

Find the oxidation numbers of the following underlined: –

1. H <u>N</u> O <sub>3</sub>	31. H <u>I</u> O <sub>4</sub>
2. H <u>Cl</u>	32. H <u>Cl</u> O
3. H <sub>2</sub> <u>S</u> O <sub>4</sub>	33. H <u>Cl</u> O <sub>2</sub>
4. K <u>Mn</u> O <sub>4</sub>	34. H <u>Cl</u> O <sub>3</sub>
5. H <u>S</u> O <sub>3</sub> <sup>-</sup>	35. H <u>Cl</u> O <sub>4</sub>
6. K <sub>2</sub> <u>Mn</u> O <sub>4</sub>	36. <u>Xe</u> F <sub>2</sub>
7. H <u>C</u> N	37. <u>Xe</u> F <sub>4</sub>
8. <u>Fe</u> <sub>3</sub> O <sub>4</sub>	38. <u>Xe</u> F <sub>6</sub>
9. <u>Os</u> O <sub>4</sub>	39. <u>Xe</u> OF <sub>2</sub>
10. Na <sub>2</sub> <u>S</u> <sub>2</sub> O <sub>3</sub>	40. <u>Xe</u> O <sub>2</sub>
11. H <sub>2</sub> <u>P</u> O <sub>4</sub> <sup>-</sup>	41. <u>Xe</u> O <sub>4</sub>
12. Na <sub>3</sub> <u>P</u> O <sub>4</sub>	42. K <sub>2</sub> <u>Cr</u> <sub>2</sub> O <sub>7</sub>
13. Fe <u>S</u> O <sub>4</sub>	43. <u>P</u> <sub>2</sub> O <sub>5</sub>
14. K <sub>2</sub> <u>Cr</u> O <sub>4</sub>	44. <u>Se</u> O <sub>2</sub>
15. <u>C</u> <sub>2</sub> H <sub>6</sub>	45. <u>Al</u> <sub>2</sub> O <sub>3</sub>
16. <u>CH</u> <sub>3</sub> <u>C</u> HO	46. <u>N</u> <sub>2</sub> H <sub>4</sub>
17. <u>N</u> O <sub>2</sub>	47. <u>S</u> O <sub>3</sub>
18. H <sub>2</sub> <u>C</u> <sub>2</sub> O <sub>4</sub>	48. <u>S</u> O <sub>2</sub>
19. Ca <u>Cl</u> <sub>2</sub>	49. CaO <u>Cl</u> <sub>2</sub>
20. Ca <u>C</u> O <sub>3</sub>	50. H <sub>2</sub> <u>P</u> O <sub>3</sub> <sup>-</sup>
21. Na <u>S</u> O <sub>3</sub>	51. H <u>N</u> O <sub>3</sub>
22. NaH <u>C</u> O <sub>3</sub>	52. H <sub>2</sub> <u>S</u> <sub>2</sub> O <sub>6</sub>
23. <u>N</u> H <sub>4</sub> OH	53. Na <sub>2</sub> SO <sub>4</sub>
24. <u>N</u> H <sub>4</sub> Cl	54. K <u>Cr</u> O <sub>4</sub>
25. <u>N</u> <sub>2</sub> O	55. <u>I</u> O <sub>3</sub> <sup>-</sup>
26. <u>N</u> O	56. <u>C</u> <sub>2</sub> O <sub>4</sub>
27. <u>N</u> <sub>2</sub> O <sub>3</sub>	57. <u>I</u> F <sub>7</sub>
28. <u>Cl</u> <sub>2</sub> O <sub>3</sub>	58. <u>Cl</u> O <sub>2</sub>
29. <u>Cl</u> <sub>2</sub> O	59. K <sub>2</sub> <u>O</u> <sub>2</sub>
30. H <u>I</u> O <sub>3</sub>	60. ( <u>N</u> H <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>

### KEY

1.	$\text{H}\underline{\text{N}}\text{O}_3 = +5$	31.	$\text{H}\underline{\text{I}}\text{O}_4 = +7$
2.	$\text{H}\underline{\text{C}}\text{I} = -1$	32.	$\text{H}\underline{\text{C}}\text{I}\text{O} = +1$
3.	$\text{H}_2\underline{\text{S}}\text{O}_4 = +6$	33.	$\text{H}\underline{\text{C}}\text{I}\text{O}_2 = +3$
4.	$\text{K}\underline{\text{Mn}}\text{O}_4 = +7$	34.	$\text{H}\underline{\text{C}}\text{I}\text{O}_3 = +5$
5.	$\text{H}\underline{\text{S}}\text{O}_3^- = +4$	35.	$\text{H}\underline{\text{C}}\text{I}\text{O}_4 = +7$
6.	$\text{K}_2\underline{\text{Mn}}\text{O}_4 = +5$	36.	$\underline{\text{Xe}}\text{F}_2 = +2$
7.	$\text{H}\underline{\text{C}}\text{N} = +2$	37.	$\underline{\text{Xe}}\text{F}_4 = +4$
8.	$\underline{\text{Fe}}_3\text{O}_4 = +\frac{8}{3}$	38.	$\underline{\text{Xe}}\text{F}_6 = +6$
9.	$\underline{\text{Os}}\text{O}_4 = +8$	39.	$\underline{\text{Xe}}\text{OF}_2 = +4$
10.	$\text{Na}_2\underline{\text{S}}_2\text{O}_3 = +2$	40.	$\underline{\text{Xe}}\text{O}_2 = +2$
11.	$\text{H}_2\underline{\text{P}}\text{O}_4^- = +5$	41.	$\underline{\text{Xe}}\text{O}_4 = +4$
12.	$\text{Na}_3\underline{\text{P}}\text{O}_4 = +5$	42.	$\text{K}_2\underline{\text{Cr}}_2\text{O}_7 = +6$
13.	$\text{Fe}\underline{\text{S}}\text{O}_4 = +6$	43.	$\underline{\text{P}}_2\text{O}_5 = +5$
14.	$\text{K}_2\underline{\text{Cr}}\text{O}_4 = +6$	44.	$\underline{\text{Se}}\text{O}_2 = +4$
15.	$\underline{\text{C}}_2\text{H}_6 = +3$	45.	$\underline{\text{Al}}_2\text{O}_3 = +3$
16.	$\underline{\text{C}}\text{H}_3\underline{\text{C}}\text{H}\text{O} = -3, +1$	46.	$\underline{\text{N}}_2\text{H}_4 = +2$
17.	$\underline{\text{N}}\text{O}_2 = +4$	47.	$\underline{\text{S}}\text{O}_3 = +6$
18.	$\text{H}_2\underline{\text{C}}_2\text{O}_4 = +3$	48.	$\underline{\text{S}}\text{O}_2 = +4$
19.	$\text{Ca}\underline{\text{C}}\text{l}_2 = -1$	49.	$\text{Ca}\underline{\text{O}}\underline{\text{C}}\text{l}_2 = +1, -1$
20.	$\text{Ca}\underline{\text{C}}\text{O}_3 = +4$	50.	$\text{H}_2\underline{\text{P}}\text{O}_3^- = +3$
21.	$\text{Na}\underline{\text{S}}\text{O}_3 = +5$	51.	$\text{H}\underline{\text{N}}\text{O}_3 = +5$
22.	$\text{NaH}\underline{\text{C}}\text{O}_3 = +4$	52.	$\text{H}_2\underline{\text{S}}_2\text{O}_6 = +5$
23.	$\underline{\text{N}}\text{H}_4\text{OH} = -3$	53.	$\text{Na}_2\underline{\text{S}}\text{O}_4 = +6$
24.	$\underline{\text{N}}\text{H}_4\text{Cl} = -3$	54.	$\text{KH}\underline{\text{C}}\text{O}_3 = +4$
25.	$\underline{\text{N}}_2\text{O} = +1$	55.	$\underline{\text{I}}\text{O}_3^- = +5$
26.	$\underline{\text{N}}\text{O} = +2$	56.	$\underline{\text{C}}_2\underline{\text{O}}_4^{2-} = +3$
27.	$\underline{\text{N}}_2\text{O}_3 = +3$	57.	$\underline{\text{I}}\text{F}_7 = +7$
28.	$\underline{\text{C}}\text{l}_2\underline{\text{O}}_3 = +3$	58.	$\underline{\text{C}}\text{l}\text{O}_2 = +4$
29.	$\underline{\text{C}}\text{l}_2\underline{\text{O}} = +1$	59.	$\text{K}_2\underline{\text{O}}_2 = -1$
30.	$\text{H}\underline{\text{I}}\text{O}_3 = +5$	60.	$(\underline{\text{N}}\text{H}_4)_2\underline{\text{S}}\text{O}_4 = -3$

The **oxidation state of Os in  $\text{OsO}_4$  is +8. The electron configuration of Os is  $[\text{Xe}]6s^24f^{14}5d^6$ . The 4f electrons are inner electrons, so Os has eight valence electrons —  $6s^25d^6$ .**