



1. The molecular formula of a commercial resin used for exchanging ions in water softening is  $C_8H_7SO_3Na$  (Mol. wt. 206). What would be the maximum uptake of  $Ca^{2+}$  ions by the resin when expressed in mole per gram resin?

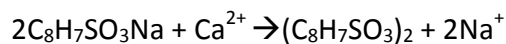
- (1)  $\frac{1}{103}$                       (2)  $\frac{1}{206}$                       (3)  $\frac{2}{309}$                       (4)  $\frac{1}{412}$

**Answer:**

Molecular weight resin = 206

Therefore 1 gram of resin =  $\frac{1}{206}$

Water softening agent  $C_8H_7SO_3Na$  reacts with  $Ca^{2+}$  to form calcium salts as



2 moles of resin reacts with 1 mole/gm of  $Ca^{++}$

206 X 2 gram reacts with 1 mole/gm of  $Ca^{++}$

1 gram reacts with  $\frac{1}{412}$  mole/gm of  $Ca^{++}$

**Correct option is (4)  $\frac{1}{412}$**