



SECTION 6

ASSESSMENT REFERENCE MATERIALS

PERIODIC TABLE OF THE ELEMENTS

1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18																																																																																			
IA		IIA		IIIB		IVB		VB		VIB		VII B		VIII B		IB		IIB		IIIA		IIIA		IVA		VA		VIA		VIIA		VIIIA																																																																																					
1 H 1.01	2 He 4.00	3 Li 6.94	4 Be 9.01	5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18	11 Na 23.0	12 Mg 24.3	13 Al 27.0	14 Si 28.1	15 P 31.0	16 S 32.1	17 Cl 35.5	18 Ar 39.9	19 K 39.1	20 Ca 40.1	21 Sc 45.0	22 Ti 47.9	23 V 50.9	24 Cr 52.0	25 Mn 54.9	26 Fe 55.8	27 Co 58.9	28 Ni 58.7	29 Cu 63.5	30 Zn 65.4	31 Ga 69.7	32 Ge 72.6	33 As 74.9	34 Se 79.0	35 Br 79.9	36 Kr 83.8	37 Rb 85.5	38 Sr 87.6	39 Y 88.9	40 Zr 91.2	41 Nb 92.9	42 Mo 95.9	43 Tc (98.9)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3	55 Cs 132.9	56 Ba 137.3	57-71 La 138.9	58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0	72 Hf 178.5	73 Ta 180.9	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)	87 Fr (223)	88 Ra (226)	89-103 Ac (227)	90 Th 232.0	91 Pa 231.0	92 U 238.0	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (264)	108 Hs (277)	109 Mt (268)	110 Ds (271)	111	112	113	114	115	116	117	118

Lanthanide Series	57 La 138.9	58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
Actinide Series	89 Ac (227)	90 Th 232.0	91 Pa 231.0	92 U 238.0	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)

Some of the elements 111 and above have been reported but not fully authenticated and named.

CONSTANTS

Description	Value
Avogadro's number	$6.02 \times 10^{23}/\text{mol}$
Molar gas volume at STP	22.4 L
Ideal gas constant (R)	$0.0821 \text{ L}\cdot\text{atm}/\text{mol}\cdot\text{K} = 8.31 \text{ J}/\text{mol}\cdot\text{K}$
Molal freezing point depression constant for water (K_f)	$1.86^\circ\text{C}/m$
Molal boiling point elevation constant for water (K_{bp})	$0.52^\circ\text{C}/m$
Heat of fusion of water (ΔH_{fus})	$334 \text{ J}/\text{g} = 80 \text{ cal}/\text{g}$
Heat of vaporization of water (ΔH_{vap})	$2260 \text{ J}/\text{g} = 540 \text{ cal}/\text{g}$
Specific heat of water (liquid)	$4.18 \text{ J}/\text{g}\cdot^\circ\text{C} = 1.0 \text{ cal}/\text{g}\cdot^\circ\text{C}$
Specific heat of water (solid or vapor)	$2.09 \text{ J}/\text{g}\cdot^\circ\text{C} = 0.50 \text{ cal}/\text{g}\cdot^\circ\text{C}$
Standard atmospheric pressure (STP)	$101.325 \text{ kPa} = 760 \text{ mm Hg}$
Planck's constant (h)	$6.63 \times 10^{-34} \text{ J}\cdot\text{s}$
Speed of light in a vacuum (c)	$3.00 \times 10^8 \text{ m}/\text{s}$
Dissociation constant of water (K_w)	1.0×10^{-14} at 25°C

FORMULAS

Description	Formula
Ideal gas law	$PV = nRT$
Gibbs free energy equation	$\Delta G = \Delta H - T\Delta S$
Root-mean-square speed	$u_{\text{rms}} = \sqrt{\frac{3RT}{M}}$
Photon energy	$E = h\nu$
Speed of light	$c = \lambda\nu$
Amount of heat (q)	$q = ms\Delta t$

FORMULAS (continued)

Description	Formula
Boyle's and Charles' laws combined	$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$
Graham's law of diffusion	$\frac{r_1}{r_2} = \sqrt{\frac{M_2}{M_1}}$

NOTES FOR CHEMISTRY TEST

Not all constants and formulas necessary are listed, nor are all constants and formulas listed used on this test.

While attention has been paid to significant figures, no answer should be considered incorrect solely because of the number of significant figures.