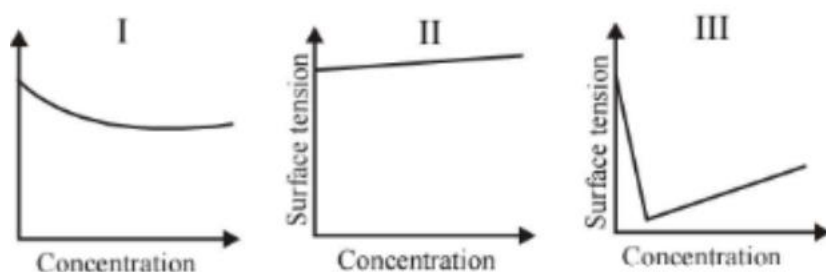


Previous JEE question 5

The qualitative sketches I, II and III given below show the variation of surface tension with molar concentration of three different aqueous solutions of KCl, CH_3OH and $\text{CH}_3(\text{CH}_2)_{11}\text{OSO}_3^- \text{Na}^+$ at room temperature. The correct assignment of the sketches is (JEE Adv. 2016)



- (a) I: KCl II: CH_3OH III: $\text{CH}_3(\text{CH}_2)_{11}\text{OSO}_3^- \text{Na}^+$
 (b) I: $\text{CH}_3(\text{CH}_2)_{11}\text{OSO}_3^- \text{Na}^+$ II: CH_3OH III: KCl
 (c) I: KCl II: $\text{CH}_3(\text{CH}_2)_{11}\text{OSO}_3^- \text{Na}^+$ III: CH_3OH
 (d) I: CH_3OH II: KCl III: $\text{CH}_3(\text{CH}_2)_{11}\text{OSO}_3^- \text{Na}^+$

(d)

- A solution of CH_3OH and water shows positive deviation from Raoult's law, it means by adding CH_3OH intermolecular force of attraction decreases and hence surface tension decreases.
- By adding KCl in water, intermolecular force of attraction bit increases, so surface tension increases by small value.
- By adding surfactant like $\text{CH}_3(\text{CH}_2)_{11}\text{OSO}_3^- \text{Na}^+$, surface tension decreases rapidly and after forming micelle it slightly increases.