

Marks
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- Order **either one** of the two following sets of oxides in terms of increasing acidity. Explain the reasons for your order.

1. HBrO_4 , H_3AsO_4 , H_2SeO_4 2. HClO_2 , HClO , HClO_4 , HClO_3 .**1. $\text{H}_3\text{AsO}_4 < \text{H}_2\text{SeO}_4 < \text{HBrO}_4$**

The acidic protons are all bonded to an O atom that in turn is bonded to the As, Se or Br. The more electronegative the central atom, the more electron density is drawn out of the O–H bond and the weaker this bond becomes. The weaker this bond, the stronger the acid. Acid strength therefore follows the electronegativity of the central atoms: $\text{Br} > \text{Se} > \text{As}$.

2. $\text{HClO} < \text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4$

All are structurally H–O–Cl(O)_x , where x is 0, 1, 2 or 3. Oxygen is a very electronegative atom and pulls electron density towards itself. The more O's bonded to the chlorine, the more pronounced this effect and the weaker the O–H bond becomes. The weaker this bond, the stronger the acid.

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