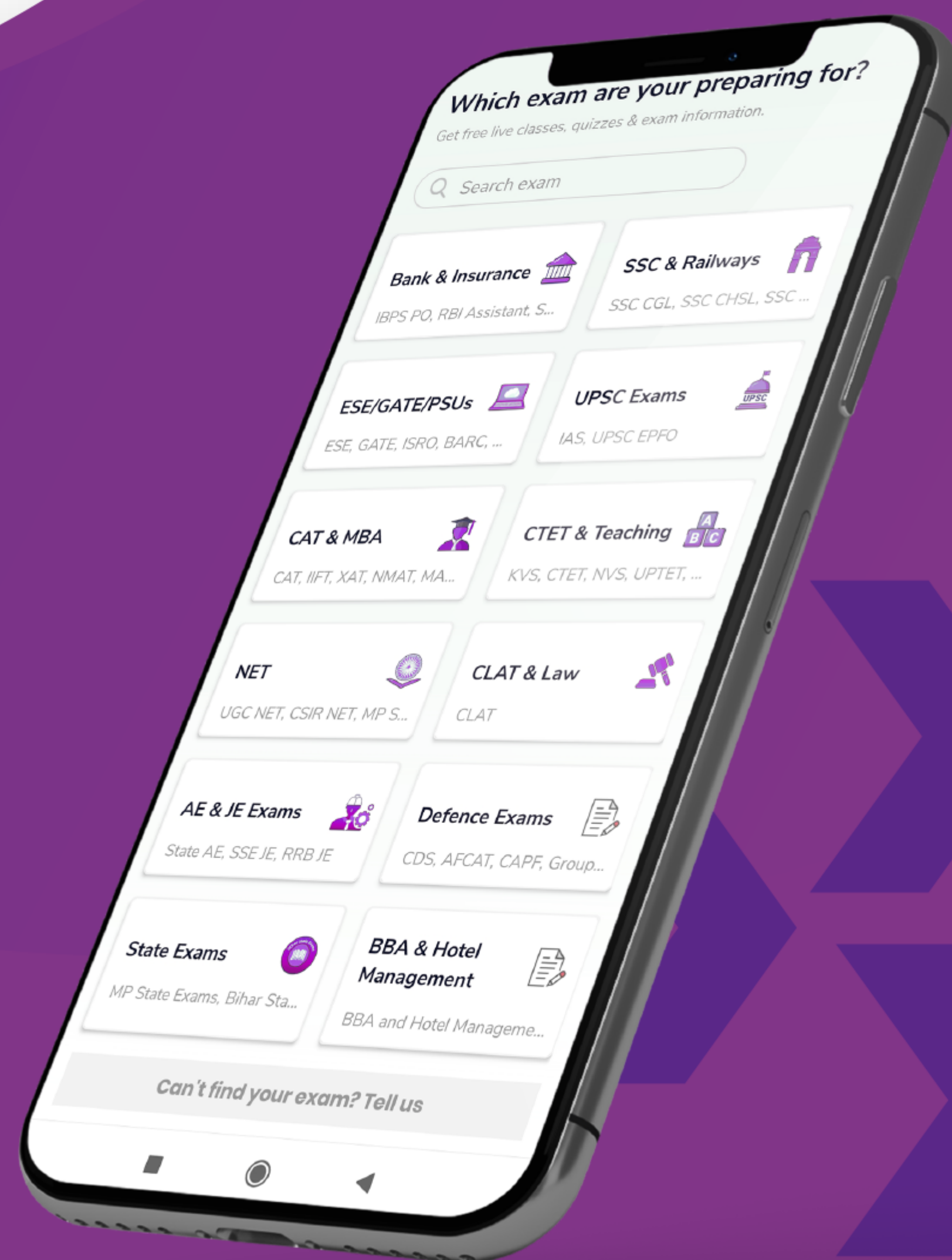


## Basic Concept

Direction along the stream is known as ***downstream***.

Direction against the stream is known as ***upstream***.

Moving of water in a river or sea or is known as ***stream***.



## Formulas

**If speed of boat in still water is 'U' km/h & speed of stream is V km/h Then,**

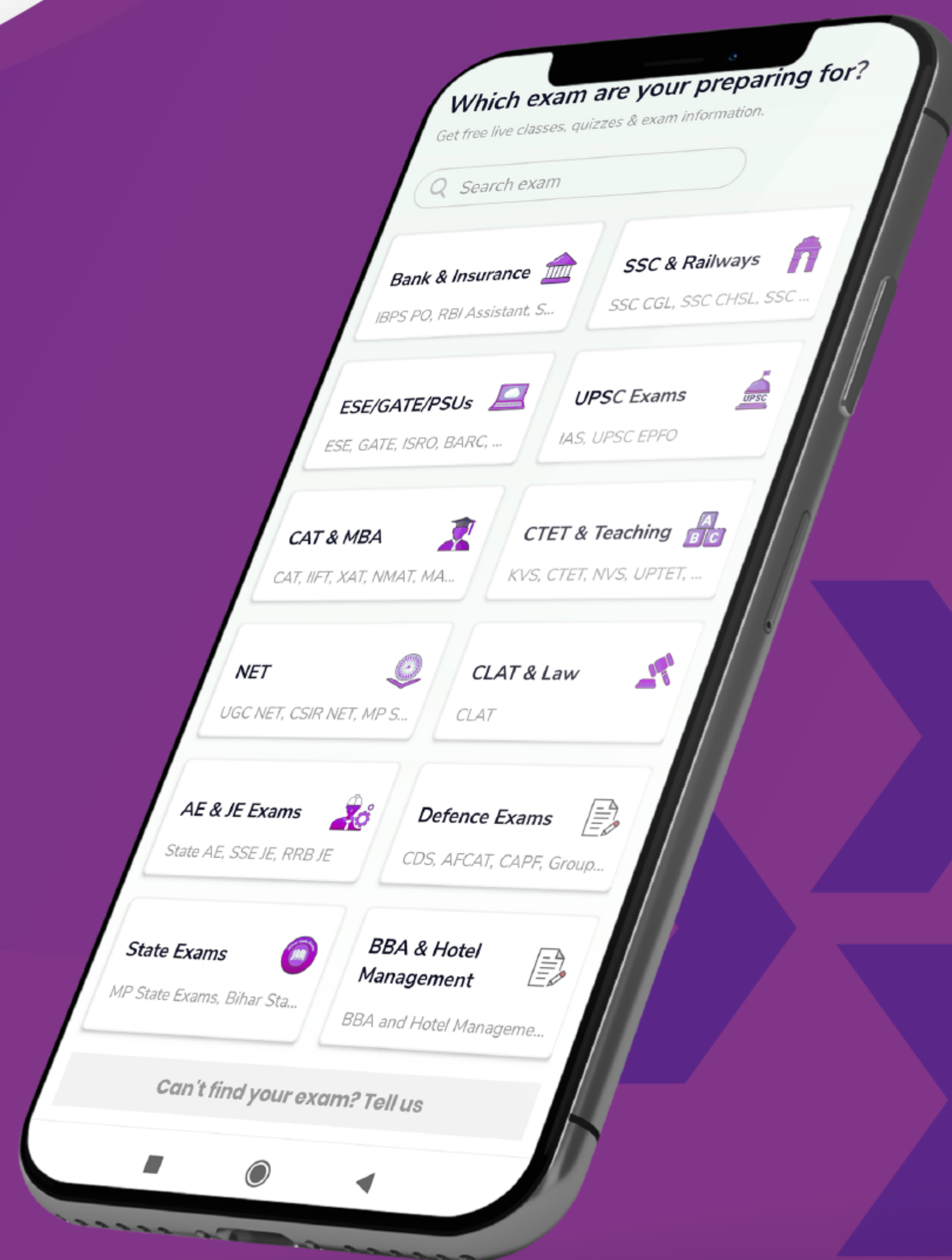
Speed Downstream =  $(U + V)$  km/h

Speed Upstream =  $(U - V)$  km/h

**If speed in downstream is 'a' km/h & the speed in upstream is 'b' km/h Then,**

Speed in still water =  $\frac{1}{2} (a + b)$  km/h

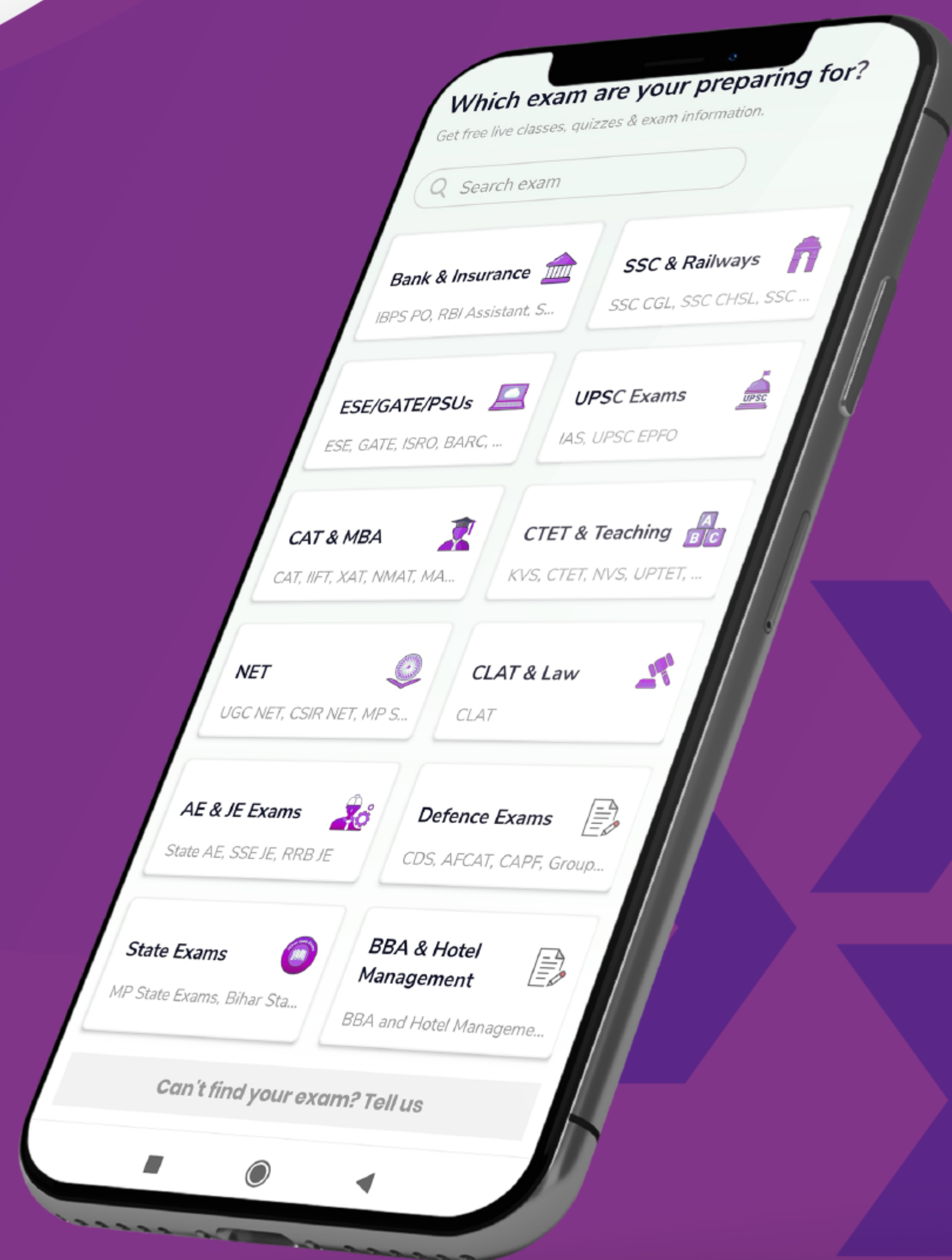
Speed of stream =  $\frac{1}{2} (a - b)$  km/h



## Some Tips And Tricks

Let's assume that a boy can row at a speed of  $A$  km/h in still water & he rows the same distance up & down in a stream which flows at rate of  $B$  km/h. Then his average speed throughout the journey-

$$\frac{\text{speed downstream} \times \text{speed upstream}}{\text{Speed in still water}} = \frac{(A+B)(A-B)}{A} \text{ km/h}$$



Let's the speed of a boy in still water be  $A$  km/h and the speed of stream be  $B$  km/hr. If he takes ' $X$ ' hours more in upstream than to go downstream for the same distance. Then the distance =  $\frac{(A \times A - B \times B) \times X}{2B}$  km

A boy can row a certain distance in still water at  $A$  km/hr. In a stream flowing at  $B$  km/hr, if it takes him  $t$  hours to row a place and come back, then the distance between two point =  $\frac{t(A \times A - B \times B)}{2A}$  km

A boy rows a certain distance downstream in  $t_1$  hours and return the same distance upstream in  $t_2$  hours. If the speed of the stream is  $A$  km/hr, Then the speed of the boy in still water =  $\frac{A(t_2 + t_1)}{t_2 - t_1}$  km/hr

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