Question 13: A 150 ml solution of I2 is divided into two unequal parts. First part reacts with hypo solution in acidic medium. 15 ml of 0.4 M hypo was consumed. Second part was added with 100 ml of 0.3 M NaOH solution. The residual base required 10 ml of 0.3 M H2SO4 solution for complete neutralization. What was the initial concentration of I_2?

ANSWER: OPTION 2

The reaction is as follows:

$I_2 + 2Na_2S_2O_3 \rightarrow 2NaI + Na_2S_4O_6 \quad \cdots(i)$

Millimoles of $Na_2S_2O_3$ consumed = $15 \times 0.4 = 6$ m mol

Millimoles of I_2 consumed=3 m mol

$3I_2 + 6NaOH \rightarrow 5NaI + NaIO_3 + 3H_2O \quad \cdots(ii)$

Millimoles of I_2 reacted with NaOH = $(30-2\times3)/2 = 12$ mmol

Total mmol of I_2 consumed in reaction (i) and (ii)

$= 3+12 = 15$ mmol.

ANSWER= Molarity of $I_2 = 15/150 = 0.1M$