A+ Academy – Online Teaching

كيمياء تحضيري جامعة القدس (أبو ديس)

Topic: Pre Chemistry

Instructor:AmmarTelfah

Chapter (4) – Part (2)

WhatsApp & Telegram (00962787124146)

تنويه:

- الأكاديمية تقدم دورات تقوية خاصة، لطلبة الجامعات المختلفة مثل جامعة العلوم والتكنولوجيا والجامعة الأردنية داخل الأردن، وجامعات القدس والنجاح والأمريكية بالضفة الغربية وأي جامعة أخرى جاهزين لتدريس طلبتها.
- الدورات تشمل العديد من المساقات مثل: [الكيمياء العامة والعضوية والتحليلية و الحيوية والبيولوجيا والفيزياء والرياضيات والإحصاء ومواد الطب والصيدلة].
- وبالتالي يا ريت توصل للمهتمين من معارفك واقاربك والدارسين لهذه المواد والذين يجدون صعوبة فيها وبحبوا يلتحقوا بدوراتنا يتواصلوا مع الأستاذ على الواتس اب أو التلغرام.
- طبعا أي دورة تعطى بناء على الخطة المتبعة بهذه الجامعة، ويوجد دروس تجريبية لكل الدورات [عشان الطالب يوخذ فكرة عن آلية التدريس والمدرس قبل ما يدفع ويسجل].
- الأكاديمية توفر ايضاً خدمة القبول وتسجيل الطلبة داخل الجامعات الأردنية.

تابعنا على الإنستغرام

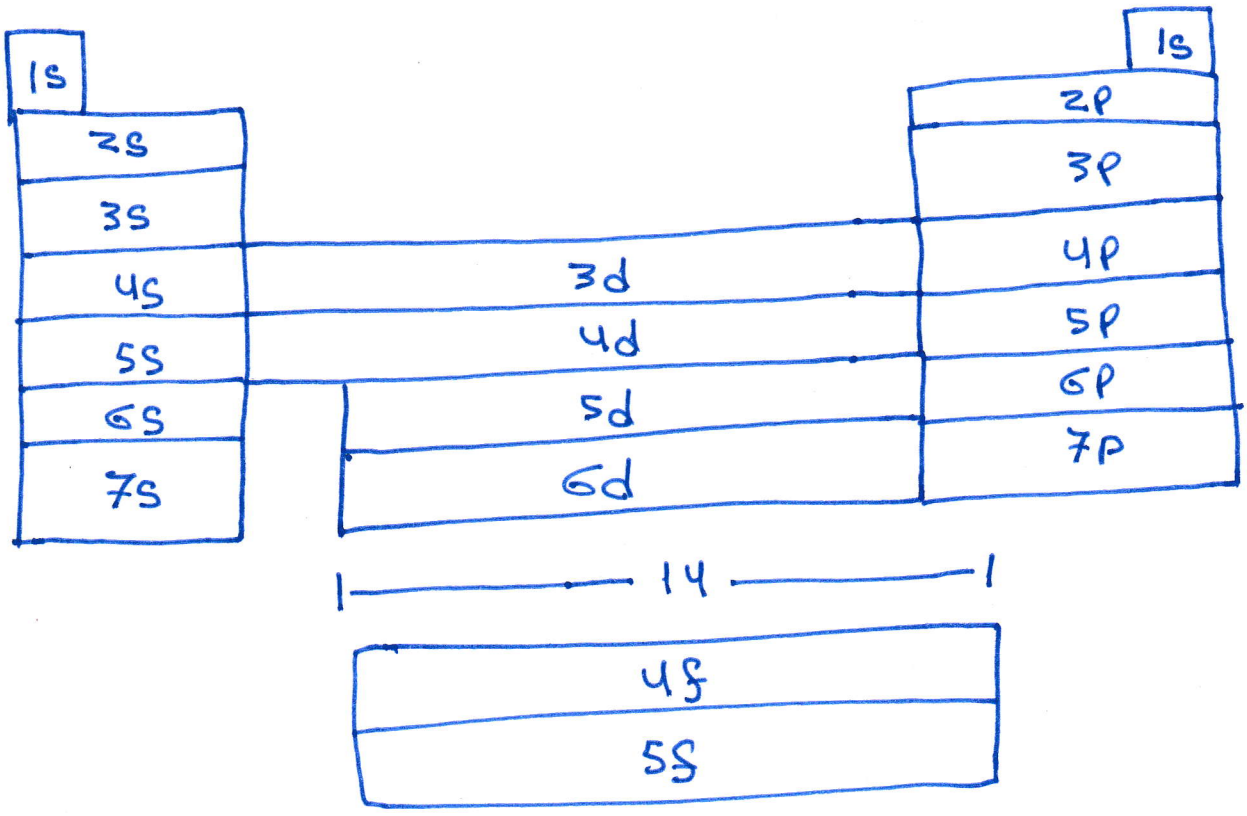
للإستفسار: التواصل مع الإدارة تلغرام او واتساب (00962787124146)

Electron configuration and the periodic table

* The periodic table can be divided into 4-Blocks

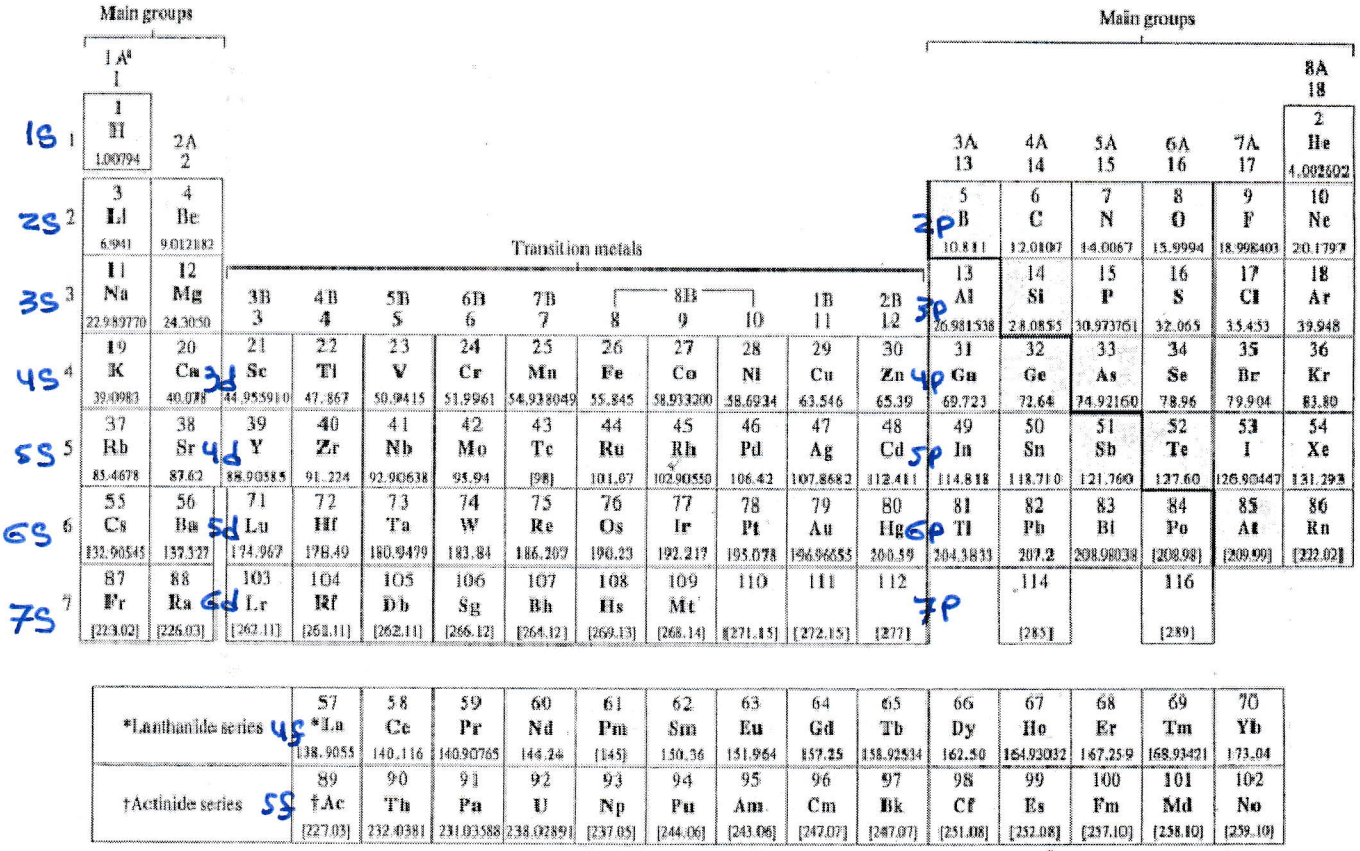
1	2	3	4
S-Block	P-Block	d-Block	f-Block
- 2 e's	- 6-e's	- 10 e's	- 14 e's
- 2-columns	- 6-columns	- 10 columns	- 14-columns
[1A+2A+He]	[3A-8A]	[1B-8B]	[series]
2	10	6	14

*



* ترتيب الاقلاك في هذه الطريقه بالجدول تشير الى قيمة اقلك الذي ستنتهي عنده الكترونات الاقلاك غير لكل ذرة حسب موقعها بالجدول الدوري

* ترتيب الأقلاك بهذه الطريقه يسهل علينا التوزيع الإلكتروني حسب القاعده الأولى من خلال متابعة الأقلاك بشكل أفقي ثم عمودي



Ex(1): Write the electronic configuration for the following?

1) O :

2) Si:

3) Co:

4) Zr:

5) Ba:

6) Pt:

Note(1): shorthand electronic configuration.

X^{16} : $1s^2/2s^2 2p^6/3s^2 3p^4$: $[Ne]\,3s^2 3p^4$

inner outer

Note(2): Determinains the nature of atom:

	Valence e⁻s	nature of element
1)	s, p	Main groups (A)
2)	d	Transition groups (B)
3)	f	inner transition groups.

Note(3): Determinains of groups and periods:

	Valence e⁻s	# Period	# group
1)	ns^a	n	a (A)
2)	$ns^a np^b$	n	a+b (A)
3)	$ns^a (n-1)d^b$	n	a+b (B)
4)	$ns^a (n-1)d^b np^c$	n	a+c (A)

Note(3): Elements in the same groups have same properties.

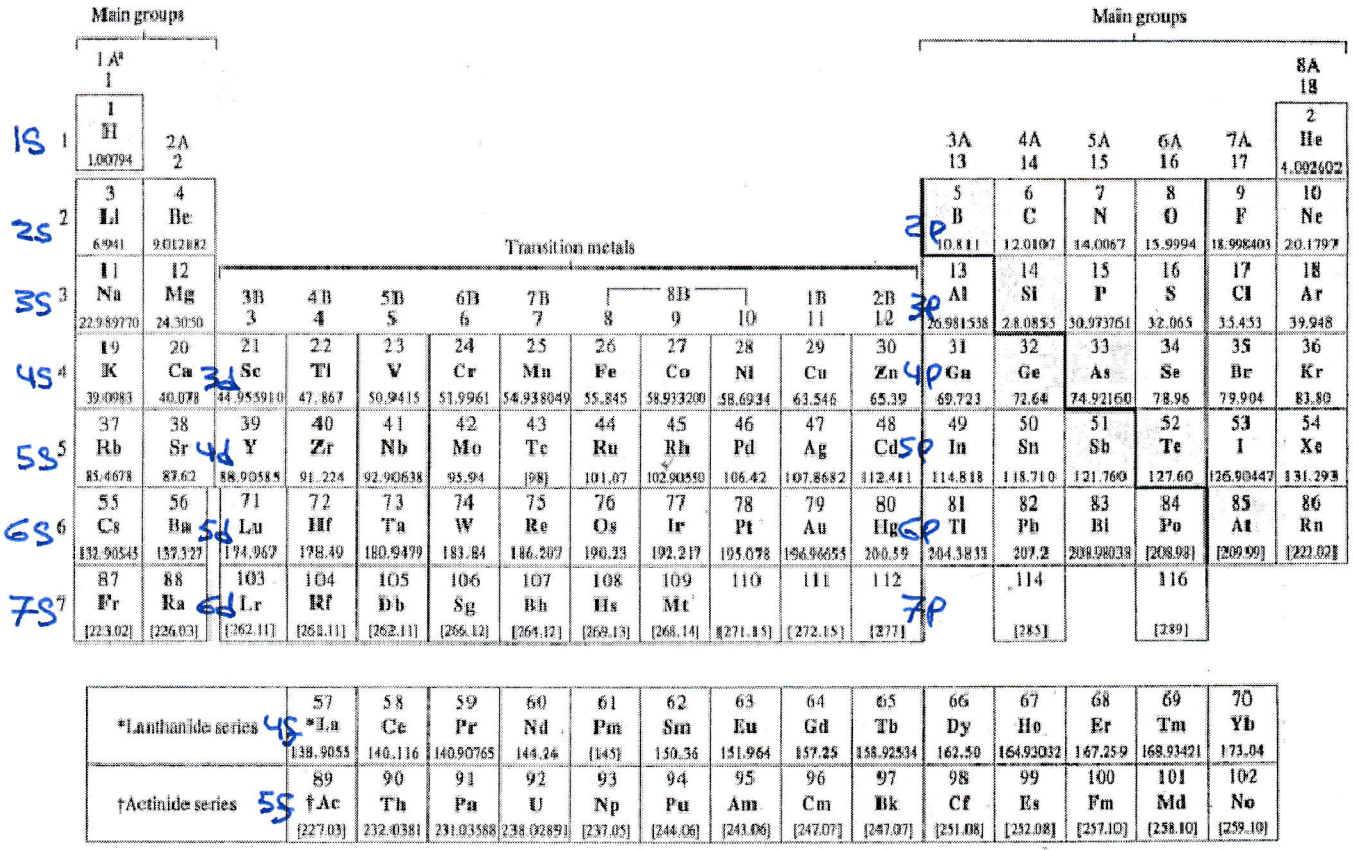
e.g: Li^3: $1s^2/2s^1$: [He]$2s^1$

Na^{11}: $1s^2/2s^2 2p^6/3s^1$: [Ne]$3s^1$

> similar electron configuration in their valence e⁻s.

Note(4): exceptions on electronic configuration.

Group	False	Correct
6B	Cr^{24}: [Ar]$4s^2 3d^4$	[Ar]$4s^1 3d^5$
	Mo^{42}: [Kr]$5s^2 4d^4$	[Kr]$5s^1 4d^5$
1B	Cu^{29}: [Ar]$4s^2 3d^9$	[Ar]$4s^1 3d^{10}$
	Ag^{47}: [Kr]$5s^2 4d^9$	[Kr]$5s^1 4d^{10}$



Ex(2): Which of the following electronic configuration is correct?

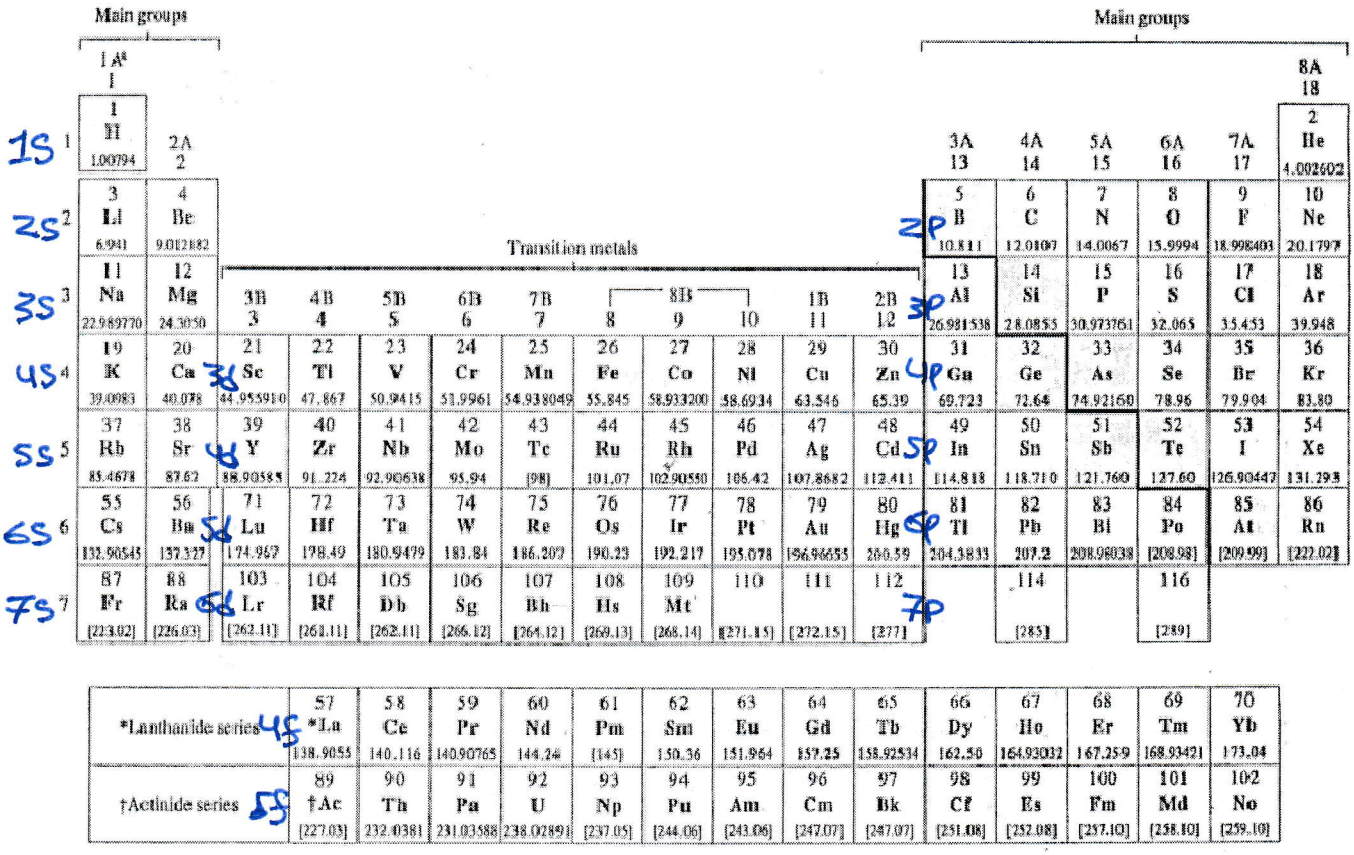
A)$[Xe]5s^2 4d^{10} 5p^3$ B) $[Ne]3s^2 3d^3$ C) $[Kr]5s^2 4f^7$ D) $[Kr]5s^2 4d^{10} 5p^3$ E) $[Xe]6s^2 5d^{10} 5p^3$

Ex(3): Which of the following (E.C) refer to halogen group ?

A) $ns^2\ np^6$ B) ns^2 C) $ns^2\ np^4$ D) $ns^2\ np^7$ E) ns^1

Ex(4): The valence shell of the element (X) contains (2-electrons) in a 5s subshell and has a partially filled 4d subshell. What type of the element (x).

A) Main group
B) Transition Element
C) Chalcogen
D) Halogen
D) Alkali metal



Ex(5): Fill in the blanks?

1) The number of valence electrons in In is……?

2) The number of unpaired electrons in Mo …….. ?

3) The electronic configuration for Pb is……?

4) An element has the electron configuration [Xe] $6s^2\ 4f^7$ ……?

5) What is the element has the valence electron configuration as $5s^2 4d^2$ ……..?

6) What is the group and period for element the valence electrons was $4s^2 3d^{10} 4p^5$……?

7) According to the building – up principle, what sub shell is typically filled next after the 4f sub shell……?

Homework

The Periodic Table of the Elements

1 H Hydrogen 1.00794																	2 He Helium 4.003
3 Li Lithium 6.941	4 Be Beryllium 9.012182											5 B Boron 10.811	6 C Carbon 12.0107	7 N Nitrogen 14.00674	8 O Oxygen 15.9994	9 F Fluorine 18.9984032	10 Ne Neon 20.1797
11 Na Sodium 22.989770	12 Mg Magnesium 24.3050											13 Al Aluminum 26.981538	14 Si Silicon 28.0855	15 P Phosphorus 30.973761	16 S Sulfur 32.066	17 Cl Chlorine 35.4527	18 Ar Argon 39.948
19 K Potassium 39.0983	20 Ca Calcium 40.078	21 Sc Scandium 44.955910	22 Ti Titanium 47.867	23 V Vanadium 50.9415	24 Cr Chromium 51.9961	25 Mn Manganese 54.938049	26 Fe Iron 55.845	27 Co Cobalt 58.933200	28 Ni Nickel 58.6934	29 Cu Copper 63.546	30 Zn Zinc 65.39	31 Ga Gallium 69.723	32 Ge Germanium 72.61	33 As Arsenic 74.92160	34 Se Selenium 78.96	35 Br Bromine 79.904	36 Kr Krypton 83.80
37 Rb Rubidium 85.4678	38 Sr Strontium 87.62	39 Y Yttrium 88.90585	40 Zr Zirconium 91.224	41 Nb Niobium 92.90638	42 Mo Molybdenum 95.94	43 Tc Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.90550	46 Pd Palladium 106.42	47 Ag Silver 107.8682	48 Cd Cadmium 112.411	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.760	52 Te Tellurium 127.60	53 I Iodine 126.90447	54 Xe Xenon 131.29
55 Cs Cesium 132.90545	56 Ba Barium 137.327	57 La Lanthanum 138.9055	72 Hf Hafnium 178.49	73 Ta Tantalum 180.9479	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.217	78 Pt Platinum 195.078	79 Au Gold 196.96655	80 Hg Mercury 200.59	81 Tl Thallium 204.3833	82 Pb Lead 207.2	83 Bi Bismuth 208.98038	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)
87 Fr Francium (223)	88 Ra Radium (226)	89 Ac Actinium (227)	104 Rf Rutherfordium (261)	105 Db Dubnium (262)	106 Sg Seaborgium (263)	107 Bh Bohrium (262)	108 Hs Hassium (265)	109 Mt Meitnerium (266)	110 (269)	111 (272)	112 (277)	113	114				

												58 Ce Cerium 140.116	59 Pr Praseodymium 140.90765	60 Nd Neodymium 144.24	61 Pm Promethium (145)	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.92534	66 Dy Dysprosium 162.50	67 Ho Holmium 164.93032	68 Er Erbium 167.26	69 Tm Thulium 168.93421	70 Yb Ytterbium 173.04	71 Lu Lutetium 174.967
												90 Th Thorium 232.0381	91 Pa Protactinium 231.03588	92 U Uranium 238.0289	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (258)	102 No Nobelium (259)	103 Lr Lawrencium (262)

Q1) What is the electron configuration of Fe?

A) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^8$ B) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^6$

C) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 4p^6$ D) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2$

E) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^6$

Q2) Which group contains only f-block elements?

A) Ni, Pd, Pt B) Si, Ge, As C) Ce, Pr, Nd

D) Kr, Xe, Rn E) Po, Fr, Ac

Q3) Which group contains only d-block elements?

A) Ni, Pd, Pt B) Si, Ge, As C) Ce, Pr, Nd

D) Kr, Xe, Rn E) Po, Fr, Ac

Q4) Transition metals can also be called

A) s-block elements. B) p-block elements. C) d-block elements.

D) f-block elements. E) precious metals.

Q5) Valence electrons in the main group elements are contained in which type(s) of orbitals?

A) *s* B) *p* C) *s* and *p* D) *d*

Q6) An s-block element in the 5th Period is

A) Y. B) As. C) Sr. D) Mo. E) Ag.

Q7) In terms of atomic structure, the common characteristic of elements in the same group is

A) number of electrons. B) number of electrons in the outermost shell.

C) number of neutrons. D) number of protons. E) none of the above

Q8) What is the correct ground-state electron configuration for molybdenum (Mo)?

A)$[Kr]5s^14d^{10}$ B) $[Kr]5s^24d^4$ C) $[Kr]5s^14d^5$ D) $[Kr]5s^24d^9$ E) $[Kr]5s^24d^9$

Q9) Which of the following atoms has the highest number of unpaired electrons?

A) Ne B) C C) Mn D) Cr

Q10) Which of the following electronic configuration is **incorrect**?

A) Al: $[Ne]3s^2 3p^1$ B) S: $[Ne]3s^2 3p^4$ C) Co: $[Ar]3d^8 4s^2$ D) Cs: $[Xe]6s^1$

Q11) An element has the electron configuration $[Ar]\ 4s^2 3d^{10} 4p^4$. The element is?

A)Actinide B) Non-metal C) Transition metal D) Lanthanide

Q12) The electron configuration of Indium (In) is?

A) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^{10} 4P^6 5s^2 4d^{10} 5p^1$
B) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^{10} 4P^1$
C) $1s^2\ 3s^2\ 2p^6\ 3p^6\ 4s^2\ 3d^{10} 4P^6 5s^2 4d^{10} 5p^1$
D) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^{10} 4P^6 5s^2 4d^{10} 5p^1 5d^{10}$

Q13) Determine the number of unpaired electrons in the ground state of P and Cl respectively?

A) 5,3 B) 5,1 C) 3,1 D) 3,2

Q14) $[Ar]4s^2 3d^{10} 4p^1$ is the electron configuration of……atom?

A) Se B) Ga C) In D) Te

Q15) How many unpaired electrons are there in a Tl atom?

A) 0 B) 1 C) 2 D) 3

Q16) The element has three unpaired electrons is?

A) P B) Mg C) Si D) Fe

Q17) The ground-state valence-shell configuration of a particular atom is $5s^2\ 4d^{10} 5p^1$. The element to which this atom belongs is a

a. noble gas.
b. inner transition element.
c. p-block main-group element.
d. transition element.
e. s-block main-group element.

Q18) The ground-state electron configuration of the element _____ is $[Kr]5s^1 4d^5$.

A) Nb B) Mo C) Cr D) Mn E) Tc

Q19) All of the _____ have a valence shell electron configuration ns^1.

A) noble gases B) halogens C) chalcogens
D) alkali metals E) alkaline earth metals

Q20) Based on the most stable electronic configuration: **(Not MCQ)**

i) The number of valence electrons in Ga is……?
ii) The number of unpaired electrons in Zn is…….?
iii) How many unpaired electrons are in P atom……..?
iv) The number of orbitals in a p subshell is……?

Q21) The number of unpaired electrons in Ni is:

A) 1 B) 2 C) 3 D) 4 E) 5

Q22) The number of valence electrons in Sn is:

A) 1 B) 2 C) 3 D) 4 E) 5

Q23) Which of the following electronic configuration is for valence electrons of an element from group 5 and a the fourth period?

A) $5s^2 4d^{10} 5p^3$ B) $4s^2 3d^{10} 4p^3$ C) $4s^2 3d^{10} 4p^5$ D) $4s^2 4p^5$

Q24) The ground state configuration of fluorine (F) is _____.
A) $[He]2s^2 2p^2$ B) $[He]2s^2 2p^3$ C) $[He]2s^2 2p^4$
D) $[He]2s^2 2p^5$ E) $[He]2s^2 2p^6$

Q25) The ground state configuration of tungsten (W) is _____.
A) $[Ar]4s^2 3d^3$ B) $[Xe]6s^2 4f^{14} 5d^4$ C) $[Ne]3s^1$
D) $[Xe]6s^2 4f^7$ E) $[Kr]5s^2 4d^{10} 5p^5$

Q26) The element that has a valence configuration of $4s^1$ is _____.
A) Li B) Na C) K D) Rb E) Cs

Q27) Which of the following elements has a ground-state electron configuration different from the predicted one?
A) Cu B) Ca C) Xe D) Cl E) Ti

Q28) Which two elements have the same ground-state electron configuration?
A) Pd and Pt B) Cu and Ag C) Fe and Cu D) Cl and Ar
E) No two elements have the same ground-state electron configuration.

Q29) $[Ar]4s^2 3d^{10} 4p^3$ is the electron configuration of a(n) _____ atom.
A) As B) V C) P D) Sb E) Sn

Q30) There are _____ unpaired electrons in a ground state nitrogen atom.
A) 0 B) 1 C) 2 D) 3 E) 4

Q31) In a ground-state silver (Ag) atoms, the _____ subshell is partially filled.
A) 3d B) 3s C) 4s D) 4d E) 4p

Q32) The condensed electron configuration of krypton (Kr), element 36, is _____.
A) $[Kr]4s^2 3d^8$ B) $[Ar]4s^4$ C) $[Kr]4s^4 3d^8$
D) $[Ar]\ 4s^2 3d^{10} 4p^6$ E) $[Ar]4s^4 3d^4$

Q33) Which element has the following ground-state electron configuration? $[Kr]5s^2 4d^{10} 5p^3$

A) Sn B) Sb C) Pb D) Bi E) Te

Q34) The electron configuration of a ground-state Co atom is

A) $[Ar]4s^2 3d^7$
B) $1s^2 2s^2 2p^6 3s^2 3d^9$
C) $[Ne]3s^2 3d^7$
D) $[Ar]4s^1 3d^5$
E) $[Ar]4s^2 4d^7$

Q35) The electron configuration of a ground-state vanadium (V) atom is

A) $[Ar]4s^2 4d^3$ B) $[Ar]4s^2 4p^3$ C) $[Ar]4s^2 3d^3$ D) $[Ar]3d^5$

Q36) Lanthanide (or *rare earth* elements) have atoms or ions with partially filled

A) *s* subshells.
B) *p* subshells.
C) *d* subshells.
D) *f* subshells.
E) *g* subshells.

Q37) Which choice lists two elements with ground-state electron configurations that are well known exceptions to the Aufbau principle?

A) Cu and C B) Cr and Cu C) Cs and Cl D) Rb and Co E) Fe and Co

Q38) A ground-state chromium (Cr) atom has how many unpaired electrons?

A) 1 B) 2 C) 4 D) 5 E) 6

Q39) An element has the electron configuration $[Kr]\ 5s^2 4d^{10} 5p^2$. The element is a(n)

A) Nonmetal
B) transition element
C) Metal
D) Lanthanide
E) Actinide

Q40) Ti has _____ in its d orbitals.

A) one electron
B) two electrons
C) three electrons
D) four electrons
E) none of these

Q41) Germanium (Ge) has _____ in its 4p orbitals.

A) one electron
B) two electrons
C) three electrons
D) four electrons
E) none of these

Q42) Fe has _____ that is (are) unpaired in its d orbitals.

A) one electron
B) two electrons
C) three electrons
D) four electrons
E) none of these

Q43) Which of the following electron configurations is correct?

A) Ga: $[Kr]4s^2 3d^{10} 4p^1$
B) Mo: $[Kr]5s^2 4d^5$
C) Ca: $[Ar]4s^1 3d^{10}$
D) Br: $[Kr]4s^2 3d^{10} 4p^7$
E) Bi: $[Xe]6s^2 4f^{14} 5d^{10} 6p^3$

Q44) For which of the following elements does the electron configuration for the lowest energy state show a partially filled *d* orbital?

A) Ti
B) Rb
C) Cu
D) Ga
E) Kr

Q45) Which element is found in the s-block of the periodic table?

a. Ra
b. Ar
c. Db
d. Np
e. none of the above

Q46) According to the building-up principle or aufbau principle, which subshell is typically filled next after the 5f subshell?

a. 6d
b. 4p
c. 7s
d. 3d
e. 5s

Q47) All of the following ground-state electron configurations are correct except

a. Fe:$[Ar]4s^2 4d^6$.
b. Ca:$[Ar]4s^2$.
c. In:$[Kr]\ 5s^2\ 4d^{10} 5p^1$.
d. Cu:$[Ar]\ 4s^1 3d^{10}$.
e. Xe:$[Kr]\ 5s^2\ 4d^{10} 5p^6$.

Q48) How many valence electrons does an arsenic (As) atom have?

a. 5
b. 6
c. 7
d. 2
e. 33

Q49) What noble gas core would be used when writing the ground state electron configuration for magnesium (Mg)?

a. [Ne]
b. [Xe]
c. [Rn]
d. [He]
e. [Ar]

Q50) The elements that are filling the 5f subshell are called

a. alkali metals.
b. transition elements.
c. lanthanides.
d. actinides.
e. main-group elements.

Q51) An element that has the same ground state valence-shell electron configuration as sodium (Na) is

a. lithium.
b. barium.
c. boron.
d. lead.
e. xenon.

GOOD LUCK

Answer Key:

Question	Answer	Question	Answer	Question	Answer	Question	Answer	Q	A
1	B	13	C	25	B	37	B	49	A
2	C	14	B	26	C	38	E	50	D
3	A	15	B	27	A	39	A	51	A
4	C	16	A	28	E	40	B		
5	C	17	C	29	A	41	B		
6	D	18	B	30	D	42	D		
7	B	19	D	31	C	43	E		
8	C	20	i(3), ii(0), iii(3) iv(3)	32	D	44	A		
9	D	21	B	33	B	45	A		
10	C	22	D	34	A	46	A		
11	B	23	B	35	C	47	A		
12	A	24	D	36	D	48	A		

ملاحظات:

اذا كان لديك أي استفسار أو سؤال تواصل مع الأستاذ على الواتس اب.

تنويه: الأستاذ عمار طلفاح يقدم دورات الكيمياء العامة والعضوية والتحليلية للعديد من الجامعات وأهمها الجامعات الأردنية وجامعات النجاح والأمريكية وأبو ديس في فلسطين وأي جامعة اخرى حول العالم, وبتالي يا ريت توصل للمهتمين من معارفك واقاربك والدارسين لهذه المواد والذين يجدون صعوبة فيها وبحبوا يلتحقوا بدورتنا يتواصلوا مع الأستاذ على الواتس اب التالي

00962787124146