Question.

An electrolyte AB undergoes 50% dissociation and 50% dimerization in solution then Van 't Hoff factor (i) would be:

(1) 1.25

(2) 1

(3) 0.90

(4) 1.50

Answer : (1) 1.25

Physical sense of Van 't Hoff factor is how much times the number of particles increased (descresed) when dissolved:

$$i = \frac{n}{n_0}$$
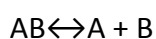
Where "n" is the number of particles after dissolving,

"n_0" is the initial number of particles.

In our case,

$$i = \frac{n_{diss} + n_{ass}}{n_0} = \frac{\alpha n_0 * 0.5 + \frac{n_0}{2} * 0.5}{n_0} = \frac{1 + 0.25}{1} = 1.25$$

Where n_{diss} is the number of particles appeared after dissociation of 50% of molecules AB:

AB↔A + B

n_{ass} is the number of particles appeared after association of 50% of molecules AB:

2AB↔ (AB)₂