KEY

Exam I (V.1)

			Name		
c = 3.00 x 10 ⁸ m/s h = 6.626 x 10 ⁻³⁴ J.s (or kg.m2/s					
$R_H = -2.18 \times 10^{-18} \text{ J}$ MULTIPLE CHOICE. Choose 6	he one alternative	that best complete	es the statement or a	nswers the ques	tion.
1) What is the volume of A) 0.116 cm ³ B) 8.60 × 10 ³ cm ³ C) 11.6 cm ³ D) 116 cm ³ E) 8.60 cm ³	a gold nugget that	t weighs 2.20 kg? Tl	he density of gold is	19 g/cm ³ .	1)
2) Where is most of the n A) neutrons	nass of an atom co B) protons	ncentrated? C) electrons	D) nucleus	E) orbitals	2)
3) How many neutrons d	loes an atom of $\frac{46}{22}$	Ti have?			3)
A) 24	B) 0	C) 68	D) 22	E) 46	
4) Which element is most number 19)? A) Rb (atomic number B) Sc (atomic number C) Sr (atomic number D) Ca (atomic number E) Ar (atomic number D)	er 37) er 21) er 38) er 20)	mical properties si	milar to those of pota	assium (atomic	4)
5) The shell having n = 2 electrons. A) 3, 6, 12 B) 1, 2, 4 C) 4, 8, 16 D) 2, 4, 8 E) none of the above		subshells,	orbitals, and up to		5)
6) The number of valence $1s^22s^22p^63s^23p^4$ is A) 2		ement with electron	n configuration D) 8	E) 6	6)

A) 7.09 × B) 5.90 × C) 4.27 × D) 8.49 ×	Li atoms are conta 10 ²¹ Li atoms 10 ²⁵ Li atoms 10 ²² Li atoms 10 ²⁴ Li atoms	nined in 97.9 g of Li?	,		7)
8) How many A) 1	different values of B) 5	f m ₁ are possible in t		E) 7	8)
A) I	(B) 5	C) 2	D) 3	E) 7	
9) Choose the A)	orbital diagram th	at represents the gr	ound state of N.		9)
15	2s 2p				
В)					
11	11 11 11 11 11 2p				
C)					
15	1 1 1 1 1 1 1 2p				
D)		1			
1	1 1 1 1 2p				
E)					
15	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				
10) What period	d 3 element is desc	ribed by the followi	ng ionization energies	(all in kJ/mol)?	10)
$IE_{7} = 1012$	IE ₂ = 1900 IE ₃ =	= 2910 <i>IE</i> 4= 4960	IE5= 6270	00	
A) Si	B) S	C) Mg	(D) P	E) CI	
11) Place the fol	llowing elements i	n order of increasing	g atomic radius.		11)
P	Ва	CI	_		

A) calcium (II) phose (B) calcium phospha C) tricalcium phospha D) calcium phospha E) calcium (III) phospha	sphite ate phorustetraoxide osphite				12) —	
13) The formula for the co A) Cr ₂ NO ₃	ompound chromi B) C ₂ NO ₃	um(II) nitrate is C) CrNO3		E) Cr(NO ₃) ₂)	13)	
(14) Which of the following (A) S	ng elements is mos B) Mg	st likely to form an C) Si	ion with a -2 char D) Ti	ge? E) K	14)	
A) small, small B) large, large C) small, large D) large, small E) none of the above	_ electron affinity		pected to have a	ionization	15)	
A) shatter when cry B) form distinct mo C) have very high n D) exist as crystallin E) conduct electrica	vstals are struck. Decules by interactions The struck and the solids at room	tion of specific par boiling points. temperature.			16)	
17) Write a nuclear equat $A) \frac{238}{11} \rightarrow \frac{1}{n} + \frac{2}{n}$		decay of ²³⁸ U.			17)	

A)
$$\frac{238}{92}U \rightarrow \frac{1}{0}n + \frac{237}{92}U$$

B) $\frac{238}{92}U \rightarrow \frac{0}{-1}e + \frac{238}{91}Pa$

C) $\frac{238}{92}U \rightarrow \frac{4}{2}He + \frac{234}{90}Th$

D) $\frac{238}{92}U \rightarrow \frac{0}{+1}e + \frac{238}{91}Pa$

E) $\frac{238}{92}U \rightarrow \frac{0}{-1}e + \frac{238}{93}Np$

18)	Place the	following in	order of	decreasing	magnitude	of lattice	energy.
,		0					

18) ____

KF

MgS RbI

- A) RbI > KF > MgS
- B)MgS > KF > RbI
- C) KF > RbI > MgS
- D) Rbi > MgS > KF
- E) MgS > RbI > KF
- 19) 95.0°F is the same as
 - A) 203°C.
- B) 85°C.
- C) 35°C
- D) 171°C.

E) 21°C.

19)

20) Read the temperature with the correct number of significant figures.

20)



B) 87.2°C



D) 87.240°C

E) 87.2400°C

21. What answer should be reported, in scientific notation, with the correct number of significant figures, for the following calculation?

$$\frac{(965.43 \times 3.911) + 9413.4136 = /3/89 = 1.3/89 \times 10^{4/3}}{3775.796}$$

22. How many photons are contained in a flash (signal) of green light (525 nm) that contains 189 kJ of energy?

Show calculations, pay attention for units; perform conversions if they are needed! 525 pm x 10-9m = 5.25 x 10-4m; 189 Ky x 1037 = 1.89 x 107 $E \text{ phot.} = \frac{h \cdot C}{\lambda} = \frac{6.626 \times 10 \text{ J} \times 3.00 \times 10^{8} \text{ m}}{5.25 \times 10^{-4} \text{ m}} = \frac{3.79 \times 10^{-19} \text{ y}}{3.79 \times 10^{-19} \text{ y}} = \frac{23}{94.99 \times 10}$ $\frac{23}{3.79 \times 10^{-19} \text{ y}} = \frac{4.99 \times 10}{940000 \text{ photons}}$

23&24. Write the ground state electron configuration for a) Co atom and b) Co2+ ion. Use any not (box notation; or s, p, d, f, or noble gas notation).

25&26.

(a) Calculate the wavelength (\underline{nm}) of light associated with the transition from n=6 to n=2 in the hydrogen atom. Show calculations, show conversion m to nm).

Eaten = -2.18 x 10 y (22 - 12) = -4.84 x 10 y F photow = 4,84 x 10-19 y

Ephotow = 4,84 × 10 3 J Ephotow = $h \cdot V = \frac{h \cdot c}{\lambda}$ $\lambda = \frac{h \cdot c}{Ephot} = \frac{6.626 \times 10 \text{ J} \cdot \text{S} \times 3.00 \times 10 \text{ m}}{4.84 \times 10^{-19} \text{ M}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S} \times 3.00 \times 10 \text{ m}}{4.84 \times 10^{-19} \text{ M}}$

(b) In what region of the spectrum is this radiation found? = $\frac{4.10 \times 10^{-2} \text{ m}}{3.10 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-2} \text{ m}}{1.00 \times 10^{-2} \text{ m}} = \frac{4.10 \times 10^{-$

visible light,

Exam 1 (V.2)



Name_

$c = 3.00 \times 10^8 \text{ m/s}$ $h = 6.626 \times 10^{-34} \text{ J.s}$ (or kg.	m2/s				
$R_H = -2.18 \times 10^{-18} J$ MULTIPLE CHOICE. C	hoose the one alte	rnative that best con	npletes the statem	ent or answers the que	estion.
1) How many neu	trons does an ator	n of $\frac{46}{22}$ Ti have?			1)
(A) 24)	B) 0	C) 68	D) 22	E) 46	
A) Rb (atomic B) Sc (atomic C) Sr (atomic D) Ca (atomic E) Ar (atomic	number 37) number 21) number 38) number 20) number 18)			e of potassium (atomic	2)
3) The shell having electrons. A) 3 6, 12 B) 1, 2, 4 C) 4 8, 16 D) 2, 4, 8 E) none of the		subshells,	orbitals, an	d up to	3)
4) The number of 1s ² 2s ² 2p ⁶ 3s ² 3p A) 2	valence electrons i o ⁴ is	n an element with ele	ectron configuratio	on .	4)
A) 2	B) 16	C) 4	D) 8	(E) 6	
5) How many Li a A) 7.09 × 1021 B) 5.90 × 1025 C) 4.27 × 1022 D) 8.49 × 1024 E) 4.18 × 1024	Li atoms Li atoms Li atoms	f in 97.9 g of Li?			5)
6) How many diffe A) I	erent values of m ₁ a	are possible in the 3d C) 2	sublevel? D) 3	E) 7	6)

7) Choose the orbital diagram that represents the ground state of N.	7)
A) $ \begin{array}{c cccc} \hline 1 & \hline 1 & \hline 2s & \hline 2p & \\ \hline \end{array} $	
B) 11 11 11 11	
1s 2s 4 2p	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
8) What period 3 element is described by the following ionization energies (all in kJ/mol)?	8)
$lE_1 = 1012$ $lE_2 = 1900$ $lE_3 = 2910$ $lE_4 = 4960$ $lE_5 = 6270$ $lE_6 = 22,200$	
A) Si B) S C) Mg D) P E) C1	
9) Place the following elements in order of increasing atomic radius.	9)
P Ba Cl	
A) P < Cl < Ba B) Ba < Cl < P C) Ba < P < Cl D) Cl < Ba < P E) Cl < P < Ba	
10) Write the name for Ca ₃ (PO ₄) ₂ .	10)
A) calcium (II) phosphite B) calcium phosphate C) tricalcium phosphorustetraoxide D) calcium (III) phosphite E) calcium phosphite	
11) The formula for the compound chromium(II) nitrate is A) Cr ₂ NO ₃ B) C ₂ NO ₃ C) CrNO ₃ D) CrNO ₂ E) Cr(NO ₃) ₂	11)
12) Which of the following elements is most likely to form an ion with a -2 charge? (A) S (B) Mg (C) Si (D) Ti (E) K	12)

13) An element belonging to the halogen family would be expected to have a ionization energy and a electron affinity. A) small, small B) large, large C) small, large D) large, small E) none of the above	13)
14) All of the following are properties typical of ionic compounds except A) shatter when crystals are struck. B) form distinct molecules by interaction of specific particles. C) have very high me'ting points and boiling points. D) exist as crystalline sc lids at room temperature. E) conduct electrical current if dissolved in water.	14)
15) Write a nuclear equation for the alpha decay of $\frac{238}{92}$ U. A) $\frac{238}{92}$ U $\rightarrow \frac{1}{0}$ n + $\frac{237}{92}$ U B) $\frac{238}{92}$ U $\rightarrow \frac{0}{-1}$ e + $\frac{238}{91}$ Pa C) $\frac{238}{92}$ U $\rightarrow \frac{4}{2}$ He) + $\frac{234}{90}$ Th D) $\frac{238}{92}$ U $\rightarrow \frac{0}{+1}$ e + $\frac{238}{91}$ Pa E) $\frac{238}{92}$ U $\rightarrow \frac{0}{-1}$ e + $\frac{238}{93}$ Np	15)
16) Place the following in order of decreasing magnitude of lattice energy. KF MgS RbI A) RbI > KF > MgS B) MgS > KF > RbI C) KF > RbI > MgS D) RbI > MgS > KF E) MgS > RbI > KF	16)
17) 95.0°F is the same as A) 203°C. B) 85°C. C) 35°C. D) 171°C. E) 21°C.	17)



A) 87°C

B) 87.2°C



D) 87.240°C

E) 87.2400°C

19) What is the volume of a gold nugget that weighs 2.20 kg? The density of gold is 19 g/cm³.

19) ____

- A) 116 cm³
- B) 8.60×10^3 cm³
- C) 11.6 cm³
- D) 8.60 cm³
- E) 0.116 cm³
- 20) Where is most of the mass of an atom concentrated?
 - A) electrons
- B) orbitals
- C) nucleus
- D) neutrons
- E) protons

20) _____

21. What answer should be reported, in scientific notation, with the correct number of significant figures, for the following calculation?

$$\frac{(965.43 \times 3.911) + 9413.4136 = |3|89 = [1.3|89 \times 10^{4}]}{3775.796}$$

22. How many photons are contained in a flash (signal) of green light (525 nm) that contains 189 kJ of

Show calculations, pay attention for units; perform conversions if they are needed! 525 pm x 10-9m = 5.25 x 10-4m; 189 Ky x 1037 = 1.89 x 10 7 $E_{phot.} = \frac{h \cdot C}{\lambda} = \frac{6.626 \times 10 \text{ J} \times 3.00 \times 10^{10} \text{ m}}{5.25 \times 10^{-12} \text{ m}} = 3.79 \times 10^{-19} \text{ J}$ $\frac{23}{3.79 \times 10^{-12} \text{ J}} = 4.99 \times 10^{0} \text{ photons}$

23&24. Write the ground state electron configuration for a) Co atom and b) Co2+ ion. Use any r (box notation; or s, p, d, f, or noble gas notation).

25&26.

(a) Calculate the wavelength (\underline{nm}) of light associated with the transition from n=6 to n=2 in the hydrogen atom. Show calculations, show conversion m to nm).

Eaten = -2.18 x 10 y (1 = -4.84 x 10 y EphotoN = 4,84 x 10-19 y

$$E photon = 4.84 \times 10^{-19} \text{ y}$$

$$E photon = h \cdot V = \frac{h \cdot c}{\lambda} = \frac{h \cdot c}{E phot} = \frac{6.626 \times 10}{4.84 \times 10^{-19} \text{ y}} = \frac{8m}{4.84 \times 10^{-19} \text{ y}}$$

(b) In what region of the spectrum is this radiation found? = $\frac{4.10 \times 10^{-2}}{1.00 \times 10^{-2}} \times \frac{10^{-2} \text{hm}}{1.00 \times 10^{-2}} = \frac{1410 \text{ hm}}{1.00 \times 10^{-2}}$

visible light,

Exam 1 (V.3)

KEY

			Nam	e	
.00 x 10 ⁸ m/s .626 x 10 ⁻³⁴ J.s (or kg.r	m2/s				
-2.18 x 10-18 J		49 49 49 4			
TIPLE CHOICE. CI	noose the one alte	rnative that best co	mpletes the statem	ent or answers the que	stion.
1) Which element number 19)?	is most likely to h	ave chemical prope	rties similar to thos	e of potassium (atomic	1)
(A) Rb (atomic	number 37)				
B) Sc (atomic	,				
C) Sr (atomic					
D) Ca (atomic	,				
E) Ar (atomic	,				
2) The number of	valence electrons i	n an element with e	lectron configuration	on	2)
1s ² 2s ² 2p ⁶ 3s ² 3p	4 is				²) —
A) 2	B) 16	C) 4	D) 8	(E) 6	
3) How many Li at	toms are contained	l in 97.9 g of Li?			3)
A) 7.09 × 1021		O			J)
B) 5.90 × 1025					
C) 4.27 × 10 ²²					
D) 8.49 x 1024					
E) 4.18 × 1024					
E) 4.10 × 1024	Li atoms				
4) How many diffe	erent values of m ₁ a	are possible in the 3	d sublevel?		4)
A) 1	B) 5	C) 2	D) 3	E) 7	., —

C) 2

D) 3

E) 7

	bital diagram that re	presents the grout	nd state of N.		5)
L	2s 2p			0	
В)	11 11 11				
to to the total transfer transfer to the total transfer tra	2s 2p			Ĭ	
Lance Lance	11 11 1			:4	
D)					
E)	2p	· N			
	$\frac{1}{2p}$)			
6) What period 3	Belement is described	by the following	ionization energies (a	all in kJ/mol)?	6)
$IE_1 = 1012$	$IE_2 = 1900 IE_3 = 2910$) IE4= 4960 IE5	$i = 6270$ $IE_6 = 22,200$)	
A) Si	B) S	C) Mg	(D) P	E) Cl	
7) Place the follo	wing elements in ord	er of increasing at	omic radius.		7)
P	Ba Cl				
A) P < Cl < B) Ba < Cl <					
C) Ba < P <	: Cl				
D) Cl < Ba <					
	e for Ca ₃ (PO ₄) ₂ .				8)
B) calcium p					
	n phosphorustetraoxi III) phosphite	de			
E) calcium p	- •				
9) The formula for A) Cr ₂ NO ₃	or the compound chro B) C2NO3	omium(II) nitrate i C) CrNO ₃	s D) CrNO ₂	E) Cr(NO ₃)	9)
10) Which of the fo	ollowing elements is r	most likely to form	n an ion with a =2 cha		10)
(A)S	B) Mg	C) Si	D) Ti	E) K	

11) An element belonging to the halogen family would be expected to have a ______ ionization 11) energy and a ______ electron affinity. A) small, small B) large, large C) small, large D) large, small E) none of the above 12) All of the following are properties typical of ionic compounds except 12) A) shatter when crystals are struck. B) form distinct molecules by interaction of specific particles. C) have very high melting points and boiling points. D) exist as crystalline solids at room temperature. E) conduct electrical current if dissolved in water. 13) Write a nuclear equation for the alpha decay of $\frac{238}{92}$ U. 13) A) $\frac{238}{92}$ U $\rightarrow \frac{1}{0}$ n + $\frac{237}{92}$ U B) $\frac{238}{92}$ U $\rightarrow \begin{array}{c} 0 \\ -1 \end{array}$ e + $\frac{238}{91}$ Pa C) $\frac{238}{92}$ U $\rightarrow \begin{array}{c} 4 \\ 234 \\ 2 \end{array}$ Th D) $\frac{238}{92}$ U $\rightarrow \frac{0}{+1}$ e + $\frac{238}{91}$ Pa E) $\frac{238}{92}$ U $\rightarrow \frac{0}{-1}$ e + $\frac{238}{93}$ Np 14) Place the following in order of decreasing magnitude of lattice energy. 14) KF MgS RbI \underline{A}) RbI > KF > MgS B) MgS > KF > RbI C) KF > Rbl > MgS

C) 35°C

D) 171°C.

15)

E) 21°C.

D) RbI > MgS > KF E) MgS > RbI > KF

B) 85°C.

15) 95.0°F is the same as

A) 203°C.



A) 87°C

B) 87.2°C



D) 87.240°C

E) 87.2400°C

17) What is the volume of a gold nugget that weighs 2.20 kg? The density of gold is 19 g/cm^3 .

17)

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 - C) 11.6 cm³
 - D) 8.60 cm^3
 - E) 0.116 cm³

18) Where is most of the mass of an atom concentrated?

- A) electrons
- B) orbitals
- C) nucleus
- D) neutrons

E) protons

19)

18)

19) How many neutrons does an atom of 46 Ti have?

A) 46

B) 22

C) 24

D) 0

E) 68

20) The shell having n = 2 contains _____ subshells, _____ orbitals, and up to _____ 20) ____

C) 4, 8, 16

D) 3, 6, 12

E) none of the above

21. What answer should be reported, in scientific notation, with the correct number of significant figures, for the following calculation?

$$\frac{(965.43 \times 3.911) + 9413.4136 = /3/89 = 1.3/89 \times 10^{4/3}}{3775.796}$$

22. How many photons are contained in a flash (signal) of green light (525 nm) that contains 189 kJ of

Show calculations, pay attention for units; perform conversions if they are needed! 525 nm x 10-9m = 5.25 x 10-4m; 189 Ky x 1057 = 1.89 x 107 $E_{phot.} = \frac{h \cdot C}{\lambda} = \frac{6.626 \times 10}{5.25 \times 10^{-4} m} = \frac{3.79 \times 10^{-19} \text{ y}}{5.25 \times 10^{-4} m} = \frac{1.89 \times 10^{-19} \text{ y}}{3.79 \times 10^{-19} \text{ y}} = \frac{1.99 \times 10}{9ho + 005}$

23&24. Write the ground state electron configuration for a) Co atom and b) Co2+ ion. Use ar (box notation; or s, p, d, f, or noble gas notation).

a) Co
$$[Az]4s^23d^7$$

25&26.

(a) Calculate the wavelength (\underline{nm}) of light associated with the transition from n=6 to n=2 in the hydrogen atom. Show calculations, show conversion m to nm).

 $(R_{H} = -2.18 \times 10^{-18} \text{ J})$ Eaten = -2.18 x 10 y (22 - 12) = -4.84 x 10 y

$$E_{photoN} = 4.84 \times 10^{-19} \text{ y}$$

$$E_{photoN} = h \cdot V = \frac{h \cdot c}{\lambda} = \frac{h \cdot c}{E_{phot}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S} \times 3.00 \times 10 \text{ m}}{4.84 \times 10^{-19} \text{ y}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S} \times 3.00 \times 10 \text{ m}}{4.84 \times 10^{-19} \text{ y}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S} \times 3.00 \times 10 \text{ m}}{4.84 \times 10^{-19} \text{ y}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S} \times 3.00 \times 10 \text{ m}}{4.84 \times 10^{-19} \text{ y}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S} \times 3.00 \times 10 \text{ m}}{4.84 \times 10^{-19} \text{ y}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S} \times 3.00 \times 10 \text{ m}}{4.84 \times 10^{-19} \text{ y}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S} \times 3.00 \times 10 \text{ m}}{4.84 \times 10^{-19} \text{ y}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S} \times 3.00 \times 10 \text{ m}}{4.84 \times 10^{-19} \text{ y}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S} \times 3.00 \times 10 \text{ m}}{4.84 \times 10^{-19} \text{ y}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S} \times 3.00 \times 10 \text{ m}}{4.84 \times 10^{-19} \text{ y}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S} \times 3.00 \times 10 \text{ m}}{4.84 \times 10^{-19} \text{ y}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S} \times 3.00 \times 10 \text{ m}}{4.84 \times 10^{-19} \text{ y}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S} \times 3.00 \times 10 \text{ m}}{4.84 \times 10^{-19} \text{ y}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S} \times 3.00 \times 10 \text{ m}}{4.84 \times 10^{-19} \text{ y}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S} \times 3.00 \times 10 \text{ m}}{4.84 \times 10^{-19} \text{ y}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S}}{4.84 \times 10^{-19} \text{ J}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S}}{4.84 \times 10^{-19} \text{ J}} = \frac{6.626 \times 10 \text{ J} \cdot \text{S}}{4.84 \times 10^{-19} \text{ J}} = \frac{6.626 \times 10 \text{ J}}{4.84 \times 10^{-19} \text{ J}} = \frac{6.626 \times 10 \text{ J}}{4.84 \times 10^{-19} \text{ J}} = \frac{6.626 \times 10 \text{ J}}{4.84 \times 10^{-19} \text{ J}} = \frac{6.626 \times 10^{-19} \text{ J}}{4.84 \times 10^{-19} \text{ J}} = \frac{6.626 \times 10^{-19} \text{ J}}{4.84 \times 10^{-19} \text{ J}} = \frac{6.626 \times 10^{-19} \text{ J}}{4.84 \times 10^{-19} \text{ J}} = \frac{6.626 \times 10^{-19} \text{ J}}{4.84 \times 10^{-19} \text{ J}} = \frac{6.626 \times 10^{-19} \text{ J}}{4.84 \times 10^{-19} \text{ J}} = \frac{6.626 \times 10^{-19} \text{ J}}{4.84 \times 10^{-19} \text{ J}} = \frac{6.626 \times 10^{-19} \text{ J}}{4.84 \times 10^{-19} \text{ J}} = \frac{6.626 \times 10^{-19} \text{ J}}{4.84 \times 10^{-19} \text{ J}} = \frac{6.626 \times 10^{-19} \text{ J}}{4.84 \times 10^{-19} \text{ J}} = \frac{6.626 \times 10^{-19} \text{ J}}{4.84 \times 10^{-19} \text{ J}} = \frac{6.626 \times 10^{-19} \text{ J}}{4.84 \times 10^{-19} \text{ J}} = \frac{6.626 \times 10^{-19} \text{ J}}{4.84 \times 10^{-19} \text{ J}}$$

(b) In what region of the spectrum is this radiation found? =
$$4.10 \times 10^{-7}$$
 $= 4.10 \times 10^{-7}$ $= 4.10 \times 10^{-7}$

visible light,