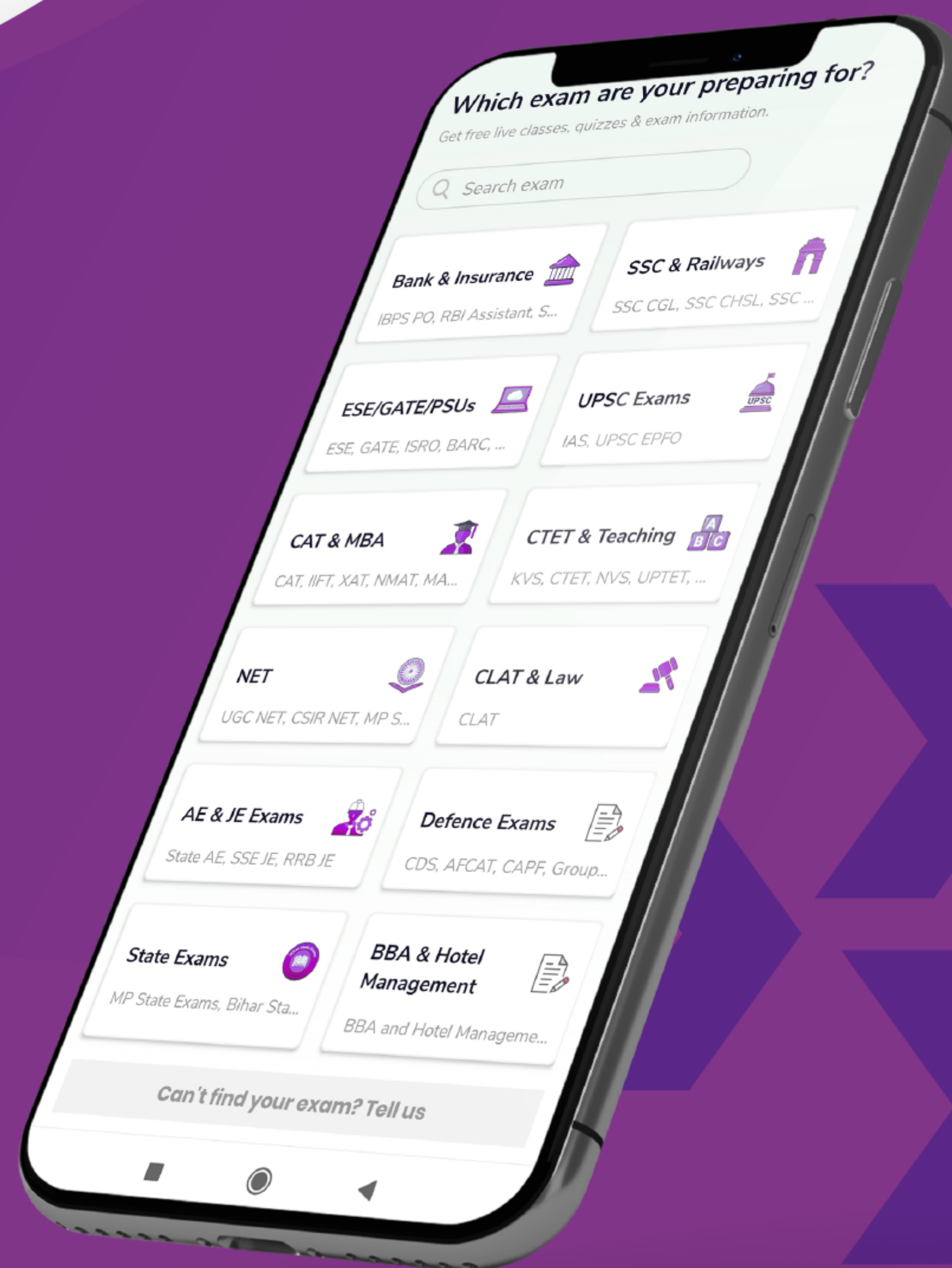


Formula Sheet On Permutations & Combination



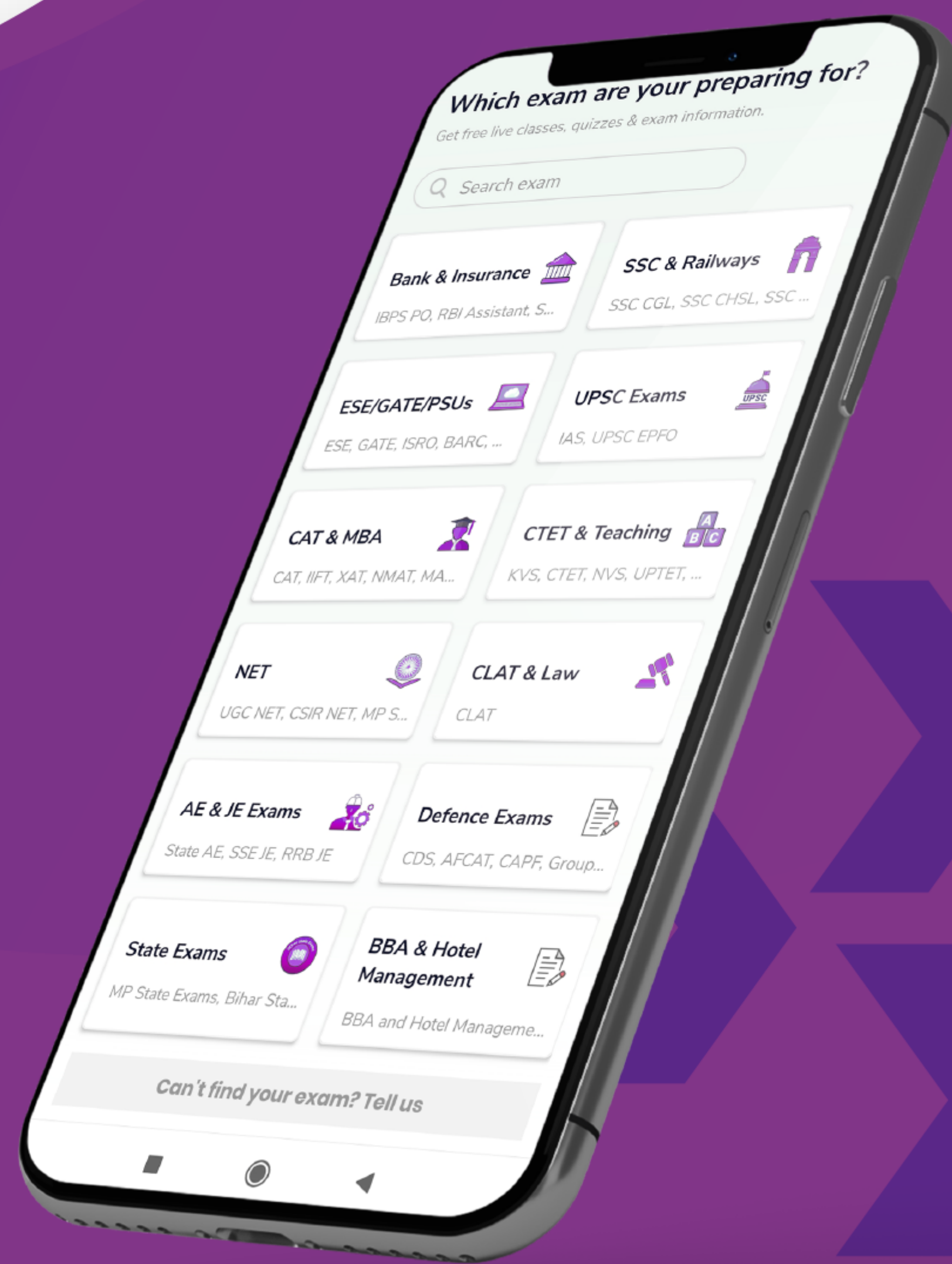
Fundamental Principle of Counting:

1. Rule of Sum :- A task is performed in m ways and another task is performed in n ways and both tasks cannot be performed simultaneously. So, either task can be accomplished in $(m + n)$ ways.

2. Rule of Multiplication:- There are two tasks, A and B can be performed in m and n ways respectively. So, the number of different ways of doing both tasks A and B simultaneously is $(m \times n)$ ways.

Factorial: Factorial is a notation for multiplication of consecutive integers. The factorial is represented by the symbol '!'.

$n! = 1 \times 2 \times 3 \times 4 \times \dots \times (n - 1) \times n$ ($n!$ mean multiplication of first n natural numbers)



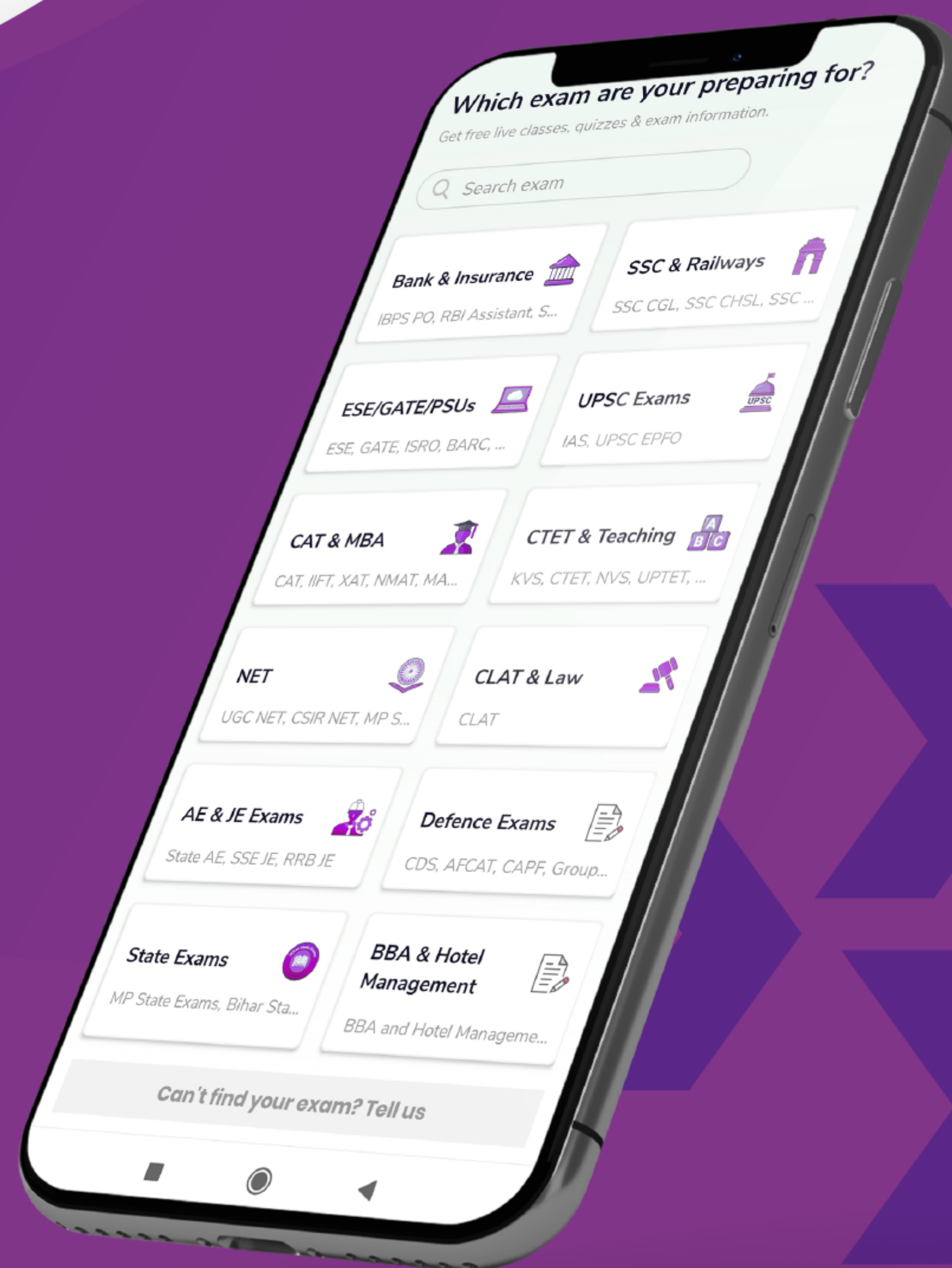
Permutation

Permutation: Permutation means arranging i.e. “selecting and ordering” one or more objects from the given certain objects (may be alike or different).

The number of permutations of n different objects taken r at a time is represented as :

$${}^n P_r = \frac{n!}{(n-r)!} = n(n-1)(n-2) \dots (n-r+1) \text{ (where, } 0 \leq r \leq n \text{)}$$

In Permutation and Combination, Combination is selection and Permutation is selection as well as arrangements.



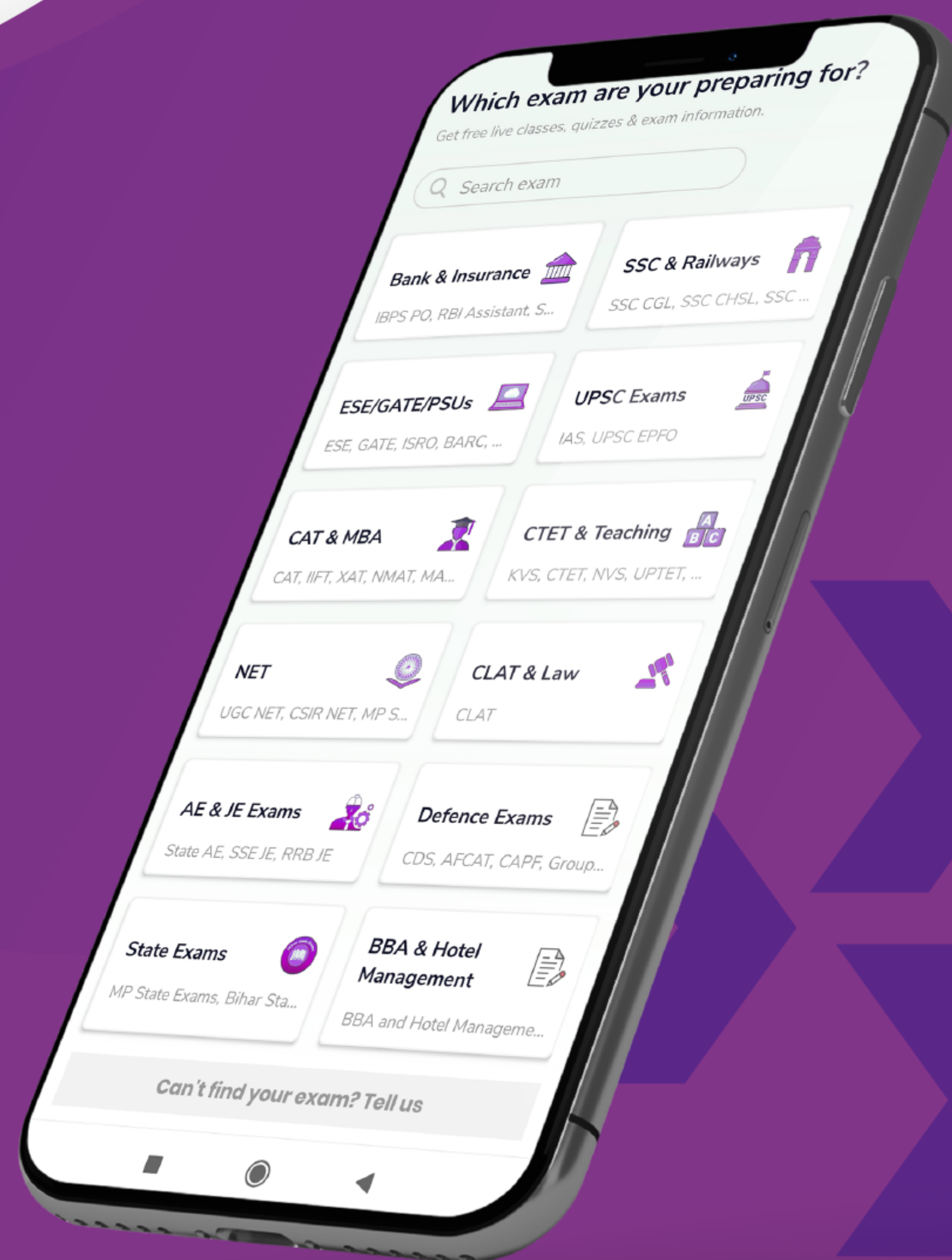
Combination

Combination: Combination means selecting one or more objects from the given certain objects (may be alike or different).

The combination of n distinct objects taken r at a time, is represented and calculated as:

$${}^n C_r = \frac{n!}{(n-r)!r!}$$

Here, r can be any positive integer less than or equal to n .



The permutation of n distinct objects taken r at a time, is represented and calculated

as:
$${}^n P_r = \frac{n!}{(n-r)!}$$

Here, r can be any positive integer less than or equals to n .

The permutation of n distinct objects taken r at a time, is represented and calculated as:

The number of permutations of n objects taken all at a time in which, p are alike objects of one kind, q are alike objects of second kind & r are alike objects of a third kind and the rest

$[n - (p + q + r)]$ are all different is
$$\frac{n!}{p!q!r!}$$

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