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مدونة المناهج السعودية eduschool40.blog



Protactinium

90

Uranium

93

94

95

#### **King Abdulaziz University**

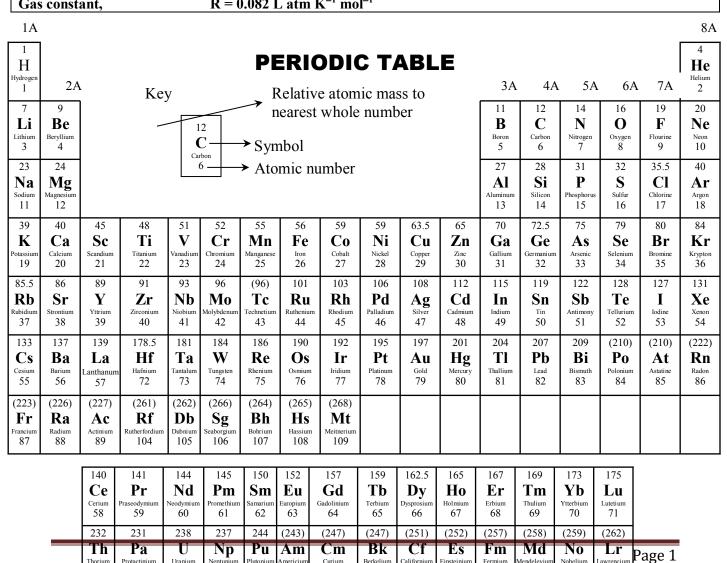
**Faculty of Science - Chemistry Department** 

Chem-110, First Exam

Thursday 16 /02 /1440

Time: 90 minutes

Name:	Number:	Section:
•Useful information:		
Speed of light,	$C = 3.0 \times 10^8 \text{ m/s}$	
Planck's const.,	$h = 6.626 \times 10^{-34} \text{ J.s}$	
Avogadro's No.,	$N_{av} = 6.022 \times 10^{23} \text{ mol}^{-1}$	
Rydberg const. for H atom	$R_{\rm H} = 2.18 \times 10^{-18}  \rm J$	
Mass of the electron,	$m_e = 9.11 \times 10^{-31} \text{ kg}$	
Cas constant	$R = 0.082 \text{ L. atm } K^{-1} \text{ mol}^{-1}$	



Curium

96

Californium

97

Nobelium

102

100

101

C-1 In	the process	of dissolving 2.5 g of pota	ssium nitrate in	140 ml of benzene, t	he
b	enzene is re	ferred to as the:			
a) precip	pitate	b) solution	c) solute	d) solvent	
C-2 Th	e correct n	ame for PdCl <sub>2</sub> is :			
a) palladium	dichloride	b) palladium (II) chloride	c) palladium (I)	chloride d) pallad	ium chloride
C-3 Th	e systemati	c name for P <sub>2</sub> S <sub>5</sub> is:			
a) phosphorus po	entasulfide	b) phosphorus (V) sulfide	c) diphosphorus	pentasulfide d) ph	osphorus silfide
C-4 TI	he formula	for potassium sulfite is:			
a) K <sub>2</sub> SO	3	b) K(SO <sub>3</sub> ) <sub>2</sub>	c) K <sub>2</sub> S	d) K <sub>2</sub> SO <sub>4</sub>	
C-5 W	hich pair of	the following have the sar	ne empirical for	mula :	
a) C <sub>10</sub> H <sub>5</sub>	5O <sub>15</sub> , C <sub>20</sub> H <sub>8</sub> O	$O_{12}$	b) C <sub>10</sub> H <sub>12</sub> O <sub>6</sub> , C	<sub>15</sub> H <sub>18</sub> O <sub>9</sub>	
c) C <sub>10</sub> H <sub>5</sub>	5O <sub>15</sub> , C <sub>16</sub> H <sub>8</sub> 0	$O_{20}$	d) C <sub>9</sub> H <sub>3</sub> O , C <sub>9</sub> H	$_{3}O_{6}$	
C-6 NI	H <sub>3</sub> can be cla	assified as			
a) comp	ound	b) molecule	c) mixture	d) compound and r	nolecule
C-7 An	example o	f monatomic ion is			
a) N <sup>3-</sup>		b) O	c) P	d) CN <sup>1-</sup>	
С-8 Но	ow many mo	oles of chlorine atoms are	in 2.1 × 10 <sup>24</sup> chlo	orine molecules (Cl <sub>2</sub> )	?
a) 35.2	mol	b) 1.26x10 <sup>48</sup> mol	c) 6.97 mol	d) 3.49 mol	
C-9 W	hat is the po	ercent of oxygen (O) in Mg	g <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> ?		
a) 22.53	%	b) 48.85 %	c) 64.65 %	d) 61.83 %	

C-10 An analysis	s of unknown compound	l gives the following pe	ercentage: 19.25% C, 0.53%
	.21% As, what is the em		
a) C <sub>3</sub> HAs <sub>2</sub>	b) C <sub>2</sub> H <sub>4</sub> As	c) CH <sub>2</sub> As	d) C <sub>2</sub> H <sub>6</sub> As
C-11 What is the	molecular formula for	the compound in the a	bove question (q10) if the
molar ma	ss of the unknown comp	oound is 374 g/mole?	
a) C <sub>9</sub> H <sub>3</sub> As <sub>6</sub>	b) C <sub>4</sub> H <sub>12</sub> As <sub>2</sub>	c) $C_2H_4As_2$	d) $C_6H_2As_4$
C-12 After balan	cing the following hypo	thetical reaction, the c	oefficient of AC2 is
	$\mathbf{A}_{3}\mathbf{I}$	$B_6 + C_2 \rightarrow AC_2 + B_2C$	
a) 1	b) 9	c) 6	d) 2
C-13 Manganese	metal can be prepared	by the thermite proces	88:
	4Al(s) + 3M	$nO_2(s) \rightarrow 3Mn(l) + 2A$	$Al_2O_3(s)$
If 203 g of	Al and 672 g of MnO <sub>2</sub>	are mixed, which is the	e limiting reactant?
a) Al <sub>2</sub> O <sub>3</sub>	b) Mn	c) MnO <sub>2</sub>	d) Al
C-14 What is the	theoretical yield (in gr	ams) of Mn that can be	e produced when the
quantities	in the above question (	q13) are mixed?	
a) 320.6 g	b) 265.7 g	c) 310.2 g	d) 298.4 g
C-15 If 254 g of 1	Mn are actually obtaine	d from the reaction in	question 13, what is the
percent yi	eld?		
a) 81.88 %	b) 95.6 %	c) 85.1 %	d) 79.2 %
C-16 You have 2	50 mL of a 0.34 M HCl	solution and you want	to dilute it to exactly
0.12 M. H	ow much water should	you add?	
a) 708.3 L	b) 0.46 L	c) 0.71 L	d) 458.3 L

C-17 3.4 g of Na <sub>2</sub> S solution wil	SO <sub>4</sub> is dissolved in 200 n ll be:	al water the concentra	ntion of the resulting
a) 0.02 M	b) 17 M	c) 0.12 M	d) 1.2x10 <sup>4-</sup> M
C-18 The correct	formula of a compound	consists of P and K:	
a) K <sub>3</sub> P	b) KP	c) KP <sub>3</sub>	d) $K_3P_2$
C-19 Which of the	e following statement is	the correct description	on for the compound in the
above quest	tion (q18) ?		
a) A diaton	nic molecule containing	atoms of different elem	ients
b) A polya	tomic molecule containir	ng atoms of different el	ements.
c) A polyat	tomic molecule containing	ng atoms of the same el	ement.
d) A diator	mic molecule containing	atoms of the same elen	nent.
C-20 40 ml of 0.32	M CaCl2 are mixed wi	th 10 ml of 0.12 M Na	Cl. calculate the
concentrati	on of chlorine ion (Cl) i	n the resulting solution	on?
a) 0.73 M	b) 0.44 M	c) 0.54 M	d) 0.28M
C-21 What is the	mass of single atom of T	Гі ?	
a) $2.89 \times 10^{25}$ g	b) 2.7x10 <sup>23-</sup> g	c) 48 g	d) 7.97 x10 <sup>23-</sup> g
C-22 The element	(As) is classified as		
a) metalloid	b) metal	c) nonmetal	d) transition metal
C-23 An element of	can change from one to	another by changing	the number of
a) Proton	b) Electron	c) Neutron	d) atomic mass
C-24 An object wi	th a mass of 5.7 g and d	lensity of 1.3g/ml was	added to a beaker
containing	water, the water level r	aised to 120 ml calcul	ate the volume of water was
in the beak	er before the addition o	f the object?	

c) 4.38 ml

a) 124.38 ml

b) 115.6 ml

d) 7.41 ml

C-25 2.4x10 <sup>3-</sup> Ma	m equal to 2.4 ?					
a) µm	b) km	c) mm	d) pm			
C-26 Which of the	ne following prefixes eq	ual to 10 <sup>12</sup> ?				
a) mili	b) kilo	c) nano	d) tera			
C-27 The SI unit	for time is					
a) second	b) minutes	c) hour	d) millisecond			
			nclude the charge if the			
species is	not neutral (5 protons,	6 neutrons, 2 electron	s):			
a) C	b) B <sup>3+</sup>	c) B	d) Na			
C-29 An atom co	ontaining which one of	the following is an isot	tope of oxygen?			
a) 7 protons and 6	5 neutrons	b) 5 protons and	b) 5 protons and 8 neutrons			
c) 8 protons and 5	5 neutrons	d) 6 protons and	d) 6 protons and 7 neutrons			
C-30 Pure silver	coin can be classified a	s				
a) Heterogenous	mixture b) Homogenou	us mixture c) compou	and d) element			

above	اعلى	classify	صنف
According	وفقاً	Mixture	خليط
Anion	ايون سالب	molecules	جزيء
Calculate	احسب	molecular	<u>جزيئي</u> ه
chemical identity	هویه کیمیانیه	Identify	حدد .
classified	صنف	theoretical yield	الناتج النظري
Cocktail juice	عصير كوكتيل	periodic table	<u>ج</u> دول دوري
Coefficient	معامل	rise	، وه روي تقع
combination	اتحاد	molarity	المولاريه
complete reaction	تفاعل كامل	commercial process	عملیه تجاریه
composed of	يتكون من	Heterogeneous	غير متجانس
consists of	تحتوي على	object	شيء
containing	يحتوى	Nonmetal	ش <i>يء</i> لا فلز
density	يحتو <i>ي</i> كثافه	process	عملية
Derived units	وحدات مشتقه	graduated cylinder	مخبار مدرج
Determine		Present	موجود
diluted	اوجد خفف	Percent yield	نسبة الناتج
Empirical	اولی	represent	يمثل
enough	كأفية	respectively	على التوالي
Equation	معادله	required	مطلوب
Example	مثال	metalloid	شبه فلز
Expressed	عبر عنه	abundant	نسبة الوفره
Following	التالي	homogenous	متجانس
Form	يكُونَ	solution	محلول
formula	صيغه	substances	مواد
fruits salad	سلطة فواكه	sugar	سكر
Liquid	سائل	pellet	حبوب
Mass number	رقم الكتله (الكتله الذريه)	symbol	رمز
Quantities	كميات	percent composition	نسبة التركيب
Question	سؤال	metal	فلز
raising	ارتفاع	species	اصناف
another	غير	beaker	وعاء
neutral	متعادل	breathe	تنفس
referred to	يشار اليه	hypothetical	افتراضي
thermite	ثيرمت	exactly	بالضبط





**Faculty of Science - Chemistry Department** 

Chem-110, First Exam

Thursday 16 /02 /1440

Time: 90 minutes

Name: Number: **Section:** •Useful information:  $C = 3.0 \times 10^8 \text{ m/s}$ Speed of light,  $h = 6.626 \times 10^{-34} \text{ J.s}$ Planck's const.,  $N_{av} = 6.022 \times 10^{23} \ mol^{-1}$ Avogadro's No.,  $R_{\rm H} = 2.18 \times \! 10^{-18} \ J$ Rydberg const. for H atom  $m_e = 9.11 \times 10^{-31} \text{ kg}$ Mass of the electron,  $R = 0.082 L atm K^{-1} mol^{-1}$ Gas constant,

O tak	Const	,					2 attill 1	1110									
1A																	8A
1 H						PE	ERIC	ODIO	C T	ABL	E						4 He
Hydrogen 1	2A	1	Ke	y		<b>&gt;</b>		e atom				3A	4A	5A	6A	7A	Helium 2
Li Lithium	Be Beryllium		_		2			whole	numb	er		11 <b>B</b>	C Carbon	Nitrogen	Oxygen	Flourine	Ne Neon
3	4			Car	bon	→ Syn						5	6	7	8	9	10
23 <b>Na</b>	24 <b>Mg</b>			(	5	→ Ato	mic n	umber				27 <b>Al</b>	28 <b>Si</b>	31 <b>P</b>	32 <b>S</b>	35.5 <b>Cl</b>	40 <b>Ar</b>
Sodium	Magnesium 12											Aluminum 13	Silicon 14	Phosphorus 15	Sulfur 16	Chlorine 17	Argon 18
39	40	45 C	48	51	52	55	56	59	59	63.5	65	70	72.5	75	79 C	80	84
K Potassium 19	Ca Calcium 20	Sc Scandium 21	Ti Titanium 22	V Vanadium 23	Cr Chromium 24	Mn Manganese 25	Fe Iron 26	Co Cobalt 27	Ni Nickel 28	Cu Copper 29	Zn Zinc 30	Gallium 31	Germanium 32	As Arsenic 33	Se Selenium 34	Br Bromine 35	Kr Krypton 36
85.5	86	89	91	93	96	(96)	101	103	106	108	112	115	119	122	128	127	131
Rb Rubidium 37	Sr Strontium 38	Y Yttrium 39	Zr Zirconium 40	Nb Niobium 41	Mo Molybdenum 42	Tc Technetium 43	Ru Ruthenium 44	Rh Rhodium 45	Pd Palladium 46	Ag Silver 47	Cd Cadmium 48	In Indium 49	Sn Tin 50	Sb Antimony 51	Te Tellurium 52	I Iodine 53	Xe Xenon 54
133	137	139	178.5	181	184	186	190	192	195	197	201	204	207	209	(210)	(210)	(222)
Cs	Ba Barium	La Lanthanum	Hf Hafnium	Ta Tantalum	W Tungsten	Re	Os Osmium	Ir Iridium	Pt Platinum	Au	Hg Mercury	Tl Thallium	Pb Lead	Bi Bismuth	Po Polonium	At Astatine	Rn
55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
(223)	(226)	(227)	(261)	(262)	(266)	(264)	(265)	(268)									
Fr Francium	Ra Radium	Ac Actinium	Rf Rutherfordium	Db Dubnium	Sg Seaborgium	Bh Bohrium	Hs Hassium	Mt Meitnerium									
87	88	89	104	105	106	107	108	109									
		140	141	144	145	150	152	157	159	162.5	165	167	169	173	175		
		Ce	Pr	Nd	Pm	Sm	En	Gd	Tb	Dv	Ho	Er	Tm	Yb	Lu		

58 232	Praseodymium 59 231	Neodymium 60 238	Promethium 61 237	62 244	63 (243)	(247)	65 (247)	Dysprosium 66 (251)	67 (252)	68 (257)	Thulium 69 (258)	70 (259)	71 (262)	D
Th Thorium 90	Pa Protactinium	Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium	Fm Fermium	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103	Page

a) 7 protons and 6 neutrons

D-1 An atom containing which one of the following is an isotope of boron?

b) 5 protons and 8 neutrons

ntrons
d) element
of water, the potassium
d) solvent
chloride d) manganese chlorid
d) sulfur hexafluoride
d) LiNO <sub>2</sub>
:
24
compound and molecule

D-9 An example o	of monatomic ion is		
a) N <sup>3-</sup>	b) O	c) P	d) CN <sup>1-</sup>
D-10 How many m	oles of chlorine atom	s are in $5.3 \times 10^{23}$ chlori	ne molecules (Cl <sub>2</sub> )?
a) 3.2x10 <sup>47</sup> mol	b) 1.76 mol	c) 327.9 mol	d) 0.88 mol
D-11 An element ca	an change from one t	o another by changing t	he number of
a) Proton	b) Electron	c) Neutron	d) atomic mass
D-12 An object wit	h a mass of 2.5 g and	density of 1.3g/ml was	added to a beaker
containing v	vater, the water level	raised to 120 ml calcula	te the volume of water was
in the beake	r before the addition	of the object?	
a) 123.25 ml	b) 3.25 ml	c) 1.92 ml	d) 118.1 ml
D-13 2.4x10 <sup>3-</sup> Gm 6	equal to 2.4 ?		
a) µm	b) Tm	c) Mm	d) pm
D-14 Which of the	following prefixes eq	ual to 10 <sup>9-</sup> ?	
a) mili	b) kilo	c) nano	d) tera
D-15 The SI unit fo	or temperature is		
a) candela	b) Celsius	c) kelvin	d) Fahrenheit
D-16 Select the syn	abol that identifies th	e following species. Inc	lude the charge if the
species is no	t neutral (13 protons,	, 14 neutrons, 10 electro	ns):
a) Al <sup>3+</sup>	b) N	c) Co	d) Ne
D-17 What is the p	ercent of calcium (Ca	a) in Ca <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> ?	
a) 38.7 %	b) 45.98 %	c) 43.01 %	d) 65.9 %
D-18 An analysis of	f unknown compound	d gives the following per	centage: 23.3% C, 3.88%
H, and 72.82	2% As, what is the en	pirical formula of the c	compound?
a) C <sub>3</sub> HAs <sub>2</sub>	b) C <sub>2</sub> H <sub>4</sub> As	c) CH <sub>2</sub> As	d) C <sub>2</sub> H <sub>6</sub> As

D-19 What is the	molecular formula for	r the compound in the a	above question (q18) if the
molar mas	s of the unknown comp	oound is 309 g/mole?	
a) C <sub>6</sub> H <sub>12</sub> As <sub>3</sub>	b) C <sub>6</sub> H <sub>2</sub> As <sub>4</sub>	c) C <sub>6</sub> H <sub>18</sub> As <sub>3</sub>	d) C <sub>2</sub> H <sub>4</sub> As <sub>2</sub>
D-20 After balan	cing the following hypo	othetical reaction, the co	oefficient of B2Cis
	$A_3l$	$B_6 + C_2 \rightarrow AC_2 + B_2C$	
a) 5	b) 2	c) 1	d) 6
D-21 The correct	formula of a compoun	d consists of N and Sr :	
a) $Sr_3N_3$	b) SrN	c) $Sr_2N_3$	d) Sr <sub>3</sub> N <sub>2</sub>
D-22 Which of th	e following statement i	s the correct descriptio	n for the compound in the
above ques	stion (q21) ?		
a) A diato	mic molecule containing	g atoms of different elem	ents
b) A polya	atomic molecule contain	ing atoms of different ele	ements.
c) A polya	atomic molecule contain	ing atoms of the same el	ement.
d) A diato	mic molecule containing	g atoms of the same elem	nent.
D-23 50 ml of 0.3	2 M CaCl <sub>2</sub> are mixed w	vith 10 ml of 0.12 M Na	Cl. calculate the
concentrat	ion of chlorine ion (Cl)	in the resulting solution	on?
a) 0.36 M	b) 0.55 M	c) 0.29 M	d) 0.44 M
D-24 What is the	mass of single atom of	Pd?	
a) 1.8x10 <sup>22-</sup> g	b) $6.4 \times 10^{25}$ g	c) 106 g	d) 4.3 x10 <sup>23</sup> - g
D-25 The element	t (Ge) is classified as		

c) nonmetal

a) metalloid

b) metal

d) transition metal

D-26 Manganese metal can be prepared by the thermite process:  $4Al (s) + 3MnO_2 (s) \rightarrow 3Mn (l) + 2Al_2O_3 (s)$  If 203 g of Al and 272 g of MnO<sub>2</sub> are mixed, which is the limiting reactant? a)  $Al_2O_3$  b) Mn c)  $MnO_2$  d)  $Al_2O_3$ 

D-27 What is the theoretical yield (in grams) of Mn that can be produced when the quantities in the above question (q26) are mixed?

a) 159.2 g

b) 171.95 g

c) 254.8 g

d) 298.4 g

D-28 If 136 g of Mn are actually obtained from the reaction in question 26, what is the percent yield?

a) 91.1 %

b) 56.9 %

c) 48.6 %

d) 79.2 %

D-29 You have 156 mL of a 0.3 M HCl solution and you want to dilute it to exactly 0.2 M. How much water should you add?

a) 0.078 L

b) 78 L

c) 234 L

d) 0.2L

D-30 3.4 g of MgSO<sub>3</sub> is dissolved in 200 ml water the concentration of the resulting solution will be:

a) 1.6x10<sup>4-</sup> M

b) 0.16 M

c) 0.32 M

d) 3.4 M

above	اعلى	classify	صنف
According	وفقاً	Mixture	خليط
Anion	ايون سالب	molecules	جزيء
Calculate	احسب	molecular	جَزيئيه
chemical identity	هویه کیمیائیه	Identify	حدد
classified	صنف	theoretical yield	الناتج النظري
Cocktail juice	عصير كوكتيل	periodic table	جدول دوري
Coefficient	معامل	rise	تقع
combination	اتحاد	molarity	المولاريه
complete reaction	تفاعل كامل	commercial process	عمليه تجاريه
composed of	يتكون من	Heterogeneous	غير متجانس
consists of	تحتوي على	object	شيء لا فلز
containing	يحتوي كثافه	Nonmetal	لا فَلز
density		process	عمليه
Derived units	وحدات مشتقه	graduated cylinder	مخبار مدرج موجود نسبة الناتج
Determine	اوجد خفف	Present	موجود
diluted	خفف	Percent yield	نسبة الناتج
Empirical	اولي	represent	يمثل
enough	كافيه	respectively	على التوالي
Equation	معادله	required	مطلوب
Example	مثال	metalloid	شبه فلز
Expressed	عبر عنه	abundant	نسبة الوفره
Following	التالي	homogenous	متجانس
Form	يكّون	solution	محلول
formula	صيغه	substances	مواد
fruits salad	سلطة فواكه	sugar	سكر
Liquid	سائل	pellet	حبوب
Mass number	رقم الكتله (الكتله الذريه)	symbol	رمز
Quantities	كميات	percent composition	حبوب رمز نسبة التركيب
Question	سؤال	metal	فاز اصناف
raising	ارتفاع	species	
another	غير	beaker	وعاء
neutral	متعادل	breathe	تنفس
referred to	يشار اليه	hypothetical	افتراضي
thermite	ثيرمت	exactly	بالضبط



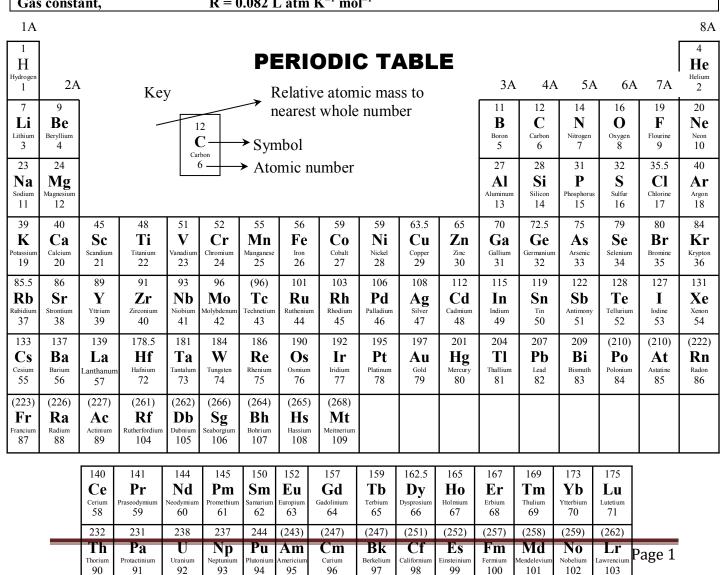
**Faculty of Science - Chemistry Department** 

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Planck's const.,	$h = 6.626 \times 10^{-34} \text{ J.s}$	
Avogadro's No.,	$N_{av} = 6.022 \times 10^{23} \text{ mol}^{-1}$	
Rydberg const. for H atom	$R_{\rm H} = 2.18 \times 10^{-18}  \rm J$	
Mass of the electron,	$m_e = 9.11 \times 10^{-31} \text{ kg}$	
Gas constant	$R = 0.082 L atm K^{-1} mol^{-1}$	



<b>B-1</b>	You have 18	3 mL of a 0.41 M HC	l solution and you want	to dilute it to exactly
	0.24 M. Ho	w much water should	you add?	
a) 12	29.6 L	b) 0.31 L	c) 0.13L	d) 312.6 L
B-2	3.4 g of MgS	SO <sub>4</sub> is dissolved in 200	ml water the concentrat	tion of the resulting
	solution wi	ll be:		
a) 5.	$7x10^{3-}$ M	b) 0.028 M	c) 1.4x10 <sup>4-</sup> M	d) 0.14 M
B-3	The correct	formula of a compou	nd consists of N and Ca	:
a) C	$a_3N_3$	b) Ca <sub>2</sub> N <sub>3</sub>	c) Ca <sub>3</sub> N <sub>2</sub>	d) CaN
<b>B-4</b>	Which of the	e following statement	is the correct description	n for the compound in the
	above ques	tion (q3) ?		
	a) A diator	mic molecule containin	g atoms of different eleme	ents
	b) A polya	tomic molecule contain	ning atoms of different ele	ements.
	c) A polya	tomic molecule contain	ning atoms of the same ele	ement.
	d) A diator	mic molecule containin	g atoms of the same elem	ent.
B-5	The SI unit	for mass is		
a) gı	ram	b) pound	c) kilogram	d) milligram
<b>B-6</b>	Select the sy	mbol that identifies tl	ne following species. Inc	lude the charge if the
	species is n	ot neutral (8 protons,	8 neutrons, 10 electrons	):
a) S		b) O	c) Ne	d) O <sup>2-</sup>

B-/ An atom contain	ning which one of the fol	nowing is an isotope of	nitrogen?
a) 7 protons and 6 neu	itrons	b) 5 protons and 8 neu	trons
c) 8 protons and 5 neu	itrons	d) 6 protons and 7 neu	trons
B-8 Pure gold coin o	can be classified as		
a) Heterogenous mixtu	ure b) Homogenous mix	ture c) compound	d) element
B-9 In the process o	f dissolving 1 g of sodiu	n chloride in 100 ml o	f ethanol, the ethanol is
referred to as	the:		
a) precipitate	b) solution	c) solute	d) solvent
B-10 The correct nam	ne for VCl <sub>3</sub> is :		
a) Vanadium (III) chloride	b) Vanadium chloride	c) Vanadium trichloride	e d) Vanadium (II) chloride
<b>B-11</b> The systematic	name for IF5 is:		
a) Iodine (V) fluoride	b) Iodine pentafluoride	c) Iodine fluoride	d) monoiodine fluoride
B-12 The formula fo	r sodium sulfate is:		
a) Na(SO <sub>4</sub> ) <sub>2</sub>	b) Na <sub>2</sub> SO <sub>3</sub>	c) Na <sub>2</sub> SO <sub>4</sub>	d) Na <sub>2</sub> S
B-13 An element can	change from one to ano	ther by changing the r	number of
a) Proton	b) Electron	c) Neutron	d) atomic mass
B-14 An object with a	a mass of 1.2 g and dens	ity of 1.3g/ml was add	ed to a beaker
containing wat	ter, the water level raise	d to 120 ml calculate t	he volume of water was
in the beaker b	pefore the addition of the	e object?	
a) 120.9 ml	b) 0.92 ml	c) 119.01 ml	d) 1.56 ml
B-15 2.4x10 <sup>3-</sup> mm eq	ual to 2.4 ?		
a) µm	b) Mm	c) Tm	d) pm

B-16 Which of the fo	llowing prefixes equal	to 10 <sup>3</sup> ?	
a) mili	b) kilo	c) nano	d) tera
B-17 Which pair of t	he following have the s	ame empirical forn	nula :
a) C <sub>10</sub> H <sub>5</sub> O <sub>15</sub> , C <sub>20</sub> H <sub>8</sub> O <sub>2</sub>	24	b) C <sub>10</sub> H <sub>15</sub> O <sub>5</sub> , C <sub>16</sub>	$H_8O_{24}$
c) $C_{10}H_5O_{15}$ , $C_{16}H_8O_{15}$	20	d) C <sub>27</sub> H <sub>9</sub> O <sub>9</sub> , C <sub>9</sub> H	$I_3O_3$
B-18 K <sub>2</sub> O can be class	ssified as		
a) compound	b) molecule	c) mixture	d) compound and molecule
B-19 An example of	monatomic ion is		
a) N <sub>2</sub>	b) OH <sup>1-</sup>	c) O <sup>2-</sup>	d) C
B-20 How many mol	es of chlorine atoms ar	e in $3 \times 10^{22}$ chlorin	ne molecules (Cl <sub>2</sub> )?
a) 1.81x10 <sup>46</sup> mol	b) 9.96x10 <sup>2-</sup> mol	c) 218.6 mol	d) 4.9x10 <sup>2-</sup> mol
B-21 What is the per	cent of phosphorus (P)	in Mg <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> ?	
a) 23.66 %	b) 43.7 %	c) 11.8 %	d) 18.5 %
B-22 An analysis of u	ınknown compound gi	ves the following pe	ercentage: 13.5% C, 2.25%
H, and 84.27%	6 As, what is the empir	ical formula of the	compound?
a) C <sub>3</sub> HAs <sub>2</sub>	b) C <sub>2</sub> H <sub>4</sub> As	c) CH <sub>2</sub> As	d) C <sub>2</sub> H <sub>6</sub> As
B-23 What is the mo	olecular formula for the	e compound in the	above question (q22) if the
molar mass of	the unknown compou	nd is 267 g/mole?	
a) $C_6H_2As_4$	b) C <sub>4</sub> H <sub>8</sub> As <sub>2</sub>	c) C <sub>3</sub> H <sub>6</sub> As <sub>3</sub>	d) $C_2H_4As_2$
B-24 After balancing	the following hypothe	tical reaction, the c	coefficient of C2 is
	$A_3B_6 +$	$C_2 \rightarrow AC_2 + B_2C$	
a) 1	b) 9	c) 2	d) 6

B	-25	Manganese	metal can	be pre	pared by	the the	rmite p	rocess:

$$4Al(s) + 3MnO_2(s) \rightarrow 3Mn(l) + 2Al_2O_3(s)$$

If 130 g of Al and 320 g of MnO<sub>2</sub> are mixed, which is the limiting reactant?

- a)  $Al_2O_3$
- b) Mn
- c) MnO<sub>2</sub>
- d) Al

#### B-26 What is the theoretical yield (in grams) of Mn that can be produced when the quantities in the above question (q25) are mixed?

- a) 198.6 g
- b) 202.3 g
- c) 220.2 g
- d) 163.2 g

#### B-27 If 154 g of Mn are actually obtained from the reaction in question 25, what is the percent yield?

- a) 76.1 %
- b) 77.54 %
- c) 69.9 %
- d) 94.4 %

#### B-28 30 ml of 0.32 M CaCl2 are mixed with 10 ml of 0.12 M NaCl. calculate the concentration of chlorine ion (Cl) in the resulting solution?

- a) 0.51 M
- b) 0.27 M
- c) 0.44 M
- d) 0.2 M

#### B-29 What is the mass of single atom of Zn?

- a) 4.98x10<sup>23</sup>- g b) 1.08x10<sup>22</sup>- g
- c) 65 g
- d)  $3.9 \times 10^{25}$  g

#### B-30 The element (B) is classified as

- a) metalloid
- b) metal
- c) nonmetal
- d) transition metal

above	اعلى	classify	صنف
According	وفقاً	Mixture	خليط
Anion	ايون سالب	molecules	جزيء
Calculate	احسب	molecular	<u>جزيئي</u> ه
chemical identity	هویه کیمیانیه	Identify	حدد .
classified	صنف	theoretical yield	الناتج النظري
Cocktail juice	عصير كوكتيل	periodic table	<u>ج</u> دول دوري
Coefficient	معامل	rise	، وه روي تقع
combination	اتحاد	molarity	المولاريه
complete reaction	تفاعل كامل	commercial process	عملیه تجاریه
composed of	يتكون من	Heterogeneous	غير متجانس
consists of	تحتوي على	object	شيء
containing	يحتوى	Nonmetal	ش <i>يء</i> لا فلز
density	يحتو <i>ي</i> كثافه	process	عملية
Derived units	وحدات مشتقه	graduated cylinder	مخبار مدرج
Determine		Present	موجود
diluted	اوجد خفف	Percent yield	نسبة الناتج
Empirical	اولی	represent	يمثل
enough	كأفية	respectively	على التوالي
Equation	معادله	required	مطلوب
Example	مثال	metalloid	شبه فلز
Expressed	عبر عنه	abundant	نسبة الوفره
Following	التالي	homogenous	متجانس
Form	يكُونَ	solution	محلول
formula	صيغه	substances	مواد
fruits salad	سلطة فواكه	sugar	سكر
Liquid	سائل	pellet	حبوب
Mass number	رقم الكتله (الكتله الذريه)	symbol	رمز
Quantities	كميات	percent composition	نسبة التركيب
Question	سؤال	metal	فلز
raising	ارتفاع	species	اصناف
another	غير	beaker	وعاء
neutral	متعادل	breathe	تنفس
referred to	يشار اليه	hypothetical	افتراضي
thermite	ثيرمت	exactly	بالضبط





**Faculty of Science - Chemistry Department** 

Chem-110, Second Exam Wednesday 13 /03 /1440 H

Time: 90 minutes

Number: **Section:** Name:

•Useful information:

 $C = 3.0 \times 10^8 \text{ m/s}$ Speed of light,  $h = 6.626 \times 10^{-34} \text{ J.s}$ Planck's const.,  $\begin{aligned} N_{av} &= 6.022 \times 10^{23} \text{ mol}^{-1} \\ R_{H} &= 2.18 \times 10^{-18} \text{ J} \end{aligned}$ Avogadro's No., Rydberg const. for H atom  $m_e = 9.11 \times 10^{-31} \text{ kg}$   $R = 0.082 \text{ L atm K}^{-1} \text{ mol}^{-1}$ Mass of the electron,

1A																	8A
$\frac{1}{H}$						PF	ERIC	DIC	C T/	\BL	F						4 He
Hydrogen	Heli										Helium 2						
7 Li	9 <b>Be</b>			12	· 		_	nearest				11 <b>B</b>	12 <b>C</b>	14 <b>N</b>	16 <b>O</b>	19 <b>F</b>	20 Ne
Lithium 3	Beryllium 4			C-		Symb						Boron 5	Carbon 6	Nitrogen 7	Oxygen 8	Flourine 9	Neon 10
Na Sodium	Mg Magnesium 12			6 -	Al Si P S Cl Aluminum Silicon Phosphorus Sulfur Chlorine A							40 <b>Ar</b> Argon 18					
39 <b>K</b> Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 <b>Ti</b> Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 <b>Fe</b> Iron 26	59 Co Cobalt 27	59 <b>Ni</b> Nickel 28	63.5 Cu Copper 29	65 <b>Zn</b> Zinc 30	70 <b>Ga</b> Gallium	72.5 <b>Ge</b> Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
85.5 <b>Rb</b>	86 <b>Sr</b>	89 <b>Y</b>	91 <b>Zr</b>	93 <b>Nb</b>	96 <b>Mo</b>	(96) <b>Tc</b>	101 <b>Ru</b>	103 <b>Rh</b>	106 <b>Pd</b>	108 <b>Ag</b>	112 <b>Cd</b>	115 <b>In</b>	119 <b>Sn</b>	122 <b>Sb</b>	128 <b>Te</b>	127 <b>I</b>	131 <b>Xe</b>
Rubidium 37	Strontium 38	Yttrium 39	Zirconium 40	Niobium 41	Molybdenum 42	Technetium 43	Ruthenium 44	Rhodium 45	Palladium 46	Silver 47	Cadmium 48	Indium 49	Tin 50	Antimony 51	Tellurium 52	Iodine 53	Xenon 54
Cs Cesium 55	137 <b>Ba</b> Barium 56	La La Lanthanum 57	178.5 <b>Hf</b> Hafnium  72	Ta Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 <b>Os</b> Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 <b>Au</b> Gold 79	Hg Mercury 80	204 Tl Thallium 81	207 <b>Pb</b> Lead 82	Bi Bismuth 83	(210) Po Polonium 84	(210) <b>At</b> Astatine 85	(222) <b>Rn</b> Radon 86
(223) <b>Fr</b> Francium 87	(226) Ra Radium 88	(227) Ac Actinium 89	(261) <b>Rf</b> Rutherfordium 104	(262) <b>Db</b> Dubnium 105	(266) <b>Sg</b> Seaborgium 106	(264) <b>Bh</b> Bohrium 107	(265) <b>Hs</b> Hassium 108	(268)  Mt  Meitnerium 109									

140	141	144	145	150	152	157	159	162.5	165	167	169	173	175
Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Но	Er	Tm	Yb	Lu
Cerium 58	Praseodymium 59	Neodymium 60	Promethium 61	62	Europium 63	Gadolinium 64	Terbium 65	Dysprosium 66	Holmium 67	Erbium 68	Thulium 69	Ytterbium 70	Lutetium 71
232	231	238	237	244	(243)	(247)	(247)	(251)	(252)	(257)	(258)	(259)	(262)
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
Thorium 90	Protactinium 91	Uranium 92	Neptunium 93	Plutonium 94	Americium 95	Curium 96	Berkelium 97	Californium 98	Einsteinium 99	Fermium 100	Mendelevium 101	Nobelium 102	Lawrencium 103

# A

A-1	If the press	sure of a gas sample is d	loubled and the absolut	e temperature is tripled, by
	what facto	r does the volume of the	e sample change?	
a) 2		b) 1.5	c) 0.6	d) 3
A-2	-	asses of O <sub>2</sub> (g) and HBr(gure, which one of the fo	<u>-</u>	iners of equal volume and ue?
b) The	e pressure in t e pressure in t	the O <sub>2</sub> container is greate the HBr container is greathe HBr container could be both gases are the same.	ter than that in the $O_2$ cope greater or smaller than	ntainer.
A-3	converted t	he following chemical ed to $N_2O_4$ gas under the sa $NO_2(g) \rightarrow N_2O_4(g)$		
a) 12.		b) 37.5 mL	c) 25 mL	d) 50 mL
<b>A-4</b> a) 0.4	added to the pressure in Assume a contract of the contract of	e same container and t	he temperature is incre v many moles of gas we	re of 400 torr. Some gas is ased to 50 °C. If the re added to the container?  d) 4.27 mol
<b>A-5</b> a) 0.0	completely reacted? 4	_	of aluminum. What is th	xygen gas at STP to react ne mass of aluminum (Al) d) 3.2 g
A-6	For a fixed volume at o	amount of gas increasi	ng the temperature will	resulted inin
a) a di	iminish	b) an increase	c) a decrease	d) no change
A-7		he molar mass of unkno 684 mmHg ?	own gaseous compound	with a density of 0.8 g/L at
a) 33.	9 g/mol	b) 0.03 g/mol	c) 2.6 g/mol	d) 22.45 g/mol
A-8		of the following statem hat is 500 m below sea l		the atmospheric pressure
a) gra	ter than 1	b) less than 1	c) equal to 1	d) 0



A-9	_		$ m H_4$ , 0.25 mol $ m C_2H_6$ , and $ m C_2$	
a) 4.2 a	-	b) 0.24 atm	c) 0.55 atm	d) 0.36 atm
A-10	Name two eleme	ents that exist as gases a	it room temperature	
a) Al a	nd Ne	b) N <sub>2</sub> and He	c) O <sub>2</sub> and I <sub>2</sub>	d) S and Na
			ble set of quantum num	
a) $n=1$ ,	$l=1, m_l=1, m_s=$	1/2	b) n=2, $l=1$ , $m_l=2$ , $m_s=$	1/2
c) n=2,	$l=2, m_l=1, m_s=$	-1/2	d) n=2, $l=1$ , $m_l=0$ , $m_s=$	-1/2
A-12	What is the energy 540 nm?	rgy in joules of a photor	ns associated with visible	e light of wavelength
a) 1.07		b) 3.68 x 10 <sup>-28</sup> J	c) 3.68 x 10 <sup>-19</sup> J	d) 3.58 x 10 <sup>-40</sup> J
A-13			3, if you know that the cries calculate the energy	
a) -3.03	3x10 <sup>-19</sup> J	b) 3.03x10 <sup>-19</sup> J		d) -2.42x10 <sup>-19</sup> J
A-14	An FM radio st		MHz. Calculate the wa	velength of the
a) 3.32		b) 29.9 x 10 <sup>9</sup> m	c) $3.02 \times 10^6 \text{ m}$	d) 3.02 m
		avelength associated with b) 3.44x10 <sup>-25</sup> nm	th tennis ball ( 55 g) trav c) 3.44 x 10 <sup>-34</sup> nm	veling at 35 m/s? d) 3.44 x 10 <sup>-40</sup> nm
A-16		0	ration violate Hund's r	ıle
a)	$\begin{array}{cc} \mathbf{1s} & \mathbf{2s} \\ \uparrow \downarrow & \uparrow \downarrow \end{array}$			
b)	$\uparrow\downarrow$ $\uparrow$	$\phantom{aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa$		
c)	$\uparrow\downarrow$ $\uparrow\downarrow$	$\begin{array}{ c c c c c c }\hline \uparrow \downarrow & \uparrow \downarrow & \uparrow \downarrow \\\hline \end{array}$		
d)	$\uparrow\downarrow$ $\uparrow\uparrow$	$\uparrow$ $\uparrow$		
<b>A-17</b> a) Mg	Which of the fol	llowing element has 2 umb) Na	npaired electrons and is c) Si	<b>paramagnetic?</b> d) B
A-18	What is the man		rbital that can have the	following quantum
a) 7	11411110111 09 I	b) 9	c) 4	d) 5
<b>A-19</b> a) [Ar]		nfiguration of a ground b) [Ne]2s <sup>2</sup> 2p <sup>1</sup>	-state Al atom is c) [Ar]3s <sup>2</sup> 3p <sup>1</sup>	d) [Ne]3s <sup>2</sup> 3p <sup>1</sup>



A-20	How many electric $m_l = -1$ ?	trons in a ground-state	calcium (Ca) atom are	in orbitals labeled by
a) 4	m <sub>l</sub> -1.	b) 2	c) 3	d) 5
A-21		he element with the folk [Ar]4s <sup>2</sup> 3d <sup>10</sup> 4p <sup>3</sup> ?	owing electron configur	ation located in the
a) grou			c) group 4A, period 5	d) group 5A, period 4
a) Alka b) Alka c) Halo	ali metals have thali earth metals hogens have the lo	rrect statement from the lowest ionization energy ave the lowest ionization energy lowest ionization energy.	gy	
A-23	0		ng ionic radius: K <sup>+</sup> , P <sup>3-</sup> ,	S <sup>2-</sup> , Cl <sup>-1</sup> .
Row 1 Row 2 Row 3 Row 4 a) Rov	$Cl^{-1} < S^{2-} < P^{3-} < S^{2-} < K^{+} < Cl^{-1} < K^{+} < P^{-3} < S^{2-} < K^{-1} < K$	$Cl^{1-} < K^+$ $< S^{2-} < P^{3-}$	c) Row 1	d) Row 4
a) Kov		,	,	,
<b>A-24</b> a) Na	Which of the fo	ollowing elements has th b) Ar	e highest electron affini	ty? d) Al
ŕ	A • 1	,		
<b>A-25</b> a) S <sup>-2</sup>	Ar is <i>not</i> isoeled	b) Na <sup>+1</sup>	c) K <sup>+</sup>	d) Cl <sup>-1</sup>
<b>A-26</b> a) H-C	-	polar covalent bond is b) F-F	c) Li-O	d) Na-N
A-27	The correct Le	wis symbol for an eleme	ent containing 4 electron	as is
a)		b) • X •	c) • X •	• X • d)
A-28	Calculate the to	otal valance electrons fo	or NO <sub>3</sub> -1 ?	
a) 22		b) 11	c) 23	d) 24
<b>A-29</b> a) +5	The formal cha	arge on the central nitro b) -1	gen in NO <sub>3</sub> <sup>-1</sup> is equal to c) +1	d) 0
<b>A-30</b> a) N	Which of the fo	ollowing when acting as b) O	central atom could devi	iate from octet rule?



Absorb	يمتص	largest	اكبر
acceptable	مقبول	least	اقل
according	وفقا	List	اوجد
amount	كميه	lone pair	ازواج حره الأقل
around	کمیه حول	lowest	الأقل
as part of	کجز ۽ من	mixture	خليط
attraction	جذب	molar mass	الكتلة المولية
broadcasts	يبث	molecules	جزيئات
boils	يغلى	multiplying	يتضاعف
certain	محدد	one-third	ثلث
classified	حون کجز ء من جذب یبٹ یغلی محدد یصنف	doubled	ضعف الكمية
Consists of	يتكون من	quadrupled	أربعة اضعاف الكمية
constant	ثابت	tripled	ثلاثة اضعاف الكمية
container	وعاء	paramagnetic	احادي المغناطيسية
Converts to	يتحول الى	partial pressure	
covalent	تساهمي	ping-pong ball	ضغط جزئي كرة تنس طاوله
density	كثافه	possible	ممکن
determined	إيجاد	process	ممکن عملیه
diamagnetic	ثنائى المغناطيسية	quantum number	اعداد کم
diminish	علاقة طرديه	raise	پرفع ٰ
corresponding	المصاحب	relationship	علاقة
During	خلال	remains	
electron configuration	توزيع الكتروني	represent	یبقی یمثل
electronegativity	سالبيه كهربائية	representative elements	عناصر ممثله
Emission	انبعاث	resonance structures	اشكال رنين
emit	ببعث	respectively	على التوالي
assume	افتر ض	sample	عينه
Energy	افتر ض طاقة	sets	مجموعات
Fixed quantity	كمية ثابتة	smallest	أصغر
Flask	وعاء	solid	أصغر صلب
Flexible	مرن	species	صنف
Found	وجد	stable	مستقر
Frequency	تردد	starred electron	
gaseous	غازی	Subjected to	الإلكترون ذو النجمة تعرض الى
greatest	غازي أكبر اعلى تحمل	exerts	بذل
Highest	اعلی	transitions	انتقاله
holding	تحمل	allowable	
Ideal gas	غاز مثالي	unpaired	مفد د
separate	منفصل	valid	مسموح مفرد صالح
Indicate	اه حد	velocity	سرعه
initially	او جد بداية	velocity	وعاء
mine	274	violate	يخالف
isoelectronic	بداية منجم نظير الالكتروني حافظ	volume	حجم
	مطير الاستروسي	wavelength	حجم طول موجي
kept	215	wavelengin	صوں موجي



**Faculty of Science - Chemistry Department** 

Chem-110, Second Exam Wednesday 13 /03 /1440 H

Time: 90 minutes

Name:	Number:	Section:

#### •Useful information:

 $C = 3.0 \times 10^8 \text{ m/s}$ Speed of light,  $h = 6.626 \times 10^{-34} \text{ J.s}$ Planck's const., 
$$\begin{split} &\mathbf{N}_{av} = 6.020 \times 10^{-3} \; \text{mol}^{-1} \\ &\mathbf{R}_{H} = 2.18 \times 10^{-18} \; \text{J} \\ &\mathbf{m}_{e} = 9.11 \; \text{x} \; 10^{-31} \; \text{kg} \\ &\mathbf{R} = 0.082 \; \text{L} \; \text{atm} \; \mathbf{K}^{-1} \; \text{mol}^{-1} \end{split}$$
Avogadro's No., Rydberg const. for H atom Mass of the electron,

1A																	8A
1 H	PERIODIC TABLE											He					
Hydrogen 1	2A	_		K	ey		Į	Relativ	e aton	nic ma	ss to	3A	4A	5A	6A	7A	Helium 2
7 Li	9 <b>Be</b> Beryllium	nearest whole number									oer	11 <b>B</b> Boron	12 C Carbon	14 N Nitrogen	16 O Oxygen 8	19 F Flourine 9	20 <b>Ne</b> Neon 10
23 Na Sodium	24 Mg Magnesium 12			Carbon 6 —								27 Al Aluminum 13	28 Si Silicon 14	31 Phosphorus 15	32 <b>S</b> Sulfur 16	35.5 Cl Chlorine	40 <b>Ar</b> Argon 18
39 <b>K</b> Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 <b>Ti</b> Titanium 22	51 V Vanadium 23	V Cr Mn Fe Co Ni Cu Zn Gallium Chromium Manganese Iron Cobalt Nickel Copper Zinc Gallium							Ga Gallium	72.5 Ge Germanium 32	75 <b>As</b> Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	Kr Krypton 36
85.5 <b>Rb</b> Rubidium 37	86 Sr Strontium 38	89 Y Yttrium 39	91 <b>Zr</b> Zirconium 40	93 <b>Nb</b> Niobium 41	96 <b>Mo</b> Molybdenum 42	(96) Tc Technetium 43	101 <b>Ru</b> Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 <b>Ag</b> Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 <b>Sn</b> Tin 50	122 <b>Sb</b> Antimony 51	128 <b>Te</b> Tellurium 52	127 <b>I</b> Iodine 53	131 <b>Xe</b> Xenon 54
133 <b>Cs</b> Cesium 55	137 <b>Ba</b> Barium 56	139 <b>La</b> Lanthanum 57	178.5 <b>Hf</b> Hafnium 72	181 <b>Ta</b> Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 <b>Os</b> Osmium 76	192 <b>Ir</b> Iridium 77	195 Pt Platinum 78	197 <b>Au</b> Gold 79	201 <b>Hg</b> Mercury 80	204 Tl Thallium 81	207 <b>Pb</b> Lead 82	209 Bi Bismuth 83	(210) <b>Po</b> Polonium 84	(210) <b>At</b> Astatine 85	(222) <b>Rn</b> Radon 86
(223) Fr Francium 87	(226) <b>Ra</b> Radium 88	(227) Ac Actinium 89	(261) <b>Rf</b> Rutherfordium 104	(262) <b>Db</b> Dubnium 105	(266) Sg Scaborgium 106	(264) <b>Bh</b> Bohrium 107	(265) <b>Hs</b> Hassium 108	(268) Mt Meitnerium 109									

140 Ce	141 Pr Praseodymium	144 Nd Neodymium	145 Pm	150 Sm	152 <b>Eu</b>	157 <b>Gd</b>	159 <b>Tb</b>	162.5 <b>Dy</b>	165 <b>Ho</b>	167 <b>Er</b>	169 <b>Tm</b>	173 <b>Yb</b> Ytterbium	175 Lu
58	59	60	61	62	63	64	65	66	67	68	69	70	71
232	231	238	237	244	(243)	(247)	(247)	(251)	(252)	(257)	(258)	(259)	(262)
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
Thorium	Protactinium	Uranium	Neptunium	Plutonium	Americium	Curium	Berkelium	Californium	Einsteinium	Fermium	Mendelevium	Nobelium	Lawrencium

B-1	completely with	llowing reaction: It taken a certain sample of alu $+3O_2(g) \rightarrow 2Al_2O_3(s)$		
a) 6.4		b) 0.009 g	c) 0.24 g	d) 0.18 g
B-2	For a fixed amovolume at const	ount of gas decreasing that the pressure	he temperature will resu	ılted inin
a) mul	tiplying	b) an increase	c) a decrease	d) no change
B-3	Calculate the m 25 °C and 862 i	nolar mass of unknown ; mmHg ?	gaseous compound with	a density of 0.8 g/L at
a) 0.02	2 g/mol	b) 44.1 g/mol	c) 17.2 g/mol	d) 1.4 g/mol
B-4		ne following statements s 600 m below sea level		tmospheric pressure
a) grat	er than 1		c) equal to 1	d) 0
<b>B-5</b> a) 0.51	total pressure is	ases contains 0.31 mol C s 1.50 atm. Calculate the b) 0.78 atm		
		ents that exist as gases a	-	
a) Mg	and As	b) F <sub>2</sub> and Si	c) P and Ar	d) H <sub>2</sub> and Xe
a) n=3	Which one of the property of		b) n=1, $l=1$ , $m_l=2$ , $m_s=0$ d) n=2, $l=1$ , $m_l=0$ , $m_s=0$	= 1/2
B-8	What is the ene	ergy in joules of a photo	ns associated with visibl	le light of wavelength
a) 4.4		b) 4.4 x 10 <sup>-28</sup> J	c) 2.99 x 10 <sup>-40</sup> J	d) 8.9 x 10 <sup>-32</sup> J
	with the electro	ops from energy level n= on drops is in Paschen so	eries calculate the energ	y of the emission?
a) 1.55	5x10 <sup>-19</sup> J	b) -2.09x10 <sup>-18</sup> J	c) $-1.55 \times 10^{-19} \mathrm{J}$	d) $-8.7 \times 10^{-20} \text{ J}$
B-10	An FM radio st	cation broadcasts at 73.2 radio waves?	2 MHz. Calculate the wa	evelength of the
a) 0.24	1 m	b) 4.1 m	c) $2.2 \times 10^{16} \text{ m}$	d) $4.1 \times 10^6$ m
<b>B-11</b> a) 3.3	Calculate the w	vavelength associated wi b) 3.3x10 <sup>-34</sup> nm	th tennis ball ( <b>50</b> g) tra c) 3.3 x 10 <sup>-28</sup> nm	veling at 40 m/s? d) 3.3 x 10 <sup>-25</sup> nm

<b>B-12</b> a) K <sup>+</sup>	Kr is <i>not</i> isoelectronic with b) Br <sup>-1</sup>	c) As <sup>-3</sup>	d) Sr <sup>+2</sup>
<b>B-13</b> a) Cl-0	An example of polar covalent bond is Cl b) H-F	c) Li-Br	d) K-I
B-14	The correct Lewis symbol for an eleme	ent containing 7 electro	ns is
a)	b) • X •	c) • X •	• <del>X</del> • d)
<b>B-15</b> a) 20	Calculate the total valance electrons for b) 10	or CO <sub>3</sub> -2 ? c) 24	d) 22
<b>B-16</b> a) -2	The formal charge on the central carb b) 0	on in CO <sub>3</sub> -2 is equal to c) +4	d) -1
<b>B-17</b> a) Br	Which of the following when acting as b) Cl	central atom could not c) B	expand it octet ? d) Si
<b>B-18</b> a)	Which of the following electron config 1s 2s 2p $\uparrow\downarrow$ $\uparrow\downarrow$ $\uparrow$	uration violate Hund's	rule
b)	$\begin{array}{c c} \uparrow \downarrow & \uparrow & \uparrow & \uparrow \\ \hline \end{array}$		
c)			
d)			
B-19 a) N	Which of the following element has 3 u b) Li	unpaired electrons and i c) O	s paramagnetic? d) B
B-20	What is the maximum number of subo	orbital that can have the	following quantum
a) 8	numbers: n=4, m <sub>s</sub> =+1/2 b) 7	c) 4	d) 16
<b>B-21</b> a) [Ne	The electron configuration of a ground [2s <sup>2</sup> 2p <sup>3</sup> b) [Ne]3s <sup>2</sup> 3p <sup>3</sup>	d-state P atom is c) [Ar]3s <sup>2</sup> 3p <sup>3</sup>	d) $[Ar]4s^24p^3$
B-22	How many electrons in a ground-state $m_l = 0$ ?	calcium (Ca) atom are	in orbitals labeled by
a) 8	b) 2	c) 20	d) 12

B-23	Where would the element with periodic table [Ar]4s <sup>2</sup> 3d <sup>10</sup> 4p <sup>5</sup> ?		figuration located in the
a) gro	up 7A, period 4 b) group 5A,		od 7 d) group 7A, period 5
<ul><li>a) Alk</li><li>b) Alk</li><li>c) Hal</li></ul>	Pick out the correct statement ali metals have the highest electronali earth metals have the highest ogens have the highest electron art gases have the highest electronal	on affinity electron affinity offinity	
Row 2 Row 3 Row 4	Increasing radius → Al +3 < Mg +2 < Na + < O +2 Na + < Mg +2 < Al +3 < O +2 Na + < Mg +2 < Al +3 < O +2 Na + < Mg +2 < Al +3	2	- <sup>2</sup> , Al + <sup>3</sup> , Na <sup>+</sup> , Mg <sup>+2</sup> .
a) Rov	w 2 b) Row 3	c) Row 1	d) Row 4
<b>B-26</b> a) Cs	Which of the following elements b) Rb	nts has the highest electron a	affinity? d) Li
B-27	If the pressure of a gas sample	e is quadrupled and the abs	olute temperature is
	doubled, by what factor does	the volume of the sample ch	nange?
a) 0.5	b) 6	c) 4	d) 2
B-28	If equal masses of O <sub>2</sub> (g) and I temperature, which one of the		<del>-</del>
b) The	pressure in the O <sub>2</sub> container is less pressures of both gases are the suppressure in the HBr container of the pressure in the HBr container is	same. ould be greater or smaller than	n that in the O2 container
B-29	Consider the following chemic converted to $N_2O_4$ gas under to occupy? $2NO_2(g) \rightarrow N_2O_4(g)$	•	
a) 45 1	1.0	c) 60 mL	d) 30 mL
<b>B-30</b> a) 4.1	A gas sample containing 1.50 added to the same container a pressure increases to 750 torr Assume a constant-volume co mol b) 0.39 mol	nd the temperature is incre , how many moles of gas we	ased to 50 °C. If the

1		
		اكبر اقل
مقبول		
وفقا		اوجد
کمیه		ازواج حره الأقل
حول	lowest	
کجز ۽ من	mixture	خليط
جذب	molar mass	الكتلة المولية
يبث	molecules	جزيئات
يغلي	multiplying	يتضاعف
محدد	one-third	ثلث
يصنف	doubled	ضعف الكمية
يتكون من	quadrupled	أربعة اضعاف الكمية
ثابت	tripled	ثلاثة اضعاف الكمية
وعاء	paramagnetic	احادي المغناطيسية
يتحول الى	partial pressure	ضغط جزئي
تساهمي		كرة تنس طاوله
كثافه	possible	ممكن
إيجاد	process	عمليه
ثنائي المغناطيسية	quantum number	اعداد کم
علاقة طرديه	raise	
المصاحب	relationship	ير فع علاقة
خلال		يبقى
		يبقى يمثل
سالبيه كهربائية	-	عناصر ممثله
	-	اشكال رنين
يبعث	respectively	على التوالي
	i	عينه
طاقة	sets	مجمو عات
كمية ثابتة	smallest	أصغر
وعاء	solid	أصغر صلب صنف
مرن	species	صنف
	stable	مستقر
تردد	starred electron	الإلكترون ذو النجمة
غازي	Subjected to	
أكبر	·	تعرض الى بذل
اعلى		انتقاله
تحمل	allowable	مسموح
غاز مثالی		
منفصل	•	مفر د صالح
اوجد		سرعه
بداية		وعاء
منجم		يخالف
	volume	 حجم طول موجي
تطبر الالكثروني	voiume	حجم
	علاقة طرديه المصاحب خلال توزيع الكتروني سالبيه كهربائية انبعاث يبعث افترض طاقة	الفقا المقبول المعادلة المعاد



**Faculty of Science - Chemistry Department** 

Chem-110, Second Exam Wednesday 13 /03 /1440 H

Time: 90 minutes

Name:	Number:	Section:
•Useful information:		
Speed of light,	$C = 3.0 \times 10^8 \text{ m/s}$	
Planck's const.,	$h = 6.626 \times 10^{-34} \text{ J.s}$	
Avogadro's No.	$N_{\rm av} = 6.022 \times 10^{23}  \text{mol}^{-1}$	

 $N_{av} = 6.022 \times 10^{23} \text{ mol}$   $R_H = 2.18 \times 10^{-18} \text{ J}$ Rydberg const. for H atom  $m_e = 9.11 \times 10^{-31} \text{ kg}$   $R = 0.082 \text{ L atm K}^{-1} \text{ mol}^{-1}$ Mass of the electron,

1A																	8A
1 H		PERIODIC TABLE  He											4 He				
Hydrogen 1	2A			K	ey		. ]	Relativ	e aton	nic ma	ss to	3A	4A	5A	6A	7A	Helium 2
7 <b>Li</b>	9 <b>Be</b>		nearest whole number								oer	11 <b>B</b>	12 <b>C</b>	14 <b>N</b>	16 <b>O</b>	19 <b>F</b>	20 <b>Ne</b>
Lithium 3	Beryllium 4		Boron Carbon Nitrogen Oxygen Flourine N									Neon 10					
23 <b>Na</b>	24 <b>Mg</b>	$ \begin{array}{c}                                     $								28 <b>Si</b>	31 <b>P</b>	32 <b>S</b>	35.5 <b>Cl</b>	40 <b>Ar</b>			
Sodium 11	Magnesium 12											Aluminum 13	Silicon 14	Phosphorus 15	Sulfur 16	Chlorine 17	Argon 18
39 <b>K</b>	40 <b>Ca</b>	45 <b>Sc</b>	48 <b>Ti</b>	51 52 55 56 59 59 63.5 65 V Cr Mn Fe Co Ni Cu Zn							65 <b>Zn</b>	70 <b>Ga</b>	72.5 <b>Ge</b>	75 <b>As</b>	79 <b>Se</b>	80 <b>Br</b>	84 <b>Kr</b>
Potassium 19	Calcium 20	Scandium 21	Titanium 22	Vanadium 23	Chromium 24	Manganese 25	Iron 26	Cobalt 27	Nickel 28	Copper 29	Zinc 30	Gallium 31	Germanium 32	Arsenic 33	Selenium 34	Bromine 35	Krypton 36
85.5 <b>Rb</b>	86 <b>Sr</b>	89 <b>Y</b>	91 <b>Zr</b>	93 <b>Nb</b>	96 <b>Mo</b>	(96) <b>Tc</b>	101 <b>Ru</b>	103 <b>Rh</b>	106 <b>Pd</b>	108 <b>Ag</b>	112 <b>Cd</b>	115 <b>In</b>	119 <b>Sn</b>	122 <b>Sb</b>	128 <b>Te</b>	127 <b>I</b>	131 <b>Xe</b>
Rubidium 37	Strontium 38	Yttrium 39	Zirconium 40	Niobium 41	Molybdenum 42	Technetium 43	Ruthenium 44	Rhodium 45	Palladium 46	Silver 47	Cadmium 48	Indium 49	Tin 50	Antimony 51	Tellurium 52	Iodine 53	Xenon 54
133 <b>Cs</b>	137 <b>Ba</b>	139 <b>La</b>	178.5 <b>Hf</b>	181 <b>Ta</b>	184 <b>W</b>	186 <b>Re</b>	190 <b>Os</b>	192 <b>Ir</b>	195 <b>Pt</b>	197 <b>Au</b>	201 <b>Hg</b>	204 <b>Tl</b>	207 <b>Pb</b>	209 <b>Bi</b>	(210) <b>Po</b>	(210) <b>At</b>	(222) <b>Rn</b>
Cesium 55	Barium 56	Lanthanum 57	Hafnium 72	Tantalum 73	Tungsten 74	Rhenium 75	Osmium 76	II Iridium 77	Platinum 78	Gold 79	Mercury 80	Thallium 81	Lead 82	Bismuth 83	Polonium 84	Astatine 85	Radon 86
(223)	(226)	(227)	(261)	(262)	(266)	(264)	(265)	(268)									
Fr Francium 87	Ra Radium 88	Ac Actinium 89	Rf Rutherfordium 104	Db Dubnium 105	Sg Seaborgium 106	Bh Bohrium 107	Hs Hassium 108	Mt Meitnerium 109									

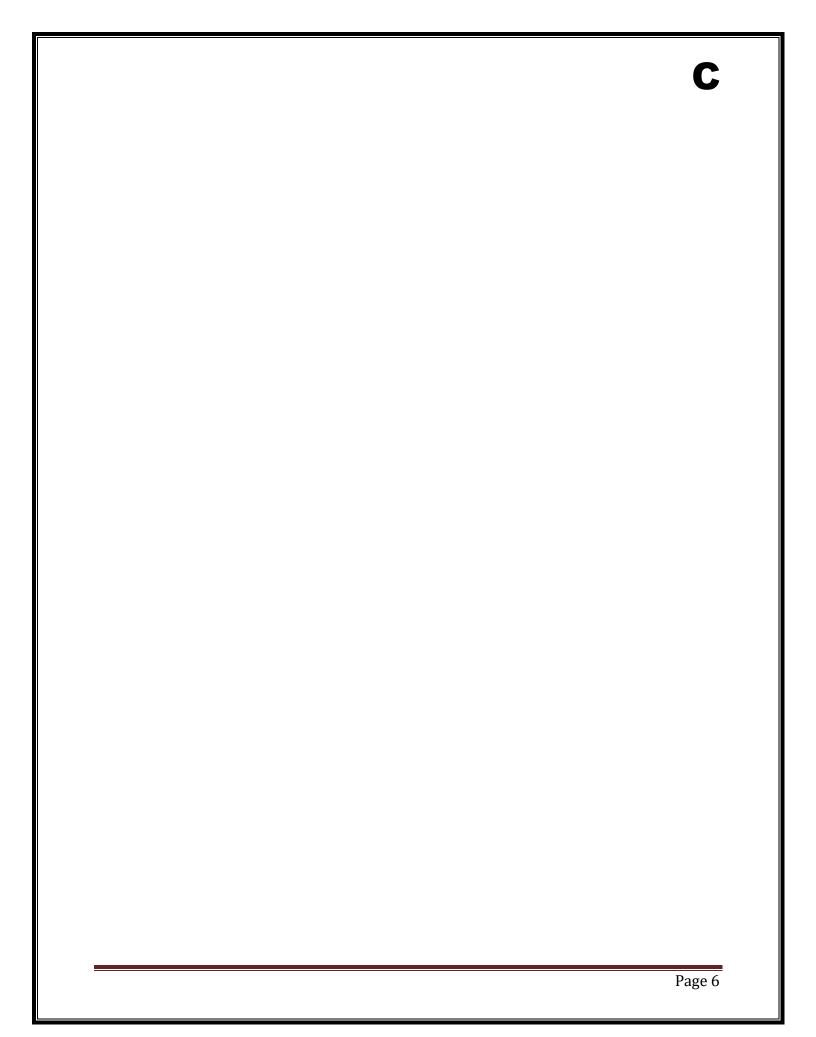
140	141	144	145	150	152	157	159	162.5	165	167	169	173	175
Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Но	Er	Tm	Yb	Lu
Cerium 58	Praseodymium 59	Neodymium 60	Promethium 61	62	Europium 63	Gadolinium 64	Terbium 65	Dysprosium 66	Holmium 67	Erbium 68	Thulium 69	Ytterbium 70	Lutetium 71
232	231	238	237	244	(243)	(247)	(247)	(251)	(252)	(257)	(258)	(259)	(262)
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
Thorium 90	Protactinium 91	Uranium 92	Neptunium 93	Plutonium 94	Americium 95	Curium 96	Berkelium 97	Californium 98	Einsteinium 99	Fermium 100	Mendelevium 101	Nobelium 102	Lawrencium 103

C-1	corresponding		5 MIIIZ. Calculate the wa	ivelength of the
a) 29.2	2 x 10 <sup>-2</sup> m	b) 2.6 x 10 <sup>16</sup> m	c) 3.4 m	d) 3.4x10 <sup>6</sup> m
C-2 a) 2.7	Calculate the w	wavelength associated with b) 2.7x10 <sup>-34</sup> nm	ith tennis ball (55 g) tra c) 2.7 x 10 <sup>-37</sup> nm	<b>veling at 45 m/s?</b> d) 2.7 x 10 <sup>-31</sup> nm
C-3	Which of the fo	ollowing electron config	uration violate Pauli exc	lusion principle
a)	$\begin{array}{cc} \mathbf{1s} & \mathbf{2s} \\ \uparrow \downarrow & \uparrow \downarrow \end{array}$	2p		
b)	$\uparrow \downarrow \qquad \uparrow$			
c)	$\uparrow\downarrow$ $\uparrow\downarrow$			
d)	$\uparrow\downarrow$ $\uparrow\uparrow$	<b> </b>		
<b>C-4</b> a) Mg	Which of the fo	b) Na	<b>inpaired electrons and is</b> c) Si	s paramagnetic? d) Be
C-5	If the pressure	of a gas sample is triple	d and the absolute temp	oerature is doubled, b
	what factor do	es the volume of the san	nple change?	
a) 2		b) 1.5	c) 0.67	d) 3
<b>C-6</b> a) F <sub>2</sub> as		nents that exist as gases b) N <sub>2</sub> and Li	at room temperature c) H <sub>2</sub> and Br <sub>2</sub>	d) C and B
a) n=2	Which one of the distribution $l=2, m_l=1, m_s=1, l=2, m_l=1, m_s=1$	= 1/2	b) n=3, $l=2$ , $m_l=2$ , $m_s=0$ d) n=2, $l=1$ , $m_l=3$ , $m_s=0$	= 1/2
C-8		ergy in joules of a photo	ns associated with visibl	e light of wavelength
a) 1.15	<b>580 nm?</b> 5 x 10 <sup>-31</sup> J	b) 3.43 x 10 <sup>-19</sup> J	c) 3.84 x 10 <sup>-40</sup> J	d) 3.43 x 10 <sup>-28</sup> J
<b>C-9</b> a) -3.0			=3, if you know that the ies calculate the energy of 1.94x10 <sup>-18</sup> J	

C-10	The correct Lo	ewis symbol for an el	ement containing 5 elec	ctrons is
a) • X		b) · X ·	c) • X •	d)
<b>C-11</b> a) 17	Calculate the t	total valance electron b) 18	s for NO <sub>2</sub> -1? c) 11	d) 19
<b>C-12</b> a) +5	The formal ch	arge on the central n b) -1	itrogen in NO2 <sup>-1</sup> is equ c) +1	al to d) 0
C-13 a) P	Which of the f	ollowing when acting b) C	g as central atom could c) F	deviate from octet rule?
C-14	completely wit	_	f aluminum. What is th	xygen gas at STP to react ne mass of aluminum (Al)
a) 0.00	· ·	b) $0.13 \text{ g}$	c) 4.8 g	d) 0.18 g
C-15	For a fixed am at constant ten		g the pressure will res	ulted inin volume
a) mult	tiplying	b) an increase	c) a decrease	d) no change
C-16	Calculate the 1 45 °C and 589		wn gaseous compound	with a density of 0.8 g/L a
a) 28.2		b) 26.9 g/mol	c) 0.035 g/mol	d) 3.8 g/mol
<ul><li>a) Alka</li><li>b) Alka</li><li>c) Halo</li></ul>	ali metals have t ali earth metals l ogens have the h	he highest ionization enaction	energy ation energy gy	
C-18 Row 1 Row 2 Row 3 Row 4	Increasin N -3 < O <sup>2</sup> Na + < F - Na + < N -	ions in order of increase radius $\rightarrow$ $^{-}$ < F $^{-1}$ < Na $^{+}$ $^{1}$ < O $^{-2}$ < N $^{-3}$ $^{3}$ < O $^{-2}$ < F $^{-1}$ < N $^{-3}$ < Na $^{+}$	easing ionic radius: O	·², Na <sup>+</sup> , N <sup>3-</sup> , F <sup>-1</sup> .
a) Row	v 2	b) Row 3	c) Row 1	d) Row 4
C-19		the following stateme is 400 m below sea le	_	the atmospheric pressure
a) grate	er than 1	b) less than 1	c) equal to 1	d) 0

C-20	What is the mannumbers: n=2,	ximum number of subor	rbital that can have the	following quantum
a) 7	numbers, n 25	b) 9	c) 4	d) 5
		<b>nfiguration of a ground</b> b) [Ar]3s <sup>2</sup> 3p <sup>2</sup>	-state Si atom is c) [Ne]2s <sup>2</sup> 2p <sup>2</sup>	d) $[Ar]4s^2 4p^2$
C-22	How many elect $m_l = +1$ ?	trons in a ground-state	potassium (K) atom are	in orbitals labeled by
a) 2	$m_l - \pm 1$ :	b) 3	c) 4	d) 5
C-23	Where would the periodic table,	ne element with the follo Krl5s <sup>2</sup> 3d <sup>10</sup> 5p <sup>2</sup> ?	owing electron configura	ation located in the
a) grou		b) group 5A, period 3	c) group 4A, period 5	d) group 5A, period 4
C-24	-	of $F_2(g)$ and $H_2(g)$ are in which one of the following	-	f equal volume and
b) The c) The	pressure in the H pressure in the H	container is greater than 2 container is greater than 2 container could be great a gases are the same.	that in the $F_2$ container.	the F <sub>2</sub> container
C-25	converted to N <sub>2</sub>	llowing chemical equati $O_4$ gas under the same of $O_4 \cap O_4(g)$		
C-25	converted to N <sub>2</sub> occupy? 2NO <sub>2</sub> (s	O <sub>4</sub> gas under the same of		
a) 30 n	converted to N <sub>2</sub> occupy? 2NO <sub>2</sub> (som)  A gas sample considered to the sample sample sample considered to the sample sampl	O <sub>4</sub> gas under the same of g) → N <sub>2</sub> O <sub>4</sub> (g) b) 20 mL ontaining 1.50 mol at 25 me container and the tenses to 800 torr, how man	conditions, what volume c) 40 mL °C exerts a pressure of mperature is increased	e will the $N_2O_4$ d) 10 mL 300 torr. Some gas is to 50 °C. If the
a) 30 n	converted to N <sub>2</sub> occupy? 2NO <sub>2</sub> (somL  A gas sample condition added to the sample samp	O <sub>4</sub> gas under the same of g) → N <sub>2</sub> O <sub>4</sub> (g) b) 20 mL ontaining 1.50 mol at 25 me container and the ter	conditions, what volume c) 40 mL °C exerts a pressure of mperature is increased	e will the $N_2O_4$ d) 10 mL 300 torr. Some gas is to 50 °C. If the
<ul><li>a) 30 n</li><li>C-26</li><li>a) 2.19</li></ul>	converted to N <sub>2</sub> occupy? 2NO <sub>2</sub> (smL  A gas sample condition added to the sample sampl	O <sub>4</sub> gas under the same of g) → N <sub>2</sub> O <sub>4</sub> (g) b) 20 mL ontaining 1.50 mol at 25 me container and the tenses to 800 torr, how manant-volume container b) 5.19 mol	conditions, what volume c) 40 mL °C exerts a pressure of mperature is increased ny moles of gas were ad c) 3.69 mol H4, 0.25 mol C <sub>2</sub> H <sub>6</sub> , and	d) 10 mL  300 torr. Some gas is to 50 °C. If the ded to the container?  d) 0.27 mol  0.29 mol C <sub>3</sub> H <sub>8</sub> . The
<ul><li>a) 30 n</li><li>C-26</li><li>a) 2.19</li></ul>	converted to N <sub>2</sub> occupy? 2NO <sub>2</sub> (som)  A gas sample condition added to the sample sample sample account of moles.  A mixture of gas total pressure is	O <sub>4</sub> gas under the same of g) → N <sub>2</sub> O <sub>4</sub> (g) b) 20 mL ontaining 1.50 mol at 25 me container and the tenses to 800 torr, how man ant-volume container b) 5.19 mol	conditions, what volume c) 40 mL °C exerts a pressure of mperature is increased ny moles of gas were ad c) 3.69 mol H4, 0.25 mol C <sub>2</sub> H <sub>6</sub> , and	d) 10 mL  300 torr. Some gas is to 50 °C. If the ded to the container?  d) 0.27 mol  0.29 mol C <sub>3</sub> H <sub>8</sub> . The
a) 30 n C-26 a) 2.19 C-27	converted to N <sub>2</sub> occupy? 2NO <sub>2</sub> (smL  A gas sample condended to the sample samp	O <sub>4</sub> gas under the same of g) → N <sub>2</sub> O <sub>4</sub> (g) b) 20 mL ontaining 1.50 mol at 25 me container and the tenses to 800 torr, how man ant-volume container b) 5.19 mol	conditions, what volume c) 40 mL  °C exerts a pressure of mperature is increased ny moles of gas were ad c) 3.69 mol  H4, 0.25 mol C <sub>2</sub> H <sub>6</sub> , and e partial pressures of C <sub>2</sub> c) 0.29 atm	d) 10 mL  300 torr. Some gas is to 50 °C. If the ded to the container?  d) 0.27 mol  0.29 mol C <sub>3</sub> H <sub>8</sub> . The eH <sub>6</sub> .  d) 0.44 atm
a) 30 n C-26  a) 2.19 C-27 a) 5.17 C-28	converted to N <sub>2</sub> occupy? 2NO <sub>2</sub> (smL  A gas sample condended to the sample samp	O <sub>4</sub> gas under the same of g) → N <sub>2</sub> O <sub>4</sub> (g) b) 20 mL ontaining 1.50 mol at 25 me container and the tenses to 800 torr, how manant-volume container b) 5.19 mol asses contains 0.31 mol Container b) 5.19 mol dises contains 0.31 mol Container b) 0.19 atm llowing elements has the b) Se	conditions, what volume c) 40 mL  °C exerts a pressure of mperature is increased in moles of gas were ad c) 3.69 mol  H4, 0.25 mol C <sub>2</sub> H <sub>6</sub> , and e partial pressures of C <sub>2</sub> c) 0.29 atm e highest electron affinite	d) 10 mL  300 torr. Some gas is to 50 °C. If the ded to the container?  d) 0.27 mol  0.29 mol C <sub>3</sub> H <sub>8</sub> . The eH <sub>6</sub> .  d) 0.44 atm

Absorb	يمتص	largest	اكبر
acceptable		least	اقل
according	مقبول وفقا	List	اوجد
amount	کمیه	lone pair	ازواج حره
around	حوان	lowest	الأقل
as part of	وقف کمیه حول کجزء من جذب بیث یغلی محدد یصنف	mixture	خلیط
attraction	جنب	molar mass	الكتلة المولية
broadcasts	ىرىث	molecules	جزيئات
boils	1:,	multiplying	يتضاعف
certain	مدر	one-third	ثلث
classified	رفنادها	doubled	ضعف الكمية
Consists of	دتکون دن دن	quadrupled	أربعة اضعاف الكمية
constant	يتكون من ثابت	tripled	اربعه اصعف الكمية ثلاثة اضعاف الكمية
container	وعاء	paramagnetic	احادي المغناطيسية
Converts to	يتحول الى	partial pressure	من فط من أ
covalent	تبداه		ضَغط جزئي كرة تنس طاوله
	تساه <i>مي</i> کثافه	ping-pong ball possible	حرہ ننس صاوتہ ممکن
density		1	عملیه
determined	إيجاد	process	
diamagnetic	ثنائي المغناطيسية	quantum number	اعداد کم
diminish	علاقة طرديه	raise	يرفع علاقة
corresponding	المصاحب خلال	relationship	
During		remains	يبقى يمثل
electron configuration	توزيع الكتروني	represent	
electronegativity	سالبيه كهربائية	representative elements	عناصر ممثله
Emission	انبعاث	resonance structures	اشكال رنين
emit	يبعث	respectively	على التوالي
assume	افتر ض طاقة	sample	عينه
Energy		sets	مجموعات
Fixed quantity	كمية ثابتة	smallest	أصغر صلب صنف
Flask	وعاء	solid	صلب
Flexible	مرن	species	صنف
Found	وجد	stable	مستقر
Frequency	تردد	starred electron	الإلكترون ذو النجمة
gaseous	غازي	Subjected to	تعرض الى
greatest	أكبر اعلى تحمل	exerts	بذل
Highest	اعلى	transitions	انتقاله
holding	تحمل	allowable	مسموح
Ideal gas	غاز مثالي	unpaired	
separate	منفصل	valid	مفر د صالح
Indicate	اوجد	velocity	سرعه
initially	بداية	vessel	وعاء
mine	منجم	violate	يخالف
isoelectronic	اوجد بدایة منجم نظیر الالکتروني	volume	
kept	حافظ	wavelength	حجم طول موجي
I.	<u>I</u>	1	<u> </u>





**Faculty of Science - Chemistry Department** 

Chem-110, Second Exam Wednesday 13 /03 /1440 H

Time: 90 minutes

Number: **Section:** Name:

•Useful information:

 $C = 3.0 \times 10^8 \text{ m/s}$ Speed of light,  $h = 6.626 \times 10^{-34} \text{ J.s}$ Planck's const.,  $\begin{aligned} N_{av} &= 6.022 \times 10^{23} \text{ mol}^{-1} \\ R_{H} &= 2.18 \times 10^{-18} \text{ J} \end{aligned}$ Avogadro's No., Rydberg const. for H atom  $m_e = 9.11 \times 10^{-31} \text{ kg}$   $R = 0.082 \text{ L atm K}^{-1} \text{ mol}^{-1}$ Mass of the electron,

1A																	8A
1	PERIODIC TABLE										4 11.0						
H Hydrogen 1												Helium 2					
7 Li	9 <b>Be</b> Beryllium			12 C	· <del></del>		→ <sub>1</sub>	nearest				11 <b>B</b> Boron	12 C Carbon	14 N Nitrogen	16 O Oxygen	19 <b>F</b> Flourine	20 Ne Neon
3 23 <b>Na</b> Sodium	24 Mg Magnesium 12	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$								10 40 <b>Ar</b> Argon 18							
39  K  Potassium 19	40 Ca Calcium 20	45 Sc Scandium	48 <b>Ti</b> Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 <b>Fe</b> Iron 26	59 <b>Co</b> Cobalt 27	59 Ni Nickel 28	63.5 <b>Cu</b> Copper 29	65 <b>Zn</b> Zinc 30	70 <b>Ga</b> Gallium 31	72.5 <b>Ge</b> Germanium 32	75 <b>As</b> Arsenic 33	79 Se Selenium 34	80 <b>Br</b> Bromine 35	84 Kr Krypton 36
85.5 Rb Rubidium	86 Sr Strontium	89 <b>Y</b> Yttrium	91 <b>Zr</b> Zirconium	93 <b>Nb</b>	96 <b>Mo</b>	(96) Tc	101 Ru	103 Rh Rhodium	106 Pd Palladium	108 <b>Ag</b> Silver	112 Cd Cadmium	115 In Indium	119 <b>Sn</b> Tin 50	122 Sb Antimony	128 <b>Te</b> Tellurium	127 I lodine	131 Xe
133 <b>Cs</b> Cesium 55	38 137 <b>Ba</b> Barium 56	139 La Lanthanum 57	178.5 <b>Hf</b> Hafnium  72	181 <b>Ta</b> Tantalum 73	184 W Tungsten 74	186 <b>Re</b> Rhenium 75	190 <b>Os</b> Osmium 76	45 192 <b>Ir</b> Iridium 77	195 <b>Pt</b> Platinum 78	47 197 <b>Au</b> Gold 79	201 <b>Hg</b> Mercury 80	204 Tl Thallium 81	207 <b>Pb</b> Lead 82	209 <b>Bi</b> Bismuth 83	52 (210) <b>Po</b> Polonium 84	53 (210) <b>At</b> Astatine 85	(222) <b>Rn</b> Radon 86
(223) <b>Fr</b> Francium 87	(226) <b>Ra</b> Radium 88	(227) Ac Actinium 89	(261) <b>Rf</b> Rutherfordium 104	(262) <b>Db</b> Dubnium 105	(266) <b>Sg</b> Seaborgium 106	(264) <b>Bh</b> Bohrium 107	(265) <b>Hs</b> Hassium 108	(268) Mt Meitnerium 109									

140 Ce Cerium	141 Pr Praseodymium	144 Nd Neodymium		150 Sm Samarium		157 Gd Gadolinium		Dy Dysprosium		167 Er	169 <b>Tm</b> Thulium	173 <b>Yb</b> Ytterbium	175 Lu
58 232 <b>Th</b>	231 <b>Pa</b>	238 U	237 <b>Np</b>	244 <b>Pu</b>	63 (243) <b>Am</b>	(247) Cm	65 (247) <b>Bk</b>	(251) <b>Cf</b>	(252) <b>Es</b>	(257) <b>Fm</b>	(258) <b>Md</b>	70 (259) <b>No</b>	(262) Lr
Thorium 90	Protactinium 91	Uranium 92	Neptunium 93	Plutonium 94	Americium 95	Curium 96	Berkelium 97	Californium 98	Einsteinium 99	Fermium 100	Mendelevium 101	Nobelium 102	Lawrencium 103

# D

D-1	completely with	llowing reaction: It takes a certain sample of alu $+3O_2(g) \rightarrow 2Al_2O_3(s)$	1 0	C
a) 0.29		b) 8.04 g	c) 0.01 g	d) 0.22 g
D-2	For a fixed amo	ount of gas decreasing the	ne pressure will resulted	inin volume
a) a dii	· · · · · · · · · · · · · · · · · · ·	b) an increase	c) a decrease	d) no change
D-3	Calculate the m 25 °C and 492 r	olar mass of unknown g nmHg ?	gaseous compound with	a density of 0.8 g/L at
a) 30.2	2 g/mol	b) 2.5 g/mol	c) 0.04 g/mol	d) 25.2 g/mol
	in a mine that is	ne following statements is 700 m below sea level (	(1 atm) ?	
a) grate	er than 1	b) less than 1	c) equal to 1	d) 0
D-5	O	ses contains 0.31 mol C 2.00 atm. Calculate the	e partial pressures of C2	
a) 0.59	o atm	b) 0.29 atm	c) 0.145 atm	d) 6.9 atm
<b>D-6</b>	Which of the fo	llowing elements has the	e highest electron affinit	ty?
a) B		b) In	c) Al	d) Ga
<b>D-7</b> a) Rb <sup>+</sup>	Kr is not isoeled	etronic with b) Se -2	c) Ca <sup>+2</sup>	d) Br <sup>-1</sup>
ŕ		,	c) ca	u) Di
<b>D-8</b> a) Ca-0		oolar covalent bond is b) Li-O	c) I-I	d) H-Br
<b>D-9</b>	The correct Lev	vis symbol for an eleme	nt containing 6 electron	s is
·X		b) · X ·	• X •	• X •
a)			c)	d)
D-10	Calculate the to	tal valance electrons for	r PO <sub>3</sub> -3 ?	
a) 26		b) 23	c) 20	d) 11
<b>D-11</b> a) 0	The formal cha	rge on the central phosp b) -3	phorus in PO <sub>3</sub> -3 is equal c) -1	<b>to</b> d) +5

	following when acting as		expand it octet?
a) I	b) N	c) P	a) S
D-13 Name two eler	nents that exist as gases	at room temperature	
a) P and S	b) Ca and N	c) Cl and Xe	d) Na and Mg
D-14 Which one of	the following is an allow	able set of quantum nur	nbers for an electron?
a) n=3, $l=2$ , $m_l=0$ , $m_s$		b) n=1, $l=1$ , $m_l=2$ , $m_s=1$	
c) n=4, $l=5$ , $m_l=1$ , $m_s$	= -1/2	d) n=2, $l=1$ , $m_l=0$ , $m_s=0$	= 1
D-15 What is the en	ergy in joules of a photo	ons associated with visib	le light of wavelength
a) 7.9 x 10 <sup>-32</sup> J	b) 2.6 x 10 <sup>-40</sup> J	c) 4.9 x 10 <sup>-28</sup> J	d) 4.9 x 10 <sup>-19</sup> J
	rops from energy level n on drops is in Brackett :		
a) $-8.7 \times 10^{-20} \text{ J}$	b) -4.9x10 <sup>-20</sup> J	c) -2.09x10 <sup>-18</sup> J	d) 4.9x10 <sup>-20</sup> J
,	,	,	,
D-17 An FM radio s corresponding	station broadcasts at 68. radio waves?	5 MHz. Calculate the w	avelength of the
a) 4.4 m		c) $4.4 \times 10^6 \text{ m}$	d) 0.23 m
<b>D-18</b> Calculate the a) 2.5 x 10 <sup>-34</sup> nm	wavelength associated w b) 2.5x10 <sup>-28</sup> nm	rith tennis ball ( 45 g) tra c) 2.5 x 10 <sup>-25</sup> nm	
D-19 If the pressure	e of a gas sample is doub	led and the absolute ten	nperature is
quadrupled, k	y what factor does the v	volume of the sample ch	ange?
a) 0.5	b) 6	c) 4	d) 2
-	s of F <sub>2</sub> (g) and H <sub>2</sub> (g) are which one of the follow	<u>-</u>	f equal volume and
c) The pressure in the	th gases are the same H <sub>2</sub> container could be gre F <sub>2</sub> container is less than the H <sub>2</sub> container is less than the	nat in the H <sub>2</sub> container	n the F <sub>2</sub> container
converted to N	following chemical equat $\sqrt{2}$ Qas under the same		
occupy? 2NO <sub>2</sub> a) 35 mL	$(g) \rightarrow N_2O_4(g)$ b) 52.5 mL	c) 17.5 mL	d) 70 mL
,	5, C = 10 11112	-, -, -, -, -, -, -, -, -, -, -, -, -, -	<u></u>
D-22 What is the m numbers: n=5.	aximum number of subo . m <sub>s</sub> =+1/2	orbital that can have the	following quantum
a) 25	b) 5	c) 12	d) 2

D-23	added to the sa pressure increa	ontaining 2.50 mol at 25 me container and the te uses to 750 torr, how matant-volume container	mperature is increased	to 50 °C. If the
a) 0.14		b) 4.4 mol	c) 6.9 mol	d) 9.4 mol
D-24	Which of the fo	ollowing electron configu 2p	ıration violate Pauli exc	lusion principle
a)	$\uparrow \downarrow \qquad \uparrow \downarrow$			
b)	$\uparrow\downarrow$ $\downarrow\downarrow$			
c)	$\uparrow\downarrow$ $\uparrow\downarrow$	$\boxed{\uparrow\downarrow  \uparrow\downarrow  }$		
d)	$\uparrow\downarrow$ $\uparrow$	$\boxed{ \uparrow\downarrow  \uparrow  \uparrow}$		
D-25	Which of the fo	ollowing element has 0 u	_	
a) Al		b) K	c) F	d) Ca
	The electron co	onfiguration of a ground b) [Ar]3s <sup>2</sup> 3p <sup>4</sup>	l-state S atom is c) [Ne]3s <sup>2</sup> 3p <sup>4</sup>	d) [Ar]4s <sup>2</sup> 4p <sup>4</sup>
D-27	How many electric $m_l = 0$ ?	trons in a ground-state	potassium (K) atom are	in orbitals labeled by
a) 7		b) 11	c) 2	d) 19
D-28	Where would t periodic table	he element with the follo	owing electron configura	ation located in the
a) grou		b) group 6A, period 4	c) group 4A, period 4	d) group 6A, period 7
<ul><li>a) Halo</li><li>b) Iner</li><li>c) Alka</li></ul>	ogens have the lost gases have the ali metals have the	rrect statement from the west electron affinity lowest electron affinity are lowest electron affinity ave the lowest electron a	,	
D-30 Row 1 Row 2 Row 3 Row 4	Increasing S -2 < Ga+. S -2 < K + < S K+ < Ca+.	fons in order of increasing radius $\rightarrow$ $^3 < Ca^{+2} < K^+$ $Ca^{+2} < Ga^{+3}$ $^2 < Ga^{+3} < S^{-2}$ $^{+2} < K^+ < S^{-2}$	ng ionic radius: Ca <sup>+2</sup> , C	Ga <sup>+3</sup> , S <sup>-2</sup> , K <sup>+</sup> .
a) Rov	v 2	b) Row 3	c) Row 1	d) Row 4

Absorb	يمتص	largest	اكبر
acceptable	مقبول	least	اقل
according	وفقا	List	اوجد
amount	كميه	lone pair	ازواج حره
around	کمیه حول	lowest	ازواج حره الأقل
as part of	کجز ۽ من	mixture	خليط
attraction	جذب	molar mass	الكتلة المولية
broadcasts	يبث	molecules	جزيئات
boils	يغلى	multiplying	يتضاعف
certain	محدد	one-third	ثلث
classified	حوں کجزء من جذب یبٹ یغلی محدد یصنف	doubled	ضعف الكمية
Consists of	يتكون من	quadrupled	أربعة اضعاف الكمية
constant	ثابت	tripled	ثلاثة اضعاف الكمية
container	وعاء	paramagnetic	احادي المغناطيسية
Converts to	يتحول الى	partial pressure	•
covalent	تساهمي	ping-pong ball	ضغط جزئي كرة تنس طاوله
density	كثافه	possible	ممكن
determined	إيجاد	process	ممکن عملیه
diamagnetic	ثنائى المغناطيسية	quantum number	اعداد کم
diminish	علاقة طرديه	raise	يرفع
corresponding	المصاحب	relationship	علاقة
During	خلال	remains	ببقى
electron configuration	توزيع الكتروني	represent	یبقی یمثل
electronegativity	سالبيه كهربائية	representative elements	عناصر ممثله
Emission	انبعاث	resonance structures	اشكال رنين
emit	يبعث	respectively	على التوالي
assume	افتر ض طاقة	sample	عينه
Energy	طاقة	sets	مجمو عات
Fixed quantity	كمية ثابتة	smallest	أصغر
Flask	وعاء	solid	أصغر صلب
Flexible	مرن	species	صنف
Found	وجد	stable	مستقر
Frequency	تردد	starred electron	الإلكترون ذو النجمة تعرض الى
gaseous	غازي	Subjected to	تعرض الى
greatest	أكبر	exerts	بذل
Highest	غازي أكبر اعلى تحمل	transitions	انتقاله
holding	تحمل	allowable	
Ideal gas	غاز مثالي	unpaired	مسموح مفر د صالح
separate	منفصل	valid	صالح
Indicate	او جد	velocity	سرعه
initially	اوجد بداية	vessel	وعاء
mine	منجم	violate	يخالف
isoelectronic	بداية منجم نظير الالكتروني حافظ	volume	حجم
kept	حافظ	wavelength	طول موجي
Кері	1	,, a verengui	