Chapter 6 Problems - Chemical Reactions, Calculations and Energy Considerations

Select the correct scientific notation representation of each of the following numbers:

	number	*a*	*b*	*c*	*d*	*answer*
1.	0.08206	8.206×10^{2}	0.08206	8.206×10^{-2}	none	____
2.	150.5	1.505×10^{2}	150	1.50×10^{-2}	none	____
3.	0.153	0.153	1.53×10^{-1}	1.50×10^{-1}	none	____
4.	8314	8314	8.314×10^{-3}	83.14×10^{3}	none	____
5.	22.4	22.4	2.24×10^{-1}	2.24×10^{1}	none	____
6.	0.003	0.003	3×10^{-3}	3×10^{-2}	none	____
7.	$\frac{3\times10^{22}}{6\times10^{23}}$	5×10^{-1}	5×10^{44}	5×10^{-2}	none	____
8.	$1/(5\times10^{23})$	2×10^{-24}	2×10^{-23}	2×10^{22}	none	____
9.	$(6.0\times10^{23})(2.0\times10^{-4})$	1.2×10^{20}	1.2×10^{19}	1.2×10^{28}	none	____
10.	$3.0\times10^{4} + 6\times10^{3}$	9×10^{4}	9×10^{7}	3.6×10^{4}	none	____
11.	$7.2\times10^{-4}/8.0\times10^{-2}$	9.0×10^{-1}	9.0×10^{-2}	9.0×10^{-3}	none	____
12.	$4.8\times10^{3}/6.0\times10^{-2}$	8.0×10^{-2}	8.0×10^{8}	8.0×10^{2}	none	____
13.	$7.7\times10^{-1}/1.1\times10^{3}$	7.0×10^{-4}	7×10^{-4}	7.0×10^{-5}	none	____

14. In 1897, J. J. Thompson, using a Crooke's tube, determined a value for the charge to mass ratio (e/m) of the electron close to the currently accepted value of 1.76×10^{8} coulombs/g. In 1909, R. A. Millikan, using his famous oil drop experiment, determined the value of e to be close to the currently accepted value of 1.6022×10^{-19} coulombs. Using a unit conversion, calculate the mass of an electron.

    a. 9.10×10^{-28} g b. 2.82×10^{-11} g c. 1.09×10^{27} g d. none ____

15. The e/m value for a proton is 9.577×10^{4} coulombs/g. Calculate the mass of a proton.

    a. 1.59×10^{23} g b. 1.67×10^{-24} g c. 1.53×10^{-14} g d. none ____

Determine the following:

16. The atomic mass of xenon
    a. 66.39 g/mol b. 83.80 g/mol c. 131.29 g.mol d. 262.58 g/mol
    e. none ____

17. The formula mass of molecular oxygen
    a. 32.00 g/mol b. 16.00 g/mol c. 8.00 g/mol d. 48 g/mol e. none ____

18. The molecular mass of water
    a. 17.01 g/mol b. 18.02 g/mol c. 34.02 g/mol d. 0.1803 g/mol e. none ____

19. The number of moles in 2.3 g of ethanol (C_2H_6O)
    a. 20 moles b. 106 moles c. 0.068 moles d. 0.050 moles e. none ____

20. The number of moles in 0.40 g of argon
    a. 1.0×10^{-3} b. 5.0×10^{-4} c. 1.0 moles d. 1.0×10^{3} moles e. none
    ____

21. The mass in grams of 2.0×10^{-3} moles of CO
    a. 7.1×10^{-5} g b. 1.4×10^{4} g c. 56 g d. 0.056 g e. none ____

22. The number of molecules in 36 g of water
    a. 2.0 molecules b. 6.0×10^{23} molecules c. 1.2×10^{24} molecules d. none ____

23. The number of moles in 3.0×10^{24} molecules of carbon dioxide
    a. 5.0 moles b. 0.20 molecules g c. 1.8×10^{48} molecules
    d. 9.0×10^{1} molecules e. none ____

24. The mass in grams of 1 atom of argon
    a. 4.2×10^{-26} g b. 1.5×10^{22} g c. 0.025 g d. 6.6×10^{-23} g e. none ____

Multiple Choice Questions

Questions 26 - 34 following page refer to the unbalanced reactions below.

26. __ $CH_4(g)$ + __ $O_2(g)$ → __ $CO_2(g)$ + __ $H_2O(g)$

27. __ $C_2H_6O(l)$ + __ $O_2(g)$ → __ $CO_2(g)$ + __ $H_2O(g)$

28. __ $N_2(g)$ + __ $H_2(g)$ → __ $NH_3(g)$

29. __ $Al(s)$ + __ $HCl(aq)$ → __ $AlCl_3(aq)$ + __ $H_2(g)$

30. __ $K_2O(s)$ + __ $H_2O(l)$ → __ $KOH(aq)$

31. __ $Fe(s)$ + __ $H_2O(l)$ → __ $Fe_3O_4(s)$ + __ $H_2(g)$

32. __ $Cu(s)$ + __ $AgNO_3(aq)$ → __ $Cu(NO_3)_2(aq)$ + __ $Ag(s)$

33. __ $SO_2(g)$ + __ $O_2(g)$ → __ $SO_3(g)$

34. __ $KClO_3(s)$ → __ $KCl(s)$ + __ $O_2(g)$

For questions #26 - 34 , determine the lowest whole number sum of the coefficients. After balancing, Na + H_2O → NaOH + H_2 becomes 2 Na + 2 H_2O = 2 NaOH + H_2 and the sum of the coefficients = 2 + 2 + 2 + 1 = 7.

rxn.	a	b	c	d	answer
26.	4	8	6	none	____
27.	8	9	12	none	____
28.	3	4	5	none	____
29.	12	13	4	none	____
30.	4	3	6	none	____
31.	11	12	16	none	____
32.	6	4	5	none	____
33.	3	5	4	none	____
34.	5	3	7	none	____