

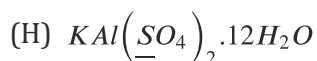
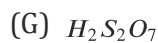
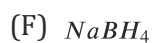
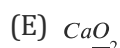
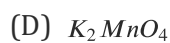
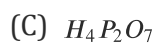
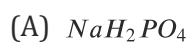
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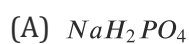
Chemistry Class 11 NCERT Solutions: Chapter 8 Redox Reactions Part 1

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Q: 1. Assign oxidation numbers to the underlined elements in each of the following species



Answer:



Let the oxidation number of P be x.

We know that,

Oxidation number of Na = +1

Oxidation number of H = +1

Oxidation number of O = -2

$$\Rightarrow \begin{matrix} +1 & +1 & x & -2 \\ Na & H_2 & P & O_4 \end{matrix}$$

Then, we have

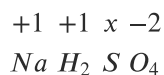
$$1(+1) + 2(+1) + 1(x) + 4(-2) = 0$$

$$\Rightarrow 1 + 2 + x - 8 = 0$$

$$\Rightarrow x = +5$$

Hence, the oxidation number of P is + 5



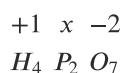
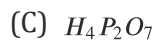


$$1(+1) + 1(+1) + 1(x) + 4(-2) = 0$$

$$\Rightarrow 1 + 1 + x - 8 = 0$$

$$\Rightarrow x = +6$$

Hence, the oxidation number of S is + 6.



Then, we have

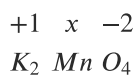
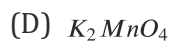
$$4(+1) + 2(x) + 7(-2) = 0$$

$$\Rightarrow 4 + 2x - 14 = 0$$

$$\Rightarrow 2x = +10$$

$$\Rightarrow x = +5$$

Hence, the oxidation number of P is + 5.



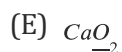
Then, we have

$$2(+1) + x + 4(-2) = 0$$

$$\Rightarrow 2 + x - 8 = 0$$

$$\Rightarrow x = +6$$

Hence, the oxidation number of Mn is + 6.



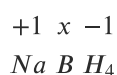
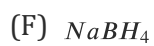
Then, we have

$$(+2) + 2(x) = 0$$

$$\Rightarrow 2 + 2x = 0$$

$$\Rightarrow x = -1$$

Hence, the oxidation number of O is -1.

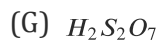


$$1(+1) + 1(x) + 4(-1) = 0$$

$$\Rightarrow 1 + x - 4 = 0$$

$$\Rightarrow x = +3$$

Hence, the oxidation number of B is + 3.



$$\begin{array}{ccccc} +1 & x & & -2 & \\ H_2 & S_2 & & H_7 & \end{array}$$



Then, we have

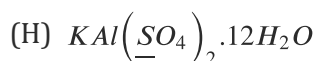
$$2 + (+1) + 2(x) + 7(-2) = 0$$

$$\Rightarrow 2 + 2x - 14 = 0$$

$$\Rightarrow 2x = 12$$

$$\Rightarrow x = +6$$

Hence, the oxidation number of S + 6.



$$\begin{array}{ccccccc} +1 & 3+ & & x & 2- & & \\ K & Al & & S & O_4 & & \\ & & & & & & \end{array} \cdot 12 \begin{array}{cc} +1 & -2 \\ H_2 & O \end{array}$$

Then, we have

$$1(+1) + 1(+3) + 2(x) + 8(-2) + 24(+1) + 12(-2) = 0$$

$$\Rightarrow 1 + 3 + 2x - 16 + 24 - 24 = 0$$

$$\Rightarrow 2x = 12$$

$$\Rightarrow x = +6$$

Or,

We can ignore the water molecule, as it is a neutral molecule. Then, the sum of the oxidation numbers of all atoms of the water molecule may be taken as zero. Therefore, after ignoring the water molecule, we have

$$1(+1) + 1(+3) + 2(x) + 8(-2) = 0$$

$$\Rightarrow 1 + 3 + 2x - 16 = 0$$

$$\Rightarrow 2x = 12$$

$$\Rightarrow x = +6$$

Hence, the oxidation number of S is + 6.