Question:

In how many ways can 5 children and a couple be seated on a bench if the couple should be together ?

A. 5040 ways
B. 720 ways
C. 1440 ways
D. 144 ways

Answer:

$C_1\ C_2\ C_3\ C_4\ C_5\ \overbrace{M_1\ M_2}^{1} \Rightarrow C_1\ C_2\ C_3\ C_4\ C_5\ M$

Two members of the couple can be considered as 1 since they have to be always together

There are $6!$ different ways for 6 people to sit.

$\rightarrow C_1\ C_2\ C_3\ C_4\ C_5\ M_1M_2 \mid C_1\ C_2\ C_3\ C_4\ C_5\ M_2M_1 \leftarrow$

$\rightarrow C_1\ C_2\ M_1M_2\ C_3\ C_4\ C_5 \mid C_1\ C_2\ M_2M_1\ C_3\ C_4\ C_5 \leftarrow$

Since both members of the couple can change their places among themselves as shown above,

There are $2!$ different ways for 2 members of the couple to be seated.

Thus total No. of ways required seating arrangement can be fulfilled $= 6!\ 2!$

$= 720 \times 2$

$= 1440$

$\therefore$ Ans : Option (C)