
 NUMERICAL ANSWERS TO ASSIGNED TUTORIAL PROBLEM SETS FOR CHEM205
 FROM KOTZ & TREICHEL'S CHEMISTRY & CHEMICAL REACTIVITY, 6th Ed.

NOTE: none of the answers from Ch.7 have been verified. Please report any errors.

Ch.	Q#	Answer	Units	SFs	Comments
7	2a				red, orange, yellow
	2b				blue
	2c				blue
7	4a	261	m	3	corresponds to 0.863 wavelengths
	4b	3.06	m	3	corresponds to 73.6 wavelengths
7	6	4.8×10^{-19}	J/photon	2	wavelength 4.1×10^{-7} m; frequency 7.3×10^{14} s ⁻¹
7	10a				radar (least E per photon)
	10b				microwaves
	10c				red light
	10d				ultraviolet radiation
	10e				gamma-rays (most E per photon)
7	12	3.7×10^{-19}	J/photon	2	insufficient E (all radiation of >540 nm wavelength)
7	14a				infrared region
	14b				none are shown in Fig.7.9 (none are in visible region)
	14c				highest E line has shortest wavelength, 837.761 nm
	14d	2.29531×10^{-19}	J/photon	6	
7	20a				n=3 to n=2
	20d				n=3 to n=5
7	24	5.6×10^{-12}	m	2	
7	26	1.41×10^{-33}	m	3	from speed = 313 m/s
7	28a				a 4d orbital
	28b				n=5, $\ell=0$ --> a single s orbital
					n=5, $\ell=1$ --> set of 3 p orbitals
					n=5, $\ell=2$ --> set of 5 d orbitals
					n=5, $\ell=3$ --> set of 7 f orbitals
					n=5, $\ell=4$ --> set of 9 g orbitals
					total of $5^2=25$ orbitals in n=5 shell
	28c				an f subshell has 7 orbitals: $m_\ell = 0, +/-1, +/-2, +/-3$
7	34a				incorrect; when n=3, max value of $\ell = 2$
	34b				incorrect; when $\ell = 3$, can have $m_\ell = 0, +/-1, +/-2, +/-3$

Ch.	Q#	Answer	Units	SFs	Comments
7	38				2f and 1p are incorrect; not allowed ℓ values for given n value
7	54	319	kJ/mol	3	energy of a mole of 375nm photons
7	56	5.9×10^4 photons		2	for photons of 4.2×10^{-19} J each
7	59				1s, 2s, 2p, 3s, 3p, 3d, 4s
7	66a				size, E and shape
	66b				0, 1, 2
	66c				f
	66d				4; 2; -2
	66e				p: $\ell = 1$, 1 nodal plane; d: $\ell = 2$, 2 nodal planes
	66f				f
	66g				2d, 3f
	66h				n=2, $\ell = 1$, $m_\ell = 2$ is not valid (invalid m_ℓ value)
	66i				(i) 3; (ii) 9; (iii) none; (iv) 1
7	72				observable: b, e-j
7	76				see solutions manual
7	79				see solutions manual