المملكة العربية السعودية

وزارة التعليم

MINISTRY OF EDUCATION

هام

لكل المهتمين و المهتمات

بدروس و مراجع الجامعية

مدونة المناهج السعودية eduschool40.blog

C

King Abdulaziz University

Faculty of Science - Chemistry Department

Chem-110, First Exam

Thursday 16 /02 /1440 H

Time: 90 minutes

Name:	**Number:**	**Section:**

•Useful information:

Speed of light,	**$C = 3.0\times10^{8}$ m/s**
Planck's const.,	**$h = 6.626\times10^{-34}$ J.s**
Avogadro's No.,	**$N_{av} = 6.022\times10^{23}$ mol^{-1}**
Rydberg const. for H atom	**$R_H = 2.18\times10^{-18}$ J**
Mass of the electron,	**$m_e = 9.11\times10^{-31}$ kg**
Gas constant,	**R = 0.082 L atm K^{-1} mol^{-1}**

PERIODIC TABLE

Key: 12 C Carbon 6 — Relative atomic mass to nearest whole number; Symbol; Atomic number

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

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

Choose the correct answer

C-1 In the process of dissolving 2.5 g of potassium nitrate in 140 ml of benzene, the benzene is referred to as the:

a) precipitate b) solution c) solute d) solvent

C-2 The correct name for $PdCl_2$ is :

a) palladium dichloride b) palladium (II) chloride c) palladium (I) chloride d) palladium chloride

C-3 The systematic name for P_2S_5 is:

a) phosphorus pentasulfide b) phosphorus (V) sulfide c) diphosphorus pentasulfide d) phosphorus silfide

C-4 The formula for potassium sulfite is:

a) K_2SO_3 b) $K(SO_3)_2$ c) K_2S d) K_2SO_4

C-5 Which pair of the following have the same empirical formula :

a) $C_{10}H_5O_{15}$, $C_{20}H_8O_{12}$ b) $C_{10}H_{12}O_6$, $C_{15}H_{18}O_9$

c) $C_{10}H_5O_{15}$, $C_{16}H_8O_{20}$ d) C_9H_3O , $C_9H_3O_6$

C-6 NH_3 can be classified as

a) compound b) molecule c) mixture d) compound and molecule

C-7 An example of monatomic ion is

a) N^{3-} b) O c) P d) CN^{1-}

C-8 How many moles of chlorine atoms are in 2.1×10^{24} chlorine molecules (Cl_2)?

a) 35.2 mol b) $1.26x10^{48}$ mol c) 6.97 mol d) 3.49 mol

C-9 What is the percent of oxygen (O) in $Mg_3(PO_4)_2$?

a) 22.53 % b) 48.85 % c) 64.65 % d) 61.83 %

C-10 An analysis of unknown compound gives the following percentage: 19.25% C, 0.53% H, and 80.21% As, what is the empirical formula of the compound?

a) C_3HAs_2 b) C_2H_4As c) CH_2As d) C_2H_6As

C-11 What is the molecular formula for the compound in the above question (q10) if the molar mass of the unknown compound is 374 g/mole?

a) $C_9H_3As_6$ b) $C_4H_{12}As_2$ c) $C_2H_4As_2$ d) $C_6H_2As_4$

C-12 After balancing the following hypothetical reaction, the coefficient of AC_2 is

$$A_3B_6 + C_2 \rightarrow AC_2 + B_2C$$

a) 1 b) 9 c) 6 d) 2

C-13 Manganese metal can be prepared by the thermite process:

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

If 203 g of Al and 672 g of MnO_2 are mixed, which is the limiting reactant?

a) Al_2O_3 b) Mn c) MnO_2 d) Al

C-14 What is the theoretical yield (in grams) of Mn that can be 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 Mn are actually obtained from the reaction in question 13 , what is the percent yield?

a) 81.88 % b) 95.6 % c) 85.1 % d) 79.2 %

C-16 You have 250 mL of a 0.34 M HCl solution and you want to dilute it to exactly 0.12 M. How 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_2SO_4 is dissolved in 200 ml water the concentration of the resulting solution will be:**

a) 0.02 M b) 17 M c) 0.12 M d) $1.2x10^{4-}$ M

C-18 **The correct formula of a compound consists of P and K :**

a) K_3P b) KP c) KP_3 d) K_3P_2

C-19 **Which of the following statement is the correct description for the compound in the above question (q18) ?**

a) A diatomic molecule containing atoms of different elements

b) A polyatomic molecule containing atoms of different elements.

c) A polyatomic molecule containing atoms of the same element.

d) A diatomic molecule containing atoms of the same element.

C-20 **40 ml of 0.32 M $CaCl_2$ are mixed with 10 ml of 0.12 M NaCl. calculate the concentration of chlorine ion (Cl) in the resulting solution?**

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 Ti ?**

a) $2.89x10^{25}$ g b) $2.7x10^{23-}$ g c) 48 g d) $7.97\ x10^{23-}$ g

C-22 **The element (As) is classified as**

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

C-23 **An element can change from one to another by changing the number of**

a) Proton b) Electron c) Neutron d) atomic mass

C-24 **An object with a mass of 5.7 g and density of 1.3g/ml was added to a beaker containing water, the water level raised to 120 ml calculate the volume of water was in the beaker before the addition of the object?**

a) 124.38 ml b) 115.6 ml c) 4.38 ml d) 7.41 ml

C-25 **$2.4x10^{3-}$ Mm equal to 2.4 ___ ?**

a) µm b) km c) mm d) pm

C-26 **Which of the following prefixes equal to 10^{12} ?**

a) mili b) kilo c) nano d) tera

C-27 **The SI unit for time is**

a) second b) minutes c) hour d) millisecond

C-28 **Select the symbol that identifies the following species. Include the charge if the species is not neutral (5 protons, 6 neutrons, 2 electrons):**

a) C b) B^{3+} c) B d) Na

C-29 **An atom containing which one of the following is an isotope of oxygen?**

a) 7 protons and 6 neutrons b) 5 protons and 8 neutrons

c) 8 protons and 5 neutrons d) 6 protons and 7 neutrons

C-30 **Pure silver coin can be classified as**

a) Heterogenous mixture b) Homogenous mixture c) compound d) element

C

above	اعلى	classify	صنف
According	وفقاً	Mixture	خليط
Anion	ايون سالب	molecules	جزيء
Calculate	احسب	molecular	جزيئيه
chemical identity	هويه كيميائيه	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
containing	يحتوي	Nonmetal	لا فلز
density	كثافه	process	عمليه
Derived units	وحدات مشتقه	graduated cylinder	مخبار مدرج
Determine	اوجد	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	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

D

King Abdulaziz University

Faculty of Science - Chemistry Department

Chem-110, First Exam

Thursday 16 /02 /1440 H

Time: 90 minutes

Name:	**Number:**	**Section:**

•Useful information:

Speed of light,	**$C = 3.0\times10^{8}$ m/s**
Planck's const.,	**$h = 6.626\times10^{-34}$ J.s**
Avogadro's No.,	**$N_{av} = 6.022\times10^{23}$ mol^{-1}**
Rydberg const. for H atom	**$R_H = 2.18\times10^{-18}$ J**
Mass of the electron,	**$m_e = 9.11\times10^{-31}$ kg**
Gas constant,	**R = 0.082 L atm K^{-1} mol^{-1}**

PERIODIC TABLE

Key: 12 C Carbon 6 — Relative atomic mass to nearest whole number; Symbol; Atomic number

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

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

Choose the correct answer

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

a) 7 protons and 6 neutrons
b) 5 protons and 8 neutrons
c) 8 protons and 5 neutrons
d) 6 protons and 7 neutrons

D-2 Distilled water we drink can be classified as

a) Heterogenous mixture b) Homogenous mixture c) compound d) element

D-3 In the process of dissolving 3 g of potassium nitrate in 20 ml of water, the potassium nitrate is referred to as the:

a) precipitate b) solution c) solute d) solvent

D-4 The correct name for $MnCl_5$ is :

a) manganese pentachloride b) manganese (VI) chloride c) manganese (V) chloride d) manganese chloride

D-5 The systematic name for SF_6 is:

a) monosulfur hexafluoride
b) sulfur (VI) fluoride
c) sulfur fluoride
d) sulfur hexafluoride

D-6 The formula for lithium nitrite is:

a) $LiNO_3$ b) $Li(NO_2)_2$ c) Li_2NO_2 d) $LiNO_2$

D-7 Which pair of the following have the same empirical formula :

a) $C_{30}H_{12}O_{36}$, $C_{20}H_8O_{24}$
b) $C_{10}H_{15}O_5$, $C_{16}H_8O_{24}$
c) $C_{10}H_5O_{15}$, $C_{16}H_8O_{20}$
d) C_9H_3O , $C_9H_3O_3$

D-8 H_2O can be classified as

a) compound b) molecule c) mixture d) compound and molecule

D-9 An example of monatomic ion is

a) N^{3-} b) O c) P d) CN^{1-}

D-10 How many moles of chlorine atoms are in 5.3×10^{23} chlorine molecules (Cl_2)?

a) $3.2x10^{47}$ mol b) 1.76 mol c) 327.9 mol d) 0.88 mol

D-11 An element can change from one to another by changing the number of

a) Proton b) Electron c) Neutron d) atomic mass

D-12 An object with a mass of 2.5 g and density of 1.3g/ml was added to a beaker containing water, the water level raised to 120 ml calculate the volume of water was in the beaker before the addition of the object?

a) 123.25 ml b) 3.25 ml c) 1.92 ml d) 118.1 ml

D-13 $2.4x10^{3-}$ Gm equal to 2.4 ___ ?

a) µm b) Tm c) Mm d) pm

D-14 Which of the following prefixes equal to 10^{9-} ?

a) mili b) kilo c) nano d) tera

D-15 The SI unit for temperature is

a) candela b) Celsius c) kelvin d) Fahrenheit

D-16 Select the symbol that identifies the following species. Include the charge if the species is not neutral (13 protons, 14 neutrons, 10 electrons):

a) Al^{3+} b) N c) Co d) Ne

D-17 What is the percent of calcium (Ca) in $Ca_3(PO_4)_2$?

a) 38.7 % b) 45.98 % c) 43.01 % d) 65.9 %

D-18 An analysis of unknown compound gives the following percentage: 23.3% C, 3.88% H, and 72.82% As, what is the empirical formula of the compound?

a) C_3HAs_2 b) C_2H_4As c) CH_2As d) C_2H_6As

D-19 What is the molecular formula for the compound in the above question (q18) if the molar mass of the unknown compound is 309 g/mole?

a) $C_6H_{12}As_3$ b) $C_6H_2As_4$ c) $C_6H_{18}As_3$ d) $C_2H_4As_2$

D-20 After balancing the following hypothetical reaction, the coefficient of B_2C is

$$A_3B_6 + C_2 \rightarrow AC_2 + B_2C$$

a) 5 b) 2 c) 1 d) 6

D-21 The correct formula of a compound consists of N and Sr :

a) Sr_3N_3 b) SrN c) Sr_2N_3 d) Sr_3N_2

D-22 Which of the following statement is the correct description for the compound in the above question (q21) ?

a) A diatomic molecule containing atoms of different elements

b) A polyatomic molecule containing atoms of different elements.

c) A polyatomic molecule containing atoms of the same element.

d) A diatomic molecule containing atoms of the same element.

D-23 50 ml of 0.32 M $CaCl_2$ are mixed with 10 ml of 0.12 M NaCl. calculate the concentration of chlorine ion (Cl) in the resulting solution?

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) $1.8x10^{22-}$ g b) $6.4x10^{25}$ g c) 106 g d) $4.3\ x10^{23-}$ g

D-25 The element (Ge) is classified as

a) metalloid b) metal c) nonmetal 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_2 are mixed, which is the limiting reactant?

a) Al_2O_3 b) Mn c) MnO_2 d) Al

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 $MgSO_3$ is dissolved in 200 ml water the concentration of the resulting solution will be:

a) $1.6x10^{4-}$ M b) 0.16 M c) 0.32 M d) 3.4 M

D

above	اعلى	classify	صنف
According	وفقاً	Mixture	خليط
Anion	ايون سالب	molecules	جزيء
Calculate	احسب	molecular	جزيئيه
chemical identity	هويه كيميائيه	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
containing	يحتوي	Nonmetal	لا فلز
density	كثافه	process	عمليه
Derived units	وحدات مشتقه	graduated cylinder	مخبار مدرج
Determine	اوجد	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	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

B

King Abdulaziz University

Faculty of Science - Chemistry Department

Chem-110, First Exam

Thursday 16 /02 /1440 H

Time: 90 minutes

Name:	**Number:**	**Section:**

•Useful information:

Speed of light,	**$C = 3.0\times10^{8}$ m/s**
Planck's const.,	**$h = 6.626\times10^{-34}$ J.s**
Avogadro's No.,	**$N_{av} = 6.022\times10^{23}$ mol^{-1}**
Rydberg const. for H atom	**$R_H = 2.18\times10^{-18}$ J**
Mass of the electron,	**$m_e = 9.11\times10^{-31}$ kg**
Gas constant,	**$R = 0.082$ L atm K^{-1} mol^{-1}**

PERIODIC TABLE

Key: 12 C Carbon 6 — Relative atomic mass to nearest whole number; Symbol; Atomic number

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

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

Choose the correct answer

B-1 **You have 183 mL of a 0.41 M HCl solution and you want to dilute it to exactly 0.24 M. How much water should you add?**

a) 129.6 L b) 0.31 L c) 0.13L d) 312.6 L

B-2 **3.4 g of $MgSO_4$ is dissolved in 200 ml water the concentration of the resulting solution will be:**

a) $5.7x10^{3-}$ M b) 0.028 M c) $1.4x10^{4-}$ M d) 0.14 M

B-3 **The correct formula of a compound consists of N and Ca :**

a) Ca_3N_3 b) Ca_2N_3 c) Ca_3N_2 d) CaN

B-4 **Which of the following statement is the correct description for the compound in the above question (q3) ?**

a) A diatomic molecule containing atoms of different elements

b) A polyatomic molecule containing atoms of different elements.

c) A polyatomic molecule containing atoms of the same element.

d) A diatomic molecule containing atoms of the same element.

B-5 **The SI unit for mass is**

a) gram b) pound c) kilogram d) milligram

B-6 **Select the symbol that identifies the following species. Include the charge if the species is not neutral (8 protons, 8 neutrons, 10 electrons):**

a) S b) O c) Ne d) O^{2-}

B-7 An atom containing which one of the following is an isotope of nitrogen?

a) 7 protons and 6 neutrons
b) 5 protons and 8 neutrons
c) 8 protons and 5 neutrons
d) 6 protons and 7 neutrons

B-8 Pure gold coin can be classified as

a) Heterogenous mixture b) Homogenous mixture c) compound d) element

B-9 In the process of dissolving 1 g of sodium chloride in 100 ml of ethanol, the ethanol is referred to as the:

a) precipitate b) solution c) solute d) solvent

B-10 The correct name for VCl_3 is :

a) Vanadium (III) chloride b) Vanadium chloride c) Vanadium trichloride d) Vanadium (II) chloride

B-11 The systematic name for IF_5 is:

a) Iodine (V) fluoride b) Iodine pentafluoride c) Iodine fluoride d) monoiodine fluoride

B-12 The formula for sodium sulfate is:

a) $Na(SO_4)_2$ b) Na_2SO_3 c) Na_2SO_4 d) Na_2S

B-13 An element can change from one to another by changing the number of

a) Proton b) Electron c) Neutron d) atomic mass

B-14 An object with a mass of 1.2 g and density of 1.3g/ml was added to a beaker containing water, the water level raised to 120 ml calculate the volume of water was in the beaker before the addition of the object?

a) 120.9 ml b) 0.92 ml c) 119.01 ml d) 1.56 ml

B-15 $2.4x10^{3-}$ mm equal to 2.4 ___ ?

a) µm b) Mm c) Tm d) pm

B-16 Which of the following prefixes equal to 10^3 ?

a) mili b) kilo c) nano d) tera

B-17 Which pair of the following have the same empirical formula :

a) $C_{10}H_5O_{15}$, $C_{20}H_8O_{24}$ b) $C_{10}H_{15}O_5$, $C_{16}H_8O_{24}$

c) $C_{10}H_5O_{15}$, $C_{16}H_8O_{20}$ d) $C_{27}H_9O_9$, $C_9H_3O_3$

B-18 K_2O can be classified as

a) compound b) molecule c) mixture d) compound and molecule

B-19 An example of monatomic ion is

a) N_2 b) OH^{1-} c) O^{2-} d) C

B-20 How many moles of chlorine atoms are in 3×10^{22} chlorine molecules (Cl_2)?

a) $1.81x10^{46}$ mol b) $9.96x10^{2-}$ mol c) 218.6 mol d) $4.9x10^{2-}$ mol

B-21 What is the percent of phosphorus (P) in $Mg_3(PO_4)_2$?

a) 23.66 % b) 43.7 % c) 11.8 % d) 18.5 %

B-22 An analysis of unknown compound gives the following percentage: 13.5% C, 2.25% H, and 84.27% As, what is the empirical formula of the compound?

a) C_3HAs_2 b) C_2H_4As c) CH_2As d) C_2H_6As

B-23 What is the molecular formula for the compound in the above question (q22) if the molar mass of the unknown compound is 267 g/mole?

a) $C_6H_2As_4$ b) $C_4H_8As_2$ c) $C_3H_6As_3$ d) $C_2H_4As_2$

B-24 After balancing the following hypothetical reaction, the coefficient of C_2 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 prepared by the thermite process:

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

If 130 g of Al and 320 g of MnO_2 are mixed, which is the limiting reactant?

a) Al_2O_3 b) Mn c) MnO_2 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 $CaCl_2$ 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) $4.98x10^{23-}$ g b) $1.08x10^{22-}$ g c) 65 g d) $3.9\ x10^{25}$ g

B-30 The element (B) is classified as

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

B

above	اعلى	classify	صنف
According	وفقاً	Mixture	خليط
Anion	ايون سالب	molecules	جزيء
Calculate	احسب	molecular	جزيئيه
chemical identity	هويه كيميائيه	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
containing	يحتوي	Nonmetal	لا فلز
density	كثافه	process	عمليه
Derived units	وحدات مشتقه	graduated cylinder	مخبار مدرج
Determine	اوجد	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	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

A

King Abdulaziz University

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,	**$C = 3.0\times10^{8}$ m/s**
Planck's const.,	**$h = 6.626\times10^{-34}$ J.s**
Avogadro's No.,	**$N_{av} = 6.022\times10^{23}$ mol^{-1}**
Rydberg const. for H atom	**$R_H = 2.18\times10^{-18}$ J**
Mass of the electron,	**$m_e = 9.11\times10^{-31}$ kg**
Gas constant,	**$R = 0.082$ L atm K^{-1} mol^{-1}**

PERIODIC TABLE

Key: 12 C Carbon 6 — Relative atomic mass to nearest whole number; Symbol; Atomic number

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

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

A

Choose the correct answer

A-1 If the pressure of a gas sample is doubled and the absolute temperature is tripled, by what factor does the volume of the sample change?

a) 2 b) 1.5 c) 0.6 d) 3

A-2 If equal masses of $O_2(g)$ and HBr(g) are in separate containers of equal volume and temperature, which one of the following statements is *true*?

a) The pressure in the O_2 container is greater than that in the HBr container
b) The pressure in the HBr container is greater than that in the O_2 container.
c) The pressure in the HBr container could be greater or smaller than that in the O_2 container
d) The pressures of both gases are the same.

A-3 Consider the following chemical equation. If 25.0 mL of NO_2 gas is completely converted to N_2O_4 gas under the same conditions, what volume will the N_2O_4 occupy? $2NO_2(g) \rightarrow N_2O_4(g)$

a) 12.5 mL b) 37.5 mL c) 25 mL d) 50 mL

A-4 A gas sample containing 1.50 mol at 25 °C exerts a pressure of 400 torr. Some gas is added to the same container and the temperature is increased to 50 °C. If the pressure increases to 800 torr, how many moles of gas were added to the container? Assume a constant-volume container

a) 0.4 mol b) 2.77 mol c) 1.27 mol d) 4.27 mol

A-5 Consider the following reaction: It takes 2.00 L of pure oxygen gas at STP to react completely with a certain sample of aluminum. What is the mass of aluminum (Al) reacted? $4Al(s)+3O_2(g) \rightarrow 2Al_2O_3(s)$

a) 0.004 g b) 0.12 g c) 0.09 g d) 3.2 g

A-6 For a fixed amount of gas increasing the temperature will resulted in _____in volume at constant pressure

a) a diminish b) an increase c) a decrease d) no change

A-7 Calculate the molar mass of unknown gaseous compound with a density of 0.8 g/L at 35 °C and 684 mmHg ?

a) 33.9 g/mol b) 0.03 g/mol c) 2.6 g/mol d) 22.45 g/mol

A-8 Which one of the following statements is true concerning the atmospheric pressure in a mine that is 500 m below sea level (1 atm) ?

a) grater than 1 b) less than 1 c) equal to 1 d) 0

A-9 A mixture of gases contains 0.31 mol CH_4, 0.25 mol C_2H_6, and 0.29 mol C_3H_8. The total pressure is 1.50 atm. Calculate the partial pressures of CH_4.

a) 4.2 atm b) 0.24 atm c) 0.55 atm d) 0.36 atm

A-10 Name two elements that exist as gases at room temperature

a) Al and Ne b) N_2 and He c) O_2 and I_2 d) S and Na

A-11 Which one of the following is an allowable set of quantum numbers for an electron?

a) n=1, l=1, m_l= 1, m_s = ½ b) n=2, l=1, m_l= 2, m_s = ½

c) n=2, l=2, m_l= 1, m_s = -½ d) n=2, l=1, m_l= 0, m_s = -½

A-12 What is the energy in joules of a photons associated with visible light of wavelength 540 nm?

a) 1.07×10^{-31} J b) 3.68×10^{-28} J c) 3.68×10^{-19} J d) 3.58×10^{-40} J

A-13 An electron drops from energy level n=3, if you know that the emission associated with the electron drops is in Balmer series calculate the energy of the emission?

a) -3.03×10^{-19} J b) 3.03×10^{-19} J c) -1.94×10^{-18} J d) -2.42×10^{-19} J

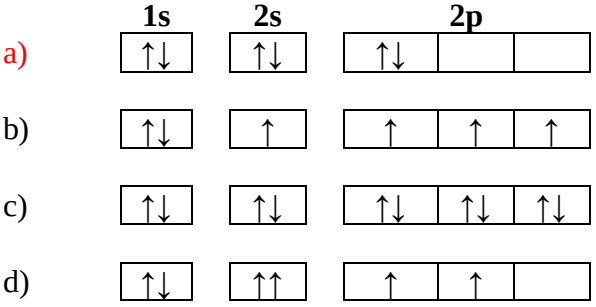
A-14 An FM radio station broadcasts at 99.5 MHz. Calculate the wavelength of the corresponding radio waves?

a) 3.32×10^{-7} m b) 29.9×10^{9} m c) 3.02×10^{6} m d) 3.02 m

A-15 Calculate the wavelength associated with tennis ball (55 g) traveling at 35 m/s?

a) 3.44×10^{-28} nm b) 3.44×10^{-25} nm c) 3.44×10^{-34} nm d) 3.44×10^{-40} nm

A-16 Which of the following electron configuration violate Hund's rule



A-17 Which of the following element has 2 unpaired electrons and is paramagnetic?

a) Mg b) Na c) Si d) B

A-18 What is the maximum number of suborbital that can have the following quantum numbers: $n=3$, $m_s=+1/2$

a) 7 b) 9 c) 4 d) 5

A-19 The electron configuration of a ground-state Al atom is

a) $[Ar]4s^2\,4p^1$ b) $[Ne]2s^2\,2p^1$ c) $[Ar]3s^2\,3p^1$ d) $[Ne]3s^2\,3p^1$

A-20 How many electrons in a ground-state calcium (Ca) atom are in orbitals labeled by $m_l = -1$?

a) 4 b) 2 c) 3 d) 5

A-21 Where would the element with the following electron configuration located in the periodic table, $[Ar]4s^2 3d^{10} 4p^3$?

a) group 3A , period 4 b) group 5A , period 3 c) group 4A , period 5 d) group 5A , period 4

A-22 Pick out the correct statement from the following:

a) Alkali metals have the lowest ionization energy
b) Alkali earth metals have the lowest ionization energy
c) Halogens have the lowest ionization energy
d) Inert gases have the lowest ionization energy.

A-23 Arrange these ions in order of increasing ionic radius: K^+, P^{3-}, S^{2-}, Cl^{-1}.

Increasing radius →

Row 1 $Cl^{-1} < S^{2-} < P^{3-} < K^+$
Row 2 $P^{3-} < S^{2-} < Cl^{1-} < K^+$
Row 3 $K^+ < Cl^{-1} < S^{2-} < P^{3-}$
Row 4 $K^+ < P^{-3} < S^{2-} < Cl^{-1}$

a) Row 2 b) Row 3 c) Row 1 d) Row 4

A-24 Which of the following elements has the highest electron affinity?

a) Na b) Ar c) S d) Al

A-25 Ar is *not* isoelectronic with

a) S^{-2} b) Na^{+1} c) K^+ d) Cl^{-1}

A-26 An example of polar covalent bond is

a) H-Cl b) F-F c) Li-O d) Na-N

A-27 The correct Lewis symbol for an element containing 4 electrons is

a)  b)  c)  d) 

A-28 Calculate the total valance electrons for NO_3^{-1} ?

a) 22 b) 11 c) 23 d) 24

A-29 The formal charge on the central nitrogen in NO_3^{-1} is equal to

a) +5 b) -1 c) +1 d) 0

A-30 Which of the following when acting as central atom could deviate from octet rule?

a) N b) O c) C d) Al

A

Absorb	يمتص	largest	اكبر
acceptable	مقبول	least	اقل
according	وفقا	List	اوجد
amount	كميه	lone pair	ازواج حره
around	حول	lowest	الأقل
as part of	كجزء من	mixture	خليط
attraction	جذب	molar mass	الكتلة المولية
broadcasts	يبث	molecules	جزيئات
boils	يغلي	multiplying	يتضاعف
certain	محدد	one-third	ثلث
classified	يصنف	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	ضغط جزئي
covalent	تساهمي	ping-pong ball	كرة تنس طاوله
density	كثافه	possible	ممكن
determined	إيجاد	process	عمليه
diamagnetic	ثنائي المغناطيسية	quantum number	اعداد كم
diminish	علاقة طرديه	raise	يرفع
corresponding	المصاحب	relationship	علاقة
During	خلال	remains	يبقى
electron configuration	توزيع الكتروني	represent	يمثل
electronegativity	سالبيه كهربائية	representative elements	عناصر ممثله
Emission	انبعاث	resonance structures	اشكال رنين
emit	يبعث	respectively	على التوالي
assume	افترض	sample	عينه
Energy	طاقة	sets	مجموعات
Fixed quantity	كمية ثابتة	smallest	أصغر
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	exerts	بذل
Highest	اعلى	transitions	انتقاله
holding	تحمل	allowable	مسموح
Ideal gas	غاز مثالي	unpaired	مفرد
separate	منفصل	valid	صالح
Indicate	اوجد	velocity	سرعه
initially	بداية	vessel	وعاء
mine	منجم	violate	يخالف
isoelectronic	نظير الالكتروني	volume	حجم
kept	حافظ	wavelength	طول موجي

B

King Abdulaziz University

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,	$C = 3.0\times10^{8}$ m/s
Planck's const.,	$h = 6.626\times10^{-34}$ J.s
Avogadro's No.,	$N_{av} = 6.022\times10^{23}$ mol^{-1}
Rydberg const. for H atom	$R_H = 2.18\times10^{-18}$ J
Mass of the electron,	$m_e = 9.11\times10^{-31}$ kg
Gas constant,	$R = 0.082$ L atm K^{-1} mol^{-1}

PERIODIC TABLE

Key: 12 C Carbon 6 — 12 = Relative atomic mass to nearest whole number; C = Symbol; 6 = Atomic number

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

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

B

Choose the correct answer

B-1 **Consider the following reaction: It takes 4.00 L of pure oxygen gas at STP to react completely with a certain sample of aluminum. What is the mass of aluminum (Al) reacted? $4Al(s)+3O_2(g) \rightarrow 2Al_2O_3(s)$**

a) 6.4 g b) 0.009 g c) 0.24 g d) 0.18 g

B-2 **For a fixed amount of gas decreasing the temperature will resulted in _____in volume at constant pressure**

a) multiplying b) an increase c) a decrease d) no change

B-3 **Calculate the molar mass of unknown gaseous compound with a density of 0.8 g/L at 25 °C and 862 mmHg ?**

a) 0.02 g/mol b) 44.1 g/mol c) 17.2 g/mol d) 1.4 g/mol

B-4 **Which one of the following statements is true concerning the atmospheric pressure in a mine that is 600 m below sea level (1 atm) ?**

a) grater than 1 b) less than 1 c) equal to 1 d) 0

B-5 **A mixture of gases contains 0.31 mol CH_4, 0.25 mol C_2H_6, and 0.29 mol C_3H_8. The total pressure is 1.50 atm. Calculate the partial pressures of C_3H_8.**

a) 0.51 atm b) 0.78 atm c) 0.34 atm d) 2.9 atm

B-6 **Name two elements that exist as gases at room temperature**

a) Mg and As b) F_2 and Si c) P and Ar d) H_2 and Xe

B-7 **Which one of the following is an allowable set of quantum numbers for an electron?**

a) n=3, l=2, m_l = 3, m_s = ½ b) n=1, l=1, m_l = 2, m_s = ½

c) n=4, l=2, m_l = 1, m_s = -½ d) n=2, l=1, m_l = 0, m_s = 1

B-8 **What is the energy in joules of a photons associated with visible light of wavelength 450 nm?**

a) 4.4×10^{-19} J b) 4.4×10^{-28} J c) 2.99×10^{-40} J d) 8.9×10^{-32} J

B-9 **An electron drops from energy level n=5, if you know that the emission associated with the electron drops is in Paschen series calculate the energy of the emission?**

a) 1.55×10^{-19} J b) -2.09×10^{-18} J c) -1.55×10^{-19} J d) -8.7×10^{-20} J

B-10 **An FM radio station broadcasts at 73.2 MHz. Calculate the wavelength of the corresponding radio waves?**

a) 0.24 m b) 4.1 m c) 2.2×10^{16} m d) 4.1×10^{6} m

B-11 **Calculate the wavelength associated with tennis ball (50 g) traveling at 40 m/s?**

a) 3.3×10^{-40} nm b) 3.3×10^{-34} nm c) 3.3×10^{-28} nm d) 3.3×10^{-25} nm

B-12 Kr is *not* isoelectronic with

a) K^+ b) Br^{-1} c) As^{-3} d) Sr^{+2}

B-13 An example of polar covalent bond is

a) Cl-Cl b) H-F c) Li-Br d) K-I

B-14 The correct Lewis symbol for an element containing 7 electrons is

a)  b)  c)  d) 

B-15 Calculate the total valance electrons for CO_3^{-2} ?

a) 20 b) 10 c) 24 d) 22

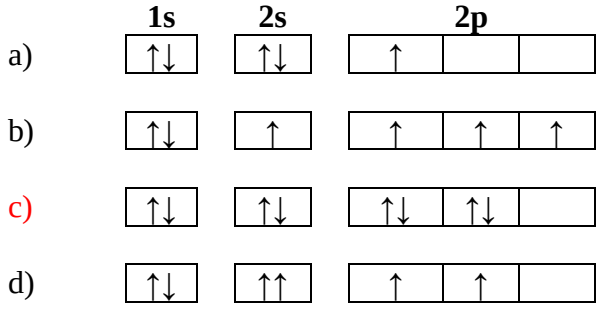
B-16 The formal charge on the central carbon in CO_3^{-2} is equal to

a) -2 b) 0 c) +4 d) -1

B-17 Which of the following when acting as central atom could not expand it octet ?

a) Br b) Cl c) B d) Si

B-18 Which of the following electron configuration violate Hund's rule



B-19 Which of the following element has 3 unpaired electrons and is paramagnetic?

a) N b) Li c) O d) B

B-20 What is the maximum number of suborbital that can have the following quantum numbers: n=4, m_s=+1/2

a) 8 b) 7 c) 4 d) 16

B-21 The electron configuration of a ground-state P atom is

a) $[Ne]2s^2\,2p^3$ b) $[Ne]3s^2\,3p^3$ c) $[Ar]3s^2\,3p^3$ d) $[Ar]4s^2\,4p^3$

B-22 How many electrons in a ground-state calcium (Ca) atom are in orbitals labeled by $m_l = 0$?

a) 8 b) 2 c) 20 d) 12

B-23 Where would the element with the following electron configuration located in the periodic table [Ar]$4s^2 3d^{10} 4p^5$?

a) group 7A , period 4 b) group 5A , period 4 c) group 4A , period 7 d) group 7A , period 5

B-24 Pick out the correct statement from the following:

a) Alkali metals have the highest electron affinity
b) Alkali earth metals have the highest electron affinity
c) Halogens have the highest electron affinity
d) Inert gases have the highest electron affinity.

B-25 Arrange these ions in order of increasing ionic radius: O^{-2}, Al^{+3}, Na^+, Mg^{+2}.

Increasing radius →

Row 1 $Al^{+3} < Mg^{+2} < Na^+ < O^{-2}$
Row 2 $Na^+ < Mg^{+2} < Al^{+3} < O^{-2}$
Row 3 $O^{-2} < Na^+ < Mg^{+2} < Al^{+3}$
Row 4 $O^{-2} < Al^{+3} < Mg^{+2} < Na^+$

a) Row 2 b) Row 3 c) Row 1 d) Row 4

B-26 Which of the following elements has the highest electron affinity?

a) Cs b) Rb c) K d) Li

B-27 If the pressure of a gas sample is quadrupled and the absolute temperature is doubled, by what factor does the volume of the sample change?

a) 0.5 b) 6 c) 4 d) 2

B-28 If equal masses of $O_2(g)$ and HBr(g) are in separate containers of equal volume and temperature, which one of the following statements is *true*?

a) The pressure in the O_2 container is less than that in the HBr container
b) The pressures of both gases are the same.
c) The pressure in the HBr container could be greater or smaller than that in the O_2 container
d) The pressure in the HBr container is less than that in the O_2 container

B-29 Consider the following chemical equation. If 30.0 mL of NO_2 gas is completely converted to N_2O_4 gas under the same conditions, what volume will the N_2O_4 occupy? $2NO_2(g) \rightarrow N_2O_4(g)$

a) 45 mL b) 15 mL c) 60 mL d) 30 mL

B-30 A gas sample containing 1.50 mol at 25 °C exerts a pressure of 400 torr. Some gas is added to the same container and the temperature is increased to 50 °C. If the pressure increases to 750 torr, how many moles of gas were added to the container? Assume a constant-volume container

a) 4.1 mol b) 0.39 mol c) 2.6 mol d) 1.1 mol

B

Absorb	يمتص	largest	اكبر
acceptable	مقبول	least	اقل
according	وفقا	List	اوجد
amount	كميه	lone pair	ازواج حره
around	حول	lowest	الأقل
as part of	كجزء من	mixture	خليط
attraction	جذب	molar mass	الكتلة المولية
broadcasts	يبث	molecules	جزيئات
boils	يغلي	multiplying	يتضاعف
certain	محدد	one-third	ثلث
classified	يصنف	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	ضغط جزئي
covalent	تساهمي	ping-pong ball	كرة تنس طاوله
density	كثافه	possible	ممكن
determined	إيجاد	process	عمليه
diamagnetic	ثنائي المغناطيسية	quantum number	اعداد كم
diminish	علاقة طرديه	raise	يرفع
corresponding	المصاحب	relationship	علاقة
During	خلال	remains	يبقى
electron configuration	توزيع الكتروني	represent	يمثل
electronegativity	سالبيه كهربائية	representative elements	عناصر ممثله
Emission	انبعاث	resonance structures	اشكال رنين
emit	يبعث	respectively	على التوالي
assume	افترض	sample	عينه
Energy	طاقة	sets	مجموعات
Fixed quantity	كمية ثابتة	smallest	أصغر
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	exerts	بذل
Highest	اعلى	transitions	انتقاله
holding	تحمل	allowable	مسموح
Ideal gas	غاز مثالي	unpaired	مفرد
separate	منفصل	valid	صالح
Indicate	اوجد	velocity	سرعه
initially	بداية	vessel	وعاء
mine	منجم	violate	يخالف
isoelectronic	نظير الالكتروني	volume	حجم
kept	حافظ	wavelength	طول موجي

C

King Abdulaziz University

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,	$C = 3.0\times10^{8}$ m/s
Planck's const.,	$h = 6.626\times10^{-34}$ J.s
Avogadro's No.,	$N_{av} = 6.022\times10^{23}$ mol^{-1}
Rydberg const. for H atom	$R_H = 2.18\times10^{-18}$ J
Mass of the electron,	$m_e = 9.11\times10^{-31}$ kg
Gas constant,	$R = 0.082$ L atm K^{-1} mol^{-1}

PERIODIC TABLE

Key: 12 C Carbon 6 — Relative atomic mass to nearest whole number; Symbol; Atomic number

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

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

Choose the correct answer

C-1 An FM radio station broadcasts at 87.5 MHz. Calculate the wavelength of the corresponding radio waves?

a) 29.2 x 10^{-2} m b) 2.6 x 10^{16} m c) 3.4 m d) 3.4x10^{6} m

C-2 Calculate the wavelength associated with tennis ball (55 g) traveling at 45 m/s?

a) 2.7 x 10^{-25} nm b) 2.7x10^{-34} nm c) 2.7 x 10^{-37} nm d) 2.7 x 10^{-31} nm

C-3 Which of the following electron configuration violate Pauli exclusion principle

	1s	2s	2p		
a)	↑↓	↑↓	↑↓		
b)	↑↓	↑	↑	↑	↑
c)	↑↓	↑↓	↑↓	↑↓	↑↓
d)	↑↓	↑↑	↑	↑	

C-4 Which of the following element has 1 unpaired electrons and is paramagnetic?

a) Mg b) Na c) Si d) Be

C-5 If the pressure of a gas sample is tripled and the absolute temperature is doubled, by what factor does the volume of the sample change?

a) 2 b) 1.5 c) 0.67 d) 3

C-6 Name two elements that exist as gases at room temperature

a) F_2 and Ar b) N_2 and Li c) H_2 and Br_2 d) C and B

C-7 Which one of the following is an allowable set of quantum numbers for an electron?

a) n=2, l=2, m_l = 1, m_s = ½ b) n=3, l=2, m_l = 2, m_s = ½

c) n=1, l=2, m_l = 1, m_s = -½ d) n=2, l=1, m_l = 3, m_s = -½

C-8 What is the energy in joules of a photons associated with visible light of wavelength 580 nm?

a) 1.15 x 10^{-31} J b) 3.43 x 10^{-19} J c) 3.84 x 10^{-40} J d) 3.43 x 10^{-28} J

C-9 An electron drops from energy level n=3, if you know that the emission associated with the electron drops is in lyman series calculate the energy of the emission?

a) -3.03x10^{-19} J b) -2.42x10^{-19} J c) 1.94x10^{-18} J d) -1.94x10^{-18} J

C-10 The correct Lewis symbol for an element containing 5 electrons is

a)  b)  c)  d) 

C-11 Calculate the total valance electrons for NO_2^{-1} ?

a) 17 b) 18 c) 11 d) 19

C-12 The formal charge on the central nitrogen in NO_2^{-1} is equal to

a) +5 b) -1 c) +1 d) 0

C-13 Which of the following when acting as central atom could deviate from octet rule?

a) P b) C c) F d) Ne

C-14 Consider the following reaction: It takes 3.00 L of pure oxygen gas at STP to react completely with a certain sample of aluminum. What is the mass of aluminum (Al) reacted? $4Al(s)+3O_2(g) \rightarrow 2Al_2O_3(s)$

a) 0.007 g b) 0.13 g c) 4.8 g d) 0.18 g

C-15 For a fixed amount of gas increasing the pressure will resulted in _____in volume at constant temperature

a) multiplying b) an increase c) a decrease d) no change

C-16 Calculate the molar mass of unknown gaseous compound with a density of 0.8 g/L at 45 °C and 589 mmHg ?

a) 28.2 g/mol b) 26.9 g/mol c) 0.035 g/mol d) 3.8 g/mol

C-17 Pick out the correct statement from the following:

a) Alkali metals have the highest ionization energy
b) Alkali earth metals have the highest ionization energy
c) Halogens have the highest ionization energy
d) Inert gases have the highest ionization energy.

C-18 Arrange these ions in order of increasing ionic radius: O^{-2}, Na^{+}, N^{3-}, F^{-1}.

	Increasing radius →
Row 1	$N^{-3} < O^{2-} < F^{-1} < Na^{+}$
Row 2	$Na^{+} < F^{-1} < O^{-2} < N^{-3}$
Row 3	$Na^{+} < N^{-3} < O^{-2} < F^{-1}$
Row 4	$F^{-1} < O^{-2} < N^{-3} < Na^{+}$

a) Row 2 b) Row 3 c) Row 1 d) Row 4

C-19 Which one of the following statements is true concerning the atmospheric pressure in a mine that is 400 m below sea level (1 atm) ?

a) grater than 1 b) less than 1 c) equal to 1 d) 0

C-20 What is the maximum number of suborbital that can have the following quantum numbers: n=2, m_s=-1/2

a) 7 b) 9 c) 4 d) 5

C-21 The electron configuration of a ground-state Si atom is

a) [Ne]$3s^2$ $3p^2$ b) [Ar]$3s^2$ $3p^2$ c) [Ne]$2s^2$ $2p^2$ d) [Ar]$4s^2$ $4p^2$

C-22 How many electrons in a ground-state potassium (K) atom are in orbitals labeled by $m_l = +1$?

a) 2 b) 3 c) 4 d) 5

C-23 Where would the element with the following electron configuration located in the periodic table, [Kr]$5s^2 3d^{10} 5p^2$?

a) group 2A , period 5 b) group 5A , period 3 c) group 4A , period 5 d) group 5A , period 4

C-24 If equal masses of F_2(g) and H_2(g) are in separate containers of equal volume and temperature, which one of the following statements is *true*?

a) The pressure in the F_2 container is greater than that in the H_2 container
b) The pressure in the H_2 container is greater than that in the F_2 container.
c) The pressure in the H_2 container could be greater or smaller than that in the F_2 container
d) The pressures of both gases are the same.

C-25 Consider the following chemical equation. If 20.0 mL of NO_2 gas is completely converted to N_2O_4 gas under the same conditions, what volume will the N_2O_4 occupy? $2NO_2(g) \rightarrow N_2O_4(g)$

a) 30 mL b) 20 mL c) 40 mL d) 10 mL

C-26 A gas sample containing 1.50 mol at 25 °C exerts a pressure of 300 torr. Some gas is added to the same container and the temperature is increased to 50 °C. If the pressure increases to 800 torr, how many moles of gas were added to the container? Assume a constant-volume container

a) 2.19 mol b) 5.19 mol c) 3.69 mol d) 0.27 mol

C-27 A mixture of gases contains 0.31 mol CH_4, 0.25 mol C_2H_6, and 0.29 mol C_3H_8. The total pressure is 1.50 atm. Calculate the partial pressures of C_2H_6.

a) 5.17 atm b) 0.19 atm c) 0.29 atm d) 0.44 atm

C-28 Which of the following elements has the highest electron affinity?

a) Ge b) Se c) Ca d) Kr

C-29 Ar is *not* isoelectronic with

a) Cl^{-1} b) Ca^{+2} c) P^{-3} d) Mg^{+2}

C-30 An example of polar covalent bond is

a) Mg-S b) K-F c) H-O d) Br-Br

C

Absorb	يمتص	largest	اكبر
acceptable	مقبول	least	اقل
according	وفقا	List	اوجد
amount	كميه	lone pair	ازواج حره
around	حول	lowest	الأقل
as part of	كجزء من	mixture	خليط
attraction	جذب	molar mass	الكتلة المولية
broadcasts	يبث	molecules	جزيئات
boils	يغلي	multiplying	يتضاعف
certain	محدد	one-third	ثلث
classified	يصنف	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	ضغط جزئي
covalent	تساهمي	ping-pong ball	كرة تنس طاوله
density	كثافه	possible	ممكن
determined	إيجاد	process	عمليه
diamagnetic	ثنائي المغناطيسية	quantum number	اعداد كم
diminish	علاقة طرديه	raise	يرفع
corresponding	المصاحب	relationship	علاقة
During	خلال	remains	يبقى
electron configuration	توزيع الكتروني	represent	يمثل
electronegativity	سالبيه كهربائية	representative elements	عناصر ممثله
Emission	انبعاث	resonance structures	اشكال رنين
emit	يبعث	respectively	على التوالي
assume	افترض	sample	عينه
Energy	طاقة	sets	مجموعات
Fixed quantity	كمية ثابتة	smallest	أصغر
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	exerts	بذل
Highest	اعلى	transitions	انتقاله
holding	تحمل	allowable	مسموح
Ideal gas	غاز مثالي	unpaired	مفرد
separate	منفصل	valid	صالح
Indicate	اوجد	velocity	سرعه
initially	بداية	vessel	وعاء
mine	منجم	violate	يخالف
isoelectronic	نظير الالكتروني	volume	حجم
kept	حافظ	wavelength	طول موجي

c

D

King Abdulaziz University

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,	$C = 3.0\times10^{8}$ m/s
Planck's const.,	$h = 6.626\times10^{-34}$ J.s
Avogadro's No.,	$N_{av} = 6.022\times10^{23}$ mol^{-1}
Rydberg const. for H atom	$R_H = 2.18\times10^{-18}$ J
Mass of the electron,	$m_e = 9.11\times10^{-31}$ kg
Gas constant,	$R = 0.082$ L atm K^{-1} mol^{-1}

PERIODIC TABLE

Key: 12 C Carbon 6 — Relative atomic mass to nearest whole number; Symbol; Atomic number

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

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

Choose the correct answer

D-1 **Consider the following reaction: It takes 5.00 L of pure oxygen gas at STP to react completely with a certain sample of aluminum. What is the mass of aluminum (Al) reacted? $4Al(s)+3O_2(g) \rightarrow 2Al_2O_3(s)$**

a) 0.29 g b) 8.04 g c) 0.01 g d) 0.22 g

D-2 **For a fixed amount of gas decreasing the pressure will resulted in _____in volume at constant temperature**

a) a diminish b) an increase c) a decrease d) no change

D-3 **Calculate the molar mass of unknown gaseous compound with a density of 0.8 g/L at 25 °C and 492 mmHg ?**

a) 30.2 g/mol b) 2.5 g/mol c) 0.04 g/mol d) 25.2 g/mol

D-4 **Which one of the following statements is true concerning the atmospheric pressure in a mine that is 700 m below sea level (1 atm) ?**

a) grater than 1 b) less than 1 c) equal to 1 d) 0

D-5 **A mixture of gases contains 0.31 mol CH_4, 0.25 mol C_2H_6, and 0.29 mol C_3H_8. The total pressure is 2.00 atm. Calculate the partial pressures of C_2H_6.**

a) 0.59 atm b) 0.29 atm c) 0.145 atm d) 6.9 atm

D-6 **Which of the following elements has the highest electron affinity?**

a) B b) In c) Al d) Ga

D-7 **Kr is *not* isoelectronic with**

a) Rb^{+} b) Se^{-2} c) Ca^{+2} d) Br^{-1}

D-8 **An example of polar covalent bond is**

a) Ca-Cl b) Li-O c) I-I d) H-Br

D-9 **The correct Lewis symbol for an element containing 6 electrons is**

a)  b)  c)  d) 

D-10 **Calculate the total valance electrons for PO_3^{-3} ?**

a) 26 b) 23 c) 20 d) 11

D-11 **The formal charge on the central phosphorus in PO_3^{-3} is equal to**

a) 0 b) -3 c) -1 d) +5

D-12 Which of the following when acting as central atom could not expand it octet?

a) I b) N c) P d) S

D-13 Name two elements 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 allowable set of quantum numbers for an electron?

a) n=3, l=2, m_l = 0, m_s = ½
b) n=1, l=1, m_l = 2, m_s = ½
c) n=4, l=5, m_l = 1, m_s = -½
d) n=2, l=1, m_l = 0, m_s = 1

D-15 What is the energy in joules of a photons associated with visible light of wavelength 400 nm?

a) 7.9×10^{-32} J b) 2.6×10^{-40} J c) 4.9×10^{-28} J d) 4.9×10^{-19} J

D-16 An electron drops from energy level n=5, if you know that the emission associated with the electron drops is in Brackett series calculate the energy of the emission?

a) -8.7×10^{-20} J b) -4.9×10^{-20} J c) -2.09×10^{-18} J d) 4.9×10^{-20} J

D-17 An FM radio station broadcasts at 68.5 MHz. Calculate the wavelength of the corresponding radio waves?

a) 4.4 m b) 2.1×10^{16} m c) 4.4×10^{6} m d) 0.23 m

D-18 Calculate the wavelength associated with tennis ball (45 g) traveling at 60 m/s?

a) 2.5×10^{-34} nm b) 2.5×10^{-28} nm c) 2.5×10^{-25} nm d) 2.5×10^{-31} nm

D-19 If the pressure of a gas sample is doubled and the absolute temperature is quadrupled, by what factor does the volume of the sample change?

a) 0.5 b) 6 c) 4 d) 2

D-20 If equal masses of $F_2(g)$ and $H_2(g)$ are in separate containers of equal volume and temperature, which one of the following statements is *true*?

a) The pressures of both gases are the same
b) The pressure in the H_2 container could be greater or smaller than that in the F_2 container
c) The pressure in the F_2 container is less than that in the H_2 container
d) The pressure in the H_2 container is less than that in the F_2 container

D-21 Consider the following chemical equation. If 35.0 mL of NO_2 gas is completely converted to N_2O_4 gas under the same conditions, what volume will the N_2O_4 occupy? $2NO_2(g) \rightarrow N_2O_4(g)$

a) 35 mL b) 52.5 mL c) 17.5 mL d) 70 mL

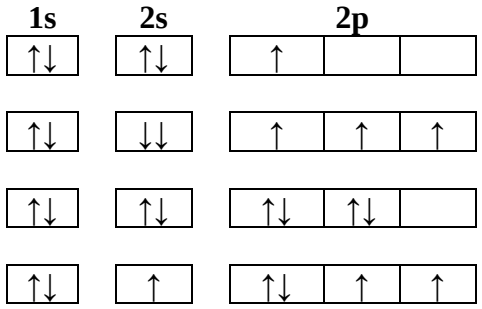
D-22 What is the maximum number of suborbital that can have the following quantum numbers: n=5, m_s=+1/2

a) 25 b) 5 c) 12 d) 2

D-23 A gas sample containing 2.50 mol at 25 °C exerts a pressure of 250 torr. Some gas is added to the same container and the temperature is increased to 50 °C. If the pressure increases to 750 torr, how many moles of gas were added to the container? Assume a constant-volume container

a) 0.14 mol b) 4.4 mol c) 6.9 mol d) 9.4 mol

D-24 Which of the following electron configuration violate Pauli exclusion principle



D-25 Which of the following element has 0 unpaired electrons and is diamagnetic?

a) Al b) K c) F d) Ca

D-26 The electron configuration of a ground-state S atom is

a) $[Ne]2s^2\,2p^4$ b) $[Ar]3s^2\,3p^4$ c) $[Ne]3s^2\,3p^4$ d) $[Ar]4s^2\,4p^4$

D-27 How many electrons in a ground-state potassium (K) atom are in orbitals labeled by $m_l = 0$?

a) 7 b) 11 c) 2 d) 19

D-28 Where would the element with the following electron configuration located in the periodic table $[Ar]4s^2 3d^{10} 4p^4$?

a) group 4A , period 6 b) group 6A , period 4 c) group 4A , period 4 d) group 6A , period 7

D-29 Pick out the correct statement from the following:

a) Halogens have the lowest electron affinity
b) Inert gases have the lowest electron affinity
c) Alkali metals have the lowest electron affinity
d) Alkali earth metals have the lowest electron affinity

D-30 Arrange these ions in order of increasing ionic radius: Ca^{+2}, Ga^{+3}, S^{-2}, K^{+}.

Increasing radius →

Row 1 $S^{-2} < Ga^{+3} < Ca^{+2} < K^{+}$
Row 2 $S^{-2} < K^{+} < Ca^{+2} < Ga^{+3}$
Row 3 $K^{+} < Ca^{+2} < Ga^{+3} < S^{-2}$
Row 4 $Ga^{+3} < Ca^{+2} < K^{+} < S^{-2}$

a) Row 2 b) Row 3 c) Row 1 d) Row 4

D

Absorb	يمتص	largest	اكبر
acceptable	مقبول	least	اقل
according	وفقا	List	اوجد
amount	كميه	lone pair	ازواج حره
around	حول	lowest	الأقل
as part of	كجزء من	mixture	خليط
attraction	جذب	molar mass	الكتلة المولية
broadcasts	يبث	molecules	جزيئات
boils	يغلي	multiplying	يتضاعف
certain	محدد	one-third	ثلث
classified	يصنف	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	ضغط جزئي
covalent	تساهمي	ping-pong ball	كرة تنس طاوله
density	كثافه	possible	ممكن
determined	إيجاد	process	عمليه
diamagnetic	ثنائي المغناطيسية	quantum number	اعداد كم
diminish	علاقة طرديه	raise	يرفع
corresponding	المصاحب	relationship	علاقة
During	خلال	remains	يبقى
electron configuration	توزيع الكتروني	represent	يمثل
electronegativity	سالبيه كهربائية	representative elements	عناصر ممثله
Emission	انبعاث	resonance structures	اشكال رنين
emit	يبعث	respectively	على التوالي
assume	افترض	sample	عينه
Energy	طاقة	sets	مجموعات
Fixed quantity	كمية ثابتة	smallest	أصغر
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	exerts	بذل
Highest	اعلى	transitions	انتقاله
holding	تحمل	allowable	مسموح
Ideal gas	غاز مثالي	unpaired	مفرد
separate	منفصل	valid	صالح
Indicate	اوجد	velocity	سرعه
initially	بداية	vessel	وعاء
mine	منجم	violate	يخالف
isoelectronic	نظير الالكتروني	volume	حجم
kept	حافظ	wavelength	طول موجي