Periodic Table & Electronic Configuration

Que 1: What is the oxidation state of Mn in $MnCl_2$

(Oxidation state of Cl= -1) ***Marks :(1)***

(a)-1 (b) +1 (c) +2 (d) -2

Ans: +2

Que 2: Iron with atomic number 26 shows +3 oxidation state in chemical reaction.

a. Write the subshell *electronic configuration of Fe.*

b. Write the subshell *electronic configuration of the ion formed.*

c. Write whether the element can show different oxidation state. *Justify?*
Marks :(3)

Ans: a. $1s^2 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^6\ 4s^2$

b. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^5$

c. Yes. The d block elements can lose electrons from the outermost s subshell and inner d subshell

Que 3: Analyse the table and answer the questions ***Marks :(4)***

Element (Symbols are not real)	Atomic number
P	11
Q	18
R	16
S	26

a . Which of the above is a first group element ?

b . Which is the valency of R?

c . Give the formula of the compound when P combines with R ?

d . Which of the above shows different oxidation state ?

Ans: a. P

b. 2

c. P_2R

d. S

Que 4: ***Match the following*** **Marks :(3)**

A	B	C
$_{20}$**Ca**	**$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$**	***p*- block**
$_{17}$**Cl**	**[Ar] $3d^6\ 4s^2$**	***f*- block**
$_{26}$**Fe**	**[Ar] $4s^2$**	***d*- block**
		***s*-block**

Ans:

A	B	C
$_{20}$Ca	[Ar] $4s^2$	*s*-block
$_{17}$Cl	$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$	*p*- block
$_{26}$Fe	[Ar] $3d^6\ 4s^2$	*d*-block

Que 5: Subshell *electronic configuration of two elements are given. To which block ,period and group does each belong* **Marks :(3)**

(a) $1s^2\ 2s^2\ 2p^6\ 3s^2$ **(b) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^3\ 4s^2$**

Ans: a.

block- s

period- 3

group- 2

b.

block - d

period- 4

group - 5

Que 6: The outermost *electronic configuration of an element is* $3s^2\ 3p^4$

a. Write the complete *electronic configuration*

b. What is the valency of this element?

c. Is it a metal or a non -metal? Justify your answer ***Marks :(4)***

Ans: a. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^4$

b. 2

c. Non-metal

It gains two electrons in chemical reaction and attains stability.

Que 7: Analyse the table and answer the questions

Elements (symbols are not real)	**Atomic number**
Elements (symbols are not real)	**Atomic number**
P	**11**
Q	**18**
R	**17**
S	**26**

a. Write the subsell *electronic configuration of S. To which block does it belong?*

b. Which is an inert gas ?

c. Which of the above is a s block element? ***Marks :(4)***

Ans: a. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^6\ 4s^2$

b. Q

c. P

Que 8: How many electrons can be accommodated in f subshell? ***Marks :(1)***

(a) 10 **(c) 6**

(b) 7 **(d) 14**

Ans: (d) 14

Que 9: Which are the subshells present in L shell ***Marks :(1)***

a. *s,p,d*

b. *s,p,d,f*

c. *s*

d. *s,p*

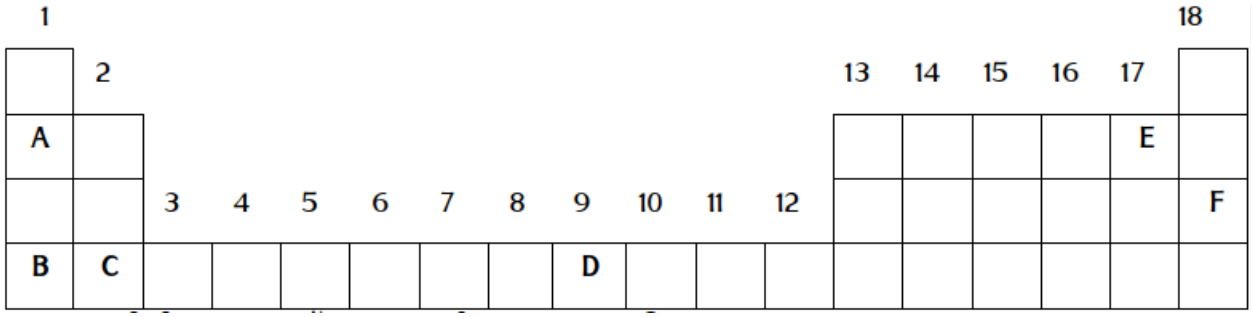
Ans: d (***s,p***)

Que 10: Arrange the subshell in the correct order of electron filling?

4s 3d 2p 3s 2s 1s 3p 4p ***Marks :(1)***

Ans: 1s 2s 2p 3s 3p 4s 3d 4p

Que 11: Part of the *Periodictable is given (symbols are not real)*



a . Which are the s block elements?

b .Which may form coloured compounds ?

c . Which is the least reactive metal in group 1 ?

d . Find the element with only 1 electron in 4s subshell ? *Marks :(4)*

Ans: a. A, B, C

b. D

c. A

d. B

Que 12: The d subshell of an element with 4 shells is completely filled and there are two electrons in the 4^{th} shell

a. How many electrons can be accommodated in d sub shell ?

b. Write the subshell electronic configuration of the element. *Marks :(2)*

Ans: a. 10

b. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10}\ 4s^2$

Que 13: The oxidation state shown by an element of the second period is -2

a. How many electrons are there in the outer most shell of this element?

b. Write down the *subshell electronic configuration of the element. Marks :(2)*

Ans: a. 6

b. $1s^2\ 2s^2\ 2p^4$

Que 14: There are 7 electrons in the third shell of an element

a. Write its subshell *electronic configuration,*

b. Find the group and block of this element *Marks :(2)*

Ans: a.$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$

b. group- 17, block - p

Que 15: The electronic configuration of Chromium ($_{24}$Cr) written as [Ar] $3d^4$ $4s^2$

Is it correct? Give reason ***Marks :(2)***

Ans: Not correct. Half filled subshell give more stability. So the electronic configuration will be [Ar]$3d^5 4s^1$

Que 16: Match the following. ***Marks :(4)***

A	B	C
s- block	Electron filling occurs in the penultimate shell	Inner transition metals
p-block	Lanthanoids	Low ionisation energy
d- block	High Electronegativity	Elements in three states
f- block	Reactive metals	transition metals

Ans:

A	B	C
s- block	Reactive metals	Low ionisation energy
p-block	High Electronegativity	Elements in three states
d- block	Electron filling occurs in the penultimate shell	transition metals
f-block	Lanthanoids	Inner transition metals

Que 17: The element A belong to second period and 17^{th} group and the element B belong third period and second group of the periodic table.(Symbols shown are not real)

a. Write the subshell electronic configuration of A

b. To which block does B belong? What is its valency?

c. Give the formula of the compound by A and B ***Marks :(4)***

Ans: a - $1s^2$ $2s^2$ $2p^5$

b - block - s

valency- 2

c - BA_2

Que 18: Which of the following is not a *characteristics of p block elements*?

a .High electronegativity

b .Belongs to 13 to 18 group.

c . High ionisation energy

d . High metallic nature ***Marks :(1)***

Ans: d

Que 19: Which of the following electronic configuration is that of an inert gas?

a,$1s^2\ 2s^2\ 2p^4$

b,$1s^2\ 2s^2\ 2p^6$

c,$1s^2\ 2s^2\ 2p^6\ 3s^2$

d,$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^2$ ***Marks :(1)***

Ans: b

Que 20: Analyse the subshell electronic configuration and answer the questions (Symbols are not real)

A - [Ne] $3s^2\ 3p^2$

B - [Ne] $3s^2$

C -[Ar] $4s^1$

D -[Ar] $4s^2\ 3d^2$

a .Which of the above has highest electro negativity?

b . Which element shows different oxidation state?

c .How many p electrons are there in the atom C?

d . Which has the lowest ionisation energy? ***Marks :(4)***

Ans: a. A

b. D

c. 12

d. C

Que 21: Complete the table ***Marks :(3)***

Electronic configuration	State	Period	Group

[Ne] $3s^2$	**solid**	**3**	**(a)**
[Ar] $3d^3$ $4s^2$	**(b)**	**(c)**	**5**
[Ar] $4s^1$	**solid**	**(d)**	**(e)**
[Ne] $3s^2$ $3p^6$	**(f)**	**3**	**18**

Ans: a. 2

b. solid

c. 4

d. 4

e. 1

f. gas

Que 22: The atomic number of A,B,C and D are 12,17,19 and 25 respectively (Symbols are not real)

a . write the subshell *electronic configuration of B*

b . Find the group and block of D

c .Which among the above shows -1 oxidation state?

d. Write the subshell electronic configuration of D ***Marks :(4)***

Ans: a. $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^5$

b. block- d ; group - 7

c. B

d. $1s^2$ $2s^2$ $2p^6 3s^2$ $3p^6 3d^5 4s^2$

Que 23: *Subshell electronic configuration of some elements are given (symbols are not real)*

A - [Ne] $3s^1$

B - [Ar] $4s^2$

C - [Ar] $3d^6$ $4s^2$

D - [Ne] $3s^2$ $3p^4$

a .What is the atomic number of B?

b . Which among the above has the highest electronegativity ?

c . Name the element the oxide of which shows acidic nature?

d .Which of the above elements form coloured compound? ***Marks :(4)***

Ans: a) 20

b) D

c) D

d) C

Que 24: Atomic number of the element of X is 25. The oxides are X_2O_3 and X_2O_5

a . Write down the subshell electronic configuration of X?

b. What is the oxidation state of X in X_2O_3 ?

(oxidation number of oxygen is -2)

c. To which period and block does this element belong? ***Marks :(4)***

Ans: a. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^5\ 4s^2$

b. +3

c. Group - 7

period - 4

Que 25: *Subshell electronic configuration* of some elements are given(Symbols are not real)

A - $1s^2\ 2s^2\ 2p^4$

B - $1s^2\ 2s^2\ 2p^6\ 3s^1$

C - $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1$

D - $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^6\ 4s^2$

a Find the atomic number of B

b . Which subshell in D has the highest energy?

c . To which period does C belong?

d .Write the formula of the compound formed by A and B*Marks :(4)*

Ans: a. 11

b. 3d

c. 4

d. B_2A

Que 26: ● The element Z has 2 Shells

● It always shows -1 oxidation state

a .Write the subshell electronic configuration of the element

b . Find the block and group of this element

c. Write the formula of the compound formed when it reacts with Aluminium

(Valency of Al = 3) ***Marks :(3)***

Ans: a. $1s^2\ 2s^2\ 2p^5$

b. block - p

Group - 17

c. AlZ_3

Que 27: Complete the table related with the oxides of manganese (Atomic No;Mn = 25)
Marks :(3)

Compound	Oxidation state of Mn	Subshell electronic configuration of manganese ion
MnO_2	**+4**	**(a)**
Mn_2O_3	**(b)**	**$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^4$**
(c)	**+7**	**$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$**

Ans: a.$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^3$

b. +3

c. Mn_2O_7

Que 28: Analysis the given electronic configurations and answer the questions

(Symbols given are not real)

A -$1s^2\ 2s^2\ 2p^6 3s^2 3p^5$

B -$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^1$

C -$1s^2\ 2s^2\ 2p^6\ 3s^1$

D -$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$

i) .Which among the above is the biggest atom?

ii) . Which element normally shows +1 oxidation state?

iii). Write the formula of the compound formed by A and B

iv) Which one of the above is s block element*?** ***Marks :(4)

Ans: i) C

ii) C

iii) BA_3

iv) C

Que 29: Find the relation and fill up ***Marks :(1)***

[Ne] $3s^2$ $3p^4$: Group 16 [Ar] $3d^3$ $4s^2$: Group ___

Ans: Group – 5

Que 30: Some *Characteristic of Manganese are given* *Marks :(4)*

● There are 4 shells.

●Last 5 electrons enter d subshell

a. Write the subshell electronic configuration of manganese

(Oxidation number: O = -2)

b. Write the subshell electronic configuration of manganese ion in MnO_2.

c. Write any two characteristics of the block to which this element belongs.

Ans: a. $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^6$ $3d^5$ $4s^2$

b. $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^6$ $3d^3$

c. any two *Characteristics of d block*

Que 31: The element Y shows oxidation numbers +2, +3

a . Name the block to which Y may belong ?

b: Write the formula of any chloride of Y

(Hint: Valency of Chlorine- 1) ***Marks :(2)***

Ans: a. *d*- block

b. YCl_2 or YCl_3

Que 32: The Atomic number of Iron is 26 and shows +3 oxidation state when it combines with oxygen(valency of oxygen=2)

a. Write the formula of the compound

b.* Write the subshell electronic configuration of Fe^{3+}** ***Marks :(3)

Ans: a. Fe_2O_3

b. $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^6$ $3d^5$

Que 33: *Analyse the given subshell electronic configuration and answer the question*

A - $1s^2$ $2s^2$ $2p^6$

B - $1s^2$ $2s^2$ $2p^6$ $3s^2 3p^4$

C - $1s^2 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^6\ 4s^2$

D - $1s^2\ 2s^2\ 2p^6\ 3s^2$

a. Which is the element that shows -2 oxidation number?

b. Which is the element that does not take part in chemical reaction ?

c. Which element shows different oxidation states? ***Marks :(3)***

Ans: a. B

b. A

c. C

Que 34: Question: Third shell of an element X contains 6 electrons.

a. Write down the subshell electronic configuration of the element

b.Find the block and the group of the element.

c.Write the subshell electronic configuration of the element of the same group with two subshells in its outer most shell. ***Marks :(3)***

Ans: a. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^4$

b. *p* -Block, Group- 16

c. $2s^2\ 2p^4$

Que 35: Of the given two subshell electronic configuration of an element A (symbol is not real)

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

ii)$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1$

a. Find the correct electronic configuration of the element "A"

b. To which block of the periodic table does this element belong ?

c. Write the formula of the oxide of this element

(Valency : Oxygen= 2) ***Marks :(3)***

Ans: a. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1$

b. *s* - Block

c. A_2O

Que 36: Complete the table (Symbols are not real) ***Marks :(3)***

Elements	**Subshell electronic configuration**	**Period number**	**Group number**

A	**$1s^2\ 2s^2$**	**2**	**2**
B	**$1s^2\ 2s^2\ 2p^1$**	**2**	**(a)**
C	**(b)**	**3**	**17**
D	**$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^2\ 4s^2$**	**(c)**	**4**

Ans: a. 13

b. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$

c. 4

Que 37: ***Some subshells are given. Find out the subshells which are not possible (3s, 1p, 3f, 3d)*** ***Marks :(1)***

Ans: 1p, 3f

Que 38: Which of the following elements have half-filled p sub shell?

a) $_7$N b)$_{13}$Al c)$_5$B d) $_{15}$P ***Marks :(2)***

Ans: a) $_7$N d) $_{15}$P

Que 39: Some electronic configurations are given below.

a)$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$

b)$1s^2 2s^2 2p^4$

c)$1s^2 2s^2 2p^6 3s^2 3p^5$

d)$1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10}\ 4s^1$

a) Which among the above is the smallest atom?

b) Which of the above is the configuration of Ca^{2+} ion

(Atomic number of Ca=20)

c)Why calcium looses 2 electrons in chemical reaction. Explain on the basis of above configuration?

d)which among the above shows -1 oxidation state? ***Marks :(4)***

Ans: a) $1s^2 2s^2 2p^4$

b $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$

c)On loosing 2 electrons it attains inert gas configuration.

d) $1s^2 2s^2 2p^6 3s^2 3p^5$

Que 40: Match suitably ***Marks :(2)***

A	**B**
$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$	**Shows different oxidation states**
$1s^2\ 2s^2\ 2p^6$	**More reactive Metal**
$1s^2\ 2s^1$	**High ionisation energy**
$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^5\ 4s^2$	**Non-metals**

Ans:

A	B
$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$	Non-metals
$1s^2\ 2s^2\ 2p^6$	High ionisation energy
$1s^2\ 2s^1$	Metal
$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^5\ 4s^2$	Shows different oxidation states

Que 41: The last electron of an atom enters the 3d sub shell. There are 3 electrons in it.

a) How many electrons are there in the outer most shell?

b) Write the subshell electronic configuration of this element?

c) Write any two characteristics of the block to which it belongs. ***Marks :(4)***

Ans: a) 2

b) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^3\ 4s^2$

c) Different oxidation states/ Forms coloured compounds/ Show similar properties in groups and properties/ All are metals (Any two)

Que 42: Correct the wrong statements if any. ***Marks :(2)***

a) As distance from nucleus increases energy of shells decreases.

b) Electron filling occurs in the increasing order of energy.

c) As distance increases attraction between the nucleus and electron decreases.

d) Number of subshells in a shell will always be greater than the shell number

Ans: a) As distance from nucleus increases energy of shells increases.

d) Number of subshells in a shell will always be equal to the shell number

Que 43: A part of the periodic table is given below(Symbols are not real)

	P $[Ne]3s^2 3p^4$	
	Q	R

a. To which block does P, Q, R belong?

b. To which period and group does Q belong?

c. Write the subshell electronic configuration of R. ***Marks :(4)***

Ans: a. Block -***p***

b. Group - 16

Period- 4

c. $[Ar]\ 3d^{10}\ 4s^2\ 4p^5$

Que 44: A part of the periodic table is given below(Symbols are not real)

	P $[Ne]3s^2 3p^4$	
	Q	R

a. To which block does P,Q,R belong?

b. To which period and group does Q belong?

c. Write the subshell electronic configuration of R. ***Marks :(4)***

Ans: a. Block -***p***

b. Group - 16

Period- 4

c. $[Ar]\ 3d^{10}\ 4s^2\ 4p^5$

Que 45: The subshell electronic configuration of an element is $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$.

a) How many 'p' electrons are there in it?

b) What is its atomic number?

c)Is it a metal or a nonmetal. Justify. ***Marks :(4)***

Ans: a)11

b)17

c) Non metal.

As it has 7 electrons in its outermost shell/ 5 electrons in outer most p subshell, it gains 1 electron in chemical reaction. So it is a non metal.