

Quiz (Temperature change during Neutralization)

The following combinations of acids and alkalis are mixed together.

- (i) 50 cm³ of 1.0M HCl + 50 cm³ of 1.0M NaOH
- (ii) 100 cm³ of 1.0M HNO₃ + 100 cm³ of 1.0M NaOH
- (iii) 25 cm³ of 2.0M HNO₃ + 75 cm³ of 2.0M NaOH
- (iv) 25 cm³ of 2.0M H₂SO₄ + 25 cm³ of 2.0M NaOH

- (a) Which combination releases the largest amount of heat? Explain.
- (b) Which combination gives the highest temperature rise? Explain your answer.

Suggested Answer

Table:

Case	No. of mole of H ⁺	No. of mole of OH ⁻	No. of mole of water formed during neutralization	Total volume of reaction mixture / dm ³	Ratio (m/V)	Temp. change
(i)	0.05	0.05	0.05	0.10	1/2	T
(ii)	0.10	0.10	0.10	0.20	1/2	T
(iii)	0.05	0.15 (Excess)	0.05	0.10	1/2	T
(iv)	0.10 (Excess)	0.05	0.05	0.05	1	2T

(a) Case (ii), highest number of moles of water formed.

(b) Case (iv), No. of moles of water formed : Volume of reaction mixture is the highest.