

Worksheet

Description of periodic table & transition elements:

[1] in the periodic table, the main transition elements start with group.....

- a) IB
- b) IVB
- c) IIIB

[2] d-block contains vertical columns &groups.

- a) 5 ,10
- b) 7,14
- c) 10,10
- d)10,8

[3] In d-block the number of groups is less than number of vertical columns by.....

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

[4] in this figure, a part of one of transition series in the periodic table:

IB

A	B	C	D	E	G
---	---	---	---	---	---

Elements that are more similar in properties to each other than their similarity to elements below them:

- a)A&G
- b)B&C
- c)E&G
- d)D&G

[5] comparison between the 4 transition series

The fourth transition series includes the elements in which the sublevel is filled successively.

- a) 3d
- b) 5d
- c) 4d
- d) 6d

[6] The second transition series contains elements.

- a) 5
- b) 14
- c) 10
- d) 7

[7] In the main transition elements , the vertical group that not take B letter contains elements

- a) 12
- b) 11
- c) 3
- d) 4

[8] Electronic configurations & exceptions

In the first column in d-block, the elements are ended with configuration & the last column elements are ended with configuration.....

- a) $ns^2, (n-1)d^1/ns^2, (n-1)d^{10}$
- b) $ns^1, (n-1)d^5/ns^2, (n-1)d^5$
- c) $ns^1, (n-1)d^1/ns^2, (n-1)d^{10}$
- d) $ns^2, (n-1)d^1/ns^2, (n+1)d^{10}$

[9] In nickel atom 3d-sublevel carries unpaired electrons.

- a) 8
- b) 6
- c) 2
- d) 4

[10] Which of the following elements its d-sublevel is half filled in atomic state?

- a) ${}_{25}\text{Mn}$
- b) ${}_{24}\text{Cr}$
- c) ${}_{29}\text{Cu}$
- d) a&b are correct

[11] In atomic state the Pairing of electrons in 3d orbitals starts after..... element

- a) $_{20}$ Calcium
- b) $_{24}$ Chromium
- c) $_{29}$ Copper
- d) $_{25}$ Manganese

[12] The number of elements of the 1st series that all its orbitals completely filled except one orbital equalelement(s).

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

[13] (X & Y) are two elements from the 1st series in which d sublevel have the same number of electrons so X & Y may be:

- a) atomic numbers 24 & 25 .
- b) found in groups IB & IIB.
- c) a & b are correct
- d) a & b are incorrect.

[14] Which choice represents the element in transition series that is located after $_{38}\text{Sr}$ directly?

	Transition Series	Period	Sublevel that gradually filled
(a)	1 st	Fourth	4d
(b)	2 nd	Fifth	6d
(c)	3 rd	Sixth	5d
(d)	2 nd	fifth	4d

[15] Location in periodic table

The element of configuration $[_{36}\text{Kr}] 5s^?, 4d^6$, choose the incorrect sentence :

- a) it found in the 5th period
- b) it found in the 8th column in periodic table

c) it found in group VIB

d) it found in the 2nd transition series

[16] Locate an element from third transition series its configuration ended by (d²)

in atomic state:

a) period 4 & group IIB

b) period 5 & group IVB

c) period 6 & group IVB

d) period 6 & group VIB

[17] Which of the following elements located in group IIIB

a) [Ar] , 4s² , 3d⁵

b) [Ar] , 4s¹ , 3d⁵

c) [Ar] , 4s² , 3d¹

d) [Ar] , 4s² , 3d²

[18] Study the opposite table then answer the following :

Element	Electronic conf.
X	[Ar] 4s ² 3d ⁷
Y	[Ar] 4s ² 3d ¹⁰
Z	[Kr] 5s ² 4d ⁸
W	[Kr] 5s ¹ 4d ⁵

1- How many unpaired electrons in d-sublevel in the element which is located before X in the same series?

2- How many unpaired electrons in d-sublevel in the element which is located after W in the same series.

3- Write the electronic configuration of the element which is located above W in The same column.

4- How many unpaired electrons in d-sublevel in the element which is located below Z in the same column?

5- Choose from the table two elements are located in the same group and their properties are different from other transition elements

(X and Z - Y and W - Y and Z - X and W)

6. Which element is located in column 10 / group VIII (X - Y - Z - W).

[19] The highest no. of unpaired electrons in an element is located in group

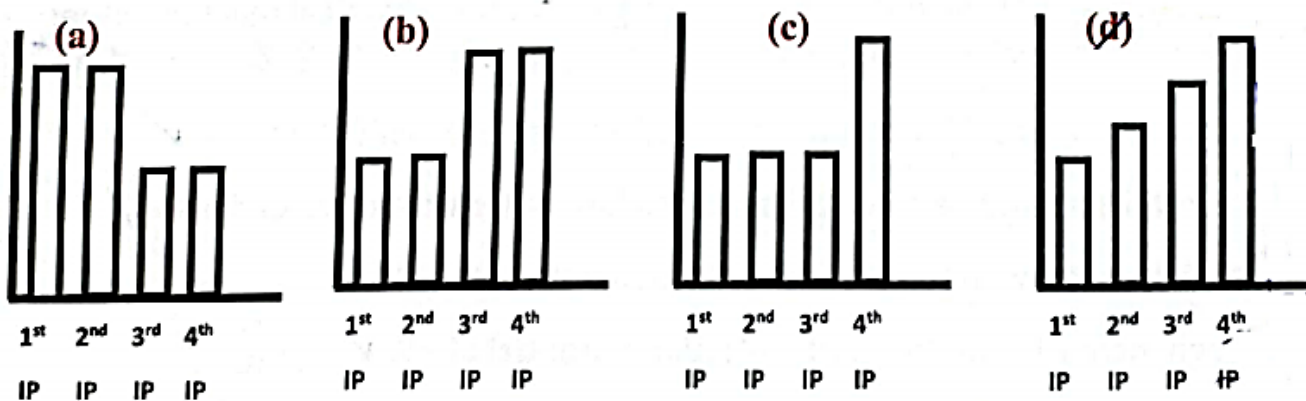
- a) IIIB
- b) IVB
- c) VB
- d) VIB

[20] The element which its electrons are distributed in 7 sublevels and contains three electrons in the d sublevel this element belongs to

- a) the first main transition series and group IIIB
- b) the second main transition series and group IVB
- c) the first main transition series and group VB .
- d) the third transition series and group IIIB

[21] oxidation states [representative & transition] & I.P.

Which graph from the following represents ionization potentials of ${}_{22}\text{Ti}$:



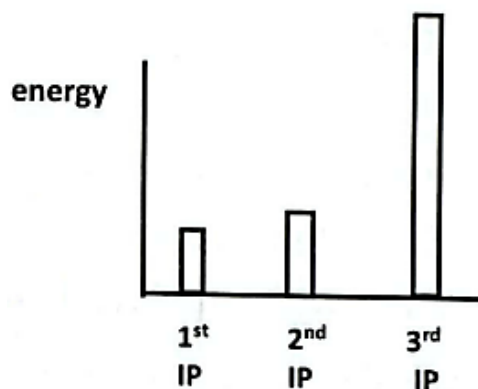
[22] Knowing that the first ionization potential of ${}_{13}\text{Al}$ is X & the following are the 1st four ionization potentials of it (disordered) , which one of them is the fourth ionization potential .

- a) 2X
- b) X
- c) 20X
- d) 3X

[23] The opposite graph represented The ionization potentials of element (x):

so element (X) may be :

- a) ${}_{21}\text{Sc}$
- b) ${}_{22}\text{Ti}$
- c) ${}_{12}\text{Mg}$
- d) ${}_{13}\text{Al}$



[24] Explanation of the difficulty to obtain Mg^{3+} during chemical reaction under normal conditions. (all the following except)

- a) difficulty of breaking completely filled energy level with electrons
- b) in representative elements its easy to lose outermost electrons only
- c) high increasing in the second ionization potential of Mg
- d) high increasing in the third ionization potential of Mg

[25] Which of the following ionization potential refers to a transition element:

	First ionization	Second ionization	Third Ionization	Fourth Ionization
(a)	X	0.5X	2X	3X
(b)	X	2X	4X	0.5X
(c)	X	2X	4X	8X
(d)	X	0.25X	3X	4X

[26] multiple oxidation states

The elements of the first transition series lose their 4s electrons before 3d electrons. because

- a) 4s orbital carry less number of electrons than 3d
- b) 4s orbital less energy than 3d
- c) 4s orbital is the farthest sublevel from nucleus
- d) 4s orbital is completely filled with electrons.

[27] is the highest oxidation state for the transition element (X) its electronic configuration $[\text{Ar}] 4s^2, 3d^3$.

- a) 3+
- b) 2+
- c) 5+
- d) 7+

[28] has the highest oxidation state in 1st transition series which is

- a) Mg/7+
- b) Mn/6+
- c) Mn/7+
- d) Cr/6+.

[29] The elements from the 1^o transition series which have no multiple oxidation States are

- a) ${}_{24}\text{Cr}$ & ${}_{29}\text{Cu}$.
- b) ${}_{29}\text{Cu}$ & ${}_{30}\text{Zn}$
- c) ${}_{21}\text{Sc}$ & ${}_{30}\text{Zn}$
- d) ${}_{21}\text{Sc}$ & ${}_{29}\text{Cu}$

[30] Scandium ${}_{21}\text{Sc}$ has oxidation state in all its compounds

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

[31] Which of the following compounds cannot be found in the nature?

- a) SCO
- b) SC_2O_3
- c) SCO_2
- d) a & C are correct choices

[32] Mention the oxidation state that all the 1st transition series carry except zinc.

- a) 2+
- b) 3+
- c) 4+
- d) 7+

[33] What is the oxidation state of IVB group elements causes a completely filled sublevel of a noble gas

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

[34]is One Of the elements that hasn't oxidation state equal to number of vertical group .

- a) ${}_{21}\text{Sc}$
- b) ${}_{26}\text{Fe}$
- c) ${}_{29}\text{Cu}$
- d) ${}_{30}\text{Zn}$

[35] In one of the periods from periodic table :

IIIB

A	X	R	L	M
---	---	---	---	---

Element(s) which have only one oxidation state in the nature:

- a) A only
- b) both A & X
- c) all of A,X&R
- d) both L&M

[36] (X) is a 1 transition element from the 1st Series it can form with chlorine:

XCl , XCl_2 & XCl_3 but cannot form XCl_4 , so its atomic number is : .

- a) 30
- b) 29
- c) 28
- d) 22

Homework

[37] Elements that are more similar in properties to each other than their similarity to elements below them:

a) with configurations $3d^2$, $3d^3$ & $3d^4$

b) with configurations $3d^5$, $3d^6$ & $3d^7$

c) with configurations $3d^1$, $3d^2$ & $3d^3$

d) with configurations $3d^6$, $3d^7$ & $3d^8$

[38] The 2nd transition series elements, sublevel is filled successively with electrons & located in period

a) 3d ,period 4

b) 4d ,period5

c) 3d ,period 5

d) 4d ,period6

[39] The orbitals of contain the largest number of unpaired electrons.

a) d^6

b) d^7

c) d^8

d) d^9

[40] the electronic configuration of element that is located in the column before the last in d-block, is.....

a) $ns^2, (n-1)d^{10}$

b) $ns^2, (n-1)d^9$

c) $ns^1, (n-1)d^{10}$

d) no correct answer

[41] Which of the following configurations include exception leads it to be less energy than its expected?

a) $[_{18}\text{Ar}] 4s^2, 3d^1$

b) $[_{18}\text{Ar}] 4s^2, 3d^3$

c) $[_{18}\text{Ar}] 4s^2, 3d^6$

d) $[_{18}\text{Ar}] 4s^1, 3d^{10}$

[42] Which one of the following elements its d-sublevel is completely filled in atomic state?

- a) $_{30}\text{Zn}$
- b) $_{24}\text{Cr}$
- c) $_{29}\text{Cu}$
- d) a & C are correct

[43] Which of the following has anomalous electronic configuration?

- a) $_{30}\text{Zn}$
- b) $_{42}\text{Mo}$
- c) $_{48}\text{Cd}$
- d) $_{77}\text{Lr}$

[44] In the 5th period in the periodic table two elements have the same number of electrons in (d) sublevel , their atomic numbers are :

- a) 24,25
- b) 29, 30
- c) 42, 43
- d) a & bare correct

[45] Transition element (X) in which (4d) sublevel filled with electrons before the filling of (5s) sublevel, so (X) found in group

- a) VIB
- b) VII
- c) IB
- d) IIB

[46] X &Y are two elements from (d) block as (Y) is located below (x) directly in periodic table :

Configuration of X° : $ns^2, (n-1)d^3$ [as (n) = no. of period of element (X)]

so configuration of Y° is :

- a) $ns^2, (n-1)d^3$
- b) $ns^2, (n-1)d^4$
- c) $(n+1)s^2, (n)d^3$
- d) no correct answer

[47] What is the general electronic configuration of the group VIB :

- a) $ns^2, (n-1)d^3$
- b) $ns^2, (n-1)d^5$
- c) $ns^1, (n-1)d^5$
- d) no correct answer

[48] Write the general electronic configuration for elements in 5th vertical column in periodic table :

- a) $ns^2, (n-1)d^3$
- b) $ns^2, (n-1)d^5$
- c) $ns^1, (n-1)d^5$
- d) no correct answer

[49]element is located in vertical column number (10) in periodic table

- a) ${}_{22}\text{Ti}$
- b) ${}_{25}\text{Mn}$
- c) ${}_{28}\text{Ni}$
- d) ${}_{27}\text{Co}$

[50] Find the atomic number of element which found in 5th period, outermost configuration of its group is $ns^2, (n-1)d^5$

- a) 25
- b) 30
- c) 43
- d) no correct

[51] The configuration $ns^1, (n-1)d^{10}$ is

- a) represents group IB in periodic table of high energy of atoms
- b) represents column 11 in periodic table of low energy of atoms
- c) represents group VIII in periodic table.
- d) b & c are correct.

[52] The figure represents a part which cut from periodic table from (d) block

X	Y
Z	R

In which case we find : similarity in properties of (X) & (Y) more than (X) & (Z)

- a) Y is found in column 8 in periodic table

- b) Y is found in column 3 in periodic table
- c) X is found in column 9 in periodic table
- d) X is found in column 10 in periodic table

[53] Element has electronic configuration $[\text{Xe}] 4f^{14}, 5d^3, 6s^2$ it should be in

- a) Second transition series
- b) Third transition series
- c) Lanthanides series
- d) Actinides series.

[54] The element which its electrons are distributed in 10 sublevels and contains two unpaired electrons in the last sublevel d. this element belongs to

- a) the second main transition series and group IVB
- b) the second main transition series and group IIB
- c) the second main transition series and group VIII
- d) a & c are correct

[55] In one of the periods from periodic table :

				VB
A	X	R	L	M

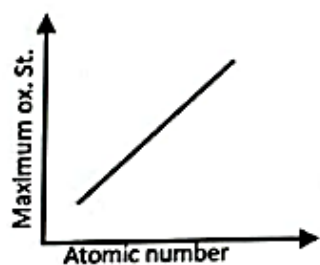
Element which has very high 2nd ionization potential:

- a) A
- b) R
- c) both of A & M
- d) X

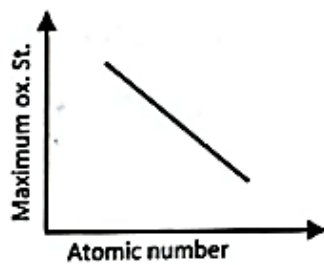
[56] If the value of ionization potentials for transition element (X) from the 1st series are 648 , 1364 , 2645 , 4267 , 11675 kJ/mole for 1st , 2nd , 3rd 4th & 5th ionization potentials, respectively.so the atomic number of (X) is =.....

- a) 23
- b) 22
- c) 21
- d) 30

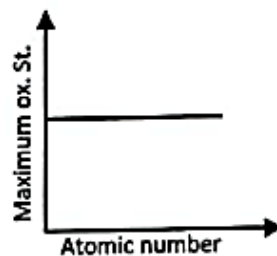
[57] Which of the following explain the relation between atomic number and the maximum oxidation state from Sc to Mn?



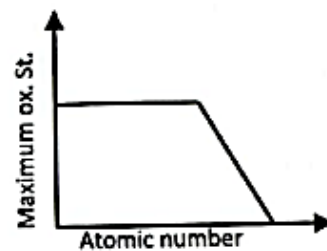
(a)



(b)



(c)



(d)

[58] In Which group of d-block the atom can lose all electrons of s & d sublevels at once

- a) VIII.
- b) IB
- c) IIB
- d) IIIB

[59] An element X that is located in the group IIIB. when this element combines with chlorine formed a compound its formula is

- a) XCl
- b) XCl₂
- c) X₂Cl₃
- d) XCl₃

[60] Which one of the following compounds cannot be found in the nature?

- a) Fe₂(SO₄)₃
- b) SC(SO₄)₂
- c) Ti(NO₃)₄
- d) ZnCl₂

[61] All the following elements, atoms reach to 2+ state by losing a pair of electrons from the same orbital except

- a) Nickel
- b) vanadium
- c) chromium
- d) zinc

[62] X is a transition element is located in the first transition series and their ionization potential values in K.J unit are :

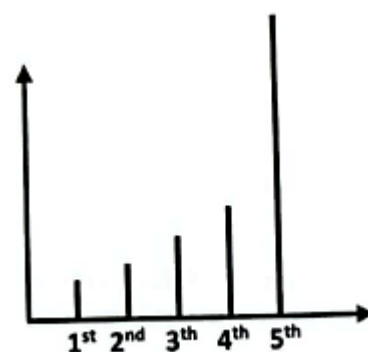
1 st ionization potential	2 nd ionization potential	3 rd ionization potential	4 th ionization potential	5 th ionization potential
721	1412	2922	4934	13230

The highest oxidation number of this element found in.....

- a) X₂O₃
- b) X₂O₅
- c) XO₂
- d) X₂O₅

[63] The opposite figure shows the graduation of the ionization potentials and oxidation states in transition element M.

	Which oxide of element M is not found in nature	What is the group of element M
A	MO ₂	IVB
B	MO ₃	VIB
C	M ₂ O ₅	IVB
d	M ₂ O ₃	IIB



[64] In one of the periods from periodic table:

A	X	R	L	M
---	---	---	---	---

Element have variable oxidation states:

- a)A
- b)R
- c) L
- d) both R &L

[65] What is the oxidation state of VB group elements causes a completely filled sublevel of a noble gas .

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

[66] The first transition series elements lose their electrons from then sublevel

- a) 3d ,4s
- b) 3s ,4d
- c) 4s ,3d
- d) 4s ,3p

[67] In the second transition series of periodic table: the reason of multiple oxidation states is that very small difference in energy between sublevels ...

- a) 3s & 4d
- b) 4s & 3d
- c) 5c & 4d
- d) 4f & 5d

[68] The following reaction occurs to the atoms of group..... $M^0 \rightarrow M^+ + e^-$

- a) VB
- b) IVB
- c) IIB
- d) IB

[69] We can obtain oxidation state X^{7+} from elements of vertical group

- a) IVB
- b) VB
- c) VIB
- d) VIIB

[70] Which of the following ions when being oxidized produces an ion with oxidation number 3+ and electronic configuration $[_{18}\text{Ar}], 3d^1$?

- a) Ti^{2+}
- b) Ti^{4+}
- c) V^{2+}
- d) Sc^+

[71] The oxidation state can exceed number of group of an element its electronic configuration is

- a) $(n-1)d^5, ns^1$
- b) $(n-1)d^{10}, ns^2$
- c) $(n-1)d^9, ns^2$
- d) $(n-1)d^{10}, ns^1$

[72] $_{21}\text{A}$ & $_{39}\text{B}$ are different in:

- a) oxidation states for each one
- b) order of transition series in which each element is found
- c) no. of vertical column of each element in periodic table.
- d) type of element.

[73] (X, Y) are transition elements in which ns sublevel not filled unless (n-1)d completely filled,. Which statement is correct:

- a) X located right to Y in modern periodic table.
- b) Y located right to Y in modern periodic table.
- c) he maximum oxidation states of both X & Y exceed group no.
- d) a & c are correct.