
ATOMIC STRUCTURE AND PERIODIC CLASSIFICATION OF ELEMENTS AND CHEMICAL BONDING

Diaprof Camp ProWS 003.

This paper contains various questions related to atomic structure, periodic table and chemical bonding. To get the ideas and other top revisions you can visit the website diaprofcamp.com.

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1. (i) The nuclide notation of element M is ${}_{19}^{39}M$, which set of sub-atomic particles is correct?

- A. 19 protons, 19 electrons and 20 neutrons
- B. 20 protons, 19 electrons and 19 neutrons
- C. 19 protons, 20 electrons and 19 neutrons
- D. 20 protons, 20 electrons 19 neutrons
- E. 19 protons, 19 electrons and 19 neutrons (Morogoro 2020).

(ii) An element X with atomic number 16, belongs to:

- A. period 3, group III, valency of 2
- B. period 3, group VI, valency of 2
- C. period 3, group VI, valency of 6
- D. period 6, group VI, valency of 6 (FTNA 2013)

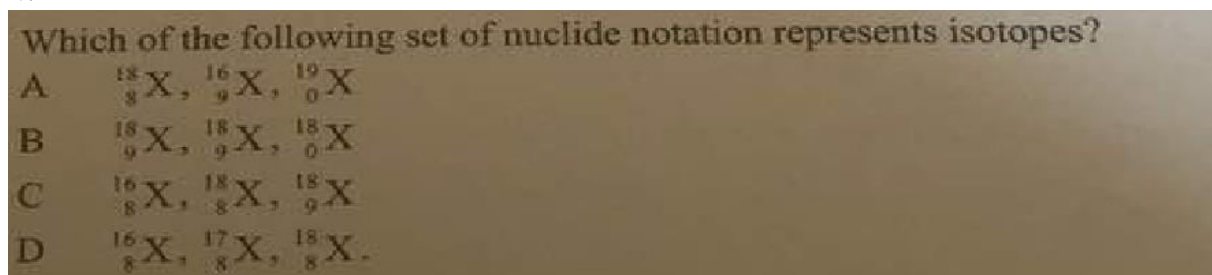
iii.

Select the most correct row given from A to E in the following table

	Element	Electronic configuration	Atomic number	valency
A	X	2:8:8:7	25	7
B	Y	2:8:4	28	4
C	M	2:8:8:8:3	5	3
D	L	2:8:8:2	20	2
E	K	2:6:8	16	2

(St. Clara 2020 F4).

iv.



(FTNA 2015)

(v) Which of the following electronic configuration are of metals?

A. 2:8:8:1 and 2:8:8:7

B. 2: 8:3 and 2: 8

C. 2:8:8:1 and 2: 8:3

D. 2:8:6 and 2: 8: 8:7

(TMS 2018)

(vi) When element P of group I combine with element R of group VI, the formula of the compound formed is:

A. P₂R B. RP C. PR₂ D. RP₄

(TMS 2018)

(vii) The percentage of C in C₂H₂ is:

A. 20 B. 40 C. 60 D. 80

(vii) Consider the species

M = 4 proton, 4 Neutrons, 3 Electrons

N = 4 Protons, 5 Neutrons, 3 Electrons

Which of the following statement about them is true?

A. They are both neutral atoms B. They both have the same atomic weight C. They are isotopes of the same element D. One of them is negative ion (TMS 2018)

viii. Sub-atomic particle NOT found in the nucleus of the atom

(a) Electron (b) Neutron (c) Mass number (d) Proton (e) Atomic number

(ix) Usually the atoms of elements are neutral because

A. The number of electrons balance out the number of protons in the atom

B. The neutrons normally have zero charge

C. The nucleus is only made up of neutrons

D. The number of protons is the same but electrons are added to the nucleus.

(x) When an element "T" of group I combines with element "X" of group VI, the formula of the compound that will be formed is:-

A. X_2T B. T_6X C. T_2X D. TX_2

2.

Consider the following elements:

${}^{16}_8O$, ${}^{19}_9F$, ${}^{20}_{10}Ne$, ${}^{23}_{11}Na$ and ${}^{24}_{12}Mg$. Atoms and ions of these

Elements can be Iso electronic (have the same number of electrons)

(i) Write down their symbols When their Iso-electronic

(ii) Write down their common electronic arrangement in their ions and atoms

3. T and K are elements in the periodic table. The atomic number of T is 16 and that of K is 19.

(a) (i) Is the element T a metal or non-metal?

(ii) In which group and period does element T appear?

(iii) Write a molecular formula of a compound formed between T and K.

(i) Which particles are atoms of the same element in the list of the particles given below?

${}^{40}_{18}A$, ${}^{38}_{20}B$, ${}^{38}_{18}C$ and ${}^{40}_{19}D$.

(ii) Given the electronic configuration of sodium and neon if the atomic number of sodium is 11 and that of neon is 10. Why can't neon react with sodium? (TAHOSSA Dar, 2019).

4. An atom of element X having atomic number 11 combines with an atom of element Z having atomic number 17.

(a) Write the formula of the compound and state the type of bond formed in the compound.

b) Give four properties of the compound formed in 3(a) (CSSC joint 2019)

5. An atom of element Y having atomic number 12 combines with an atom of element Z having atomic number 17 to form a compound.

(a) Write the formula and state the type of bond formed in the compound

(b) Give four properties of the bond formed (Geita 2020).

6. a) A metal B has an atomic mass of 56 and valencies of 2 and 3. Write the formulae of its

(i) Oxides

(ii) Hydroxides

b) A certain amount of oxygen was found to contain two isotopes of oxygen as follows $^{16}\text{O}=90\%$ and $^{18}\text{O}=10\%$. Calculate the relative atomic mass of oxygen (Ilemela 2020).

7. (a) An element X has a number of neutrons 16 and a mass number of 31, element Y has a total number of 19 electrons in its shells.

(i) Write a nuclide notation of element X

(ii) How many neutrons are there in element Y?

(iii) Write the electronic configuration and draw its electronic structure of element X

(iv) Using the actual symbol of element, write the chemical formula formed when element X and Y reacts, and state the type of bond formed (Iringa, 2020).

9. Study the periodic table below

I							VIII
A	II	III	IV	V	VI	VII	B
C		D					E
F					G	H	
	J						

Use the letters shown in the periodic table above to indicate:

- Elements with zero valency: _____ and _____
- The lightest atom: _____
- The alkaline earth metal: _____
- An element with electronic configuration of 2:8:1: _____
- Give the names of elements represented by:
A: _____
B: _____
C: _____
D: _____
- Write electronic configuration of J
- Write a formula formed between J and H (Ludewa, 2018).

8. (a) State the modern periodic law
- (b) Element X, Y and Z have atomic number 17, 18 and 20 respectively.
- (i) Write the electronic configuration of each element.
- (ii) Basing on reactivity; which of the above element is likely to be found in uncombined state?
- (c) (i) Write the chemical formula of a compound formed when X combines with Z.
- (ii) Write down three (3) characteristic of the compound formed in c.(i) above (Mikumi Cluster Academic Unity 2020).

10. (a) Write the electronic configuration of the following chemical species

(i) Na^+ (ii) Cl (iii) Ar

(b) A and B are elements found in the periodic table. The atomic numbers of the elements are 16 and 19 respectively.

(i) In which group and period of the periodic table does each element belong?

(ii) Write a molecular formula of a compound formed between A and B (Mbeya 2020).

11.

Study the periodic table below and answer the questions that follow:-

I	II	III	IV	V	VI	VII	VIII
		Q				T	
U					X	E	
Y							

Which element forms:

- (i) anion with two charges.
- (ii) is cation with three charge
- (iii) Most electronegative element (Mwanza 2018)
- (iv) State one common physical property which element U and Y have.

12.

Consider elements below. The symbols used are not actual symbols

Element	Atomic number
W	3
V	10
X	20
Y	17
T	11
U	1
R	6

- a) Identify the element(s) which is/are:
 - i) Alkali earth metal
 - ii) Alkali metal
 - iii) Halogen
 - iv) Have zero valency
- b) i) From the above elements; identify the group and period of V and X
 - ii) Write the formula of the compounds made by combination of R and U and the formula of compound made by X and R.
- c) Identify the type of bond in each of the compounds formed in (b) (ii) above and give any three differences between the bonds
- d) Draw the electronic configuration of T, Y, R^4+ , and X
- e) List the elements which are:
 - i) In the same period
 - ii) In the same group (St. Clara 2019 F2)

Use the following elements to answer questions that follow.

Element	Atomic number
P	3
Q	8
R	9
T	12
U	16
V	10
Y	11

State with reason(s) which of these elements is/ are:-

- Inert gas
- Alkali metal
- Halogen
- Are Similar in chemical properties
- Its oxide is acidic

(St. Clara Mlali 2019 F4)

14. 2014 FTNA

(a) Study the following periodic table and then answer the questions that follow.

I	II	III	IV	V	VI	VII	VIII
	S		T		U	V	
W				X			Y
Z							

(i) Name and write the chemical symbols for the elements represented by the following letters:
 S
 W
 X
 Z

(ii) Write the electronic configuration for the elements represented by the following letter:
 T U
 V Y

15. (a) The structure of the atom is successive improvement of various models advanced by different scientists. John Dalton was the first scientist to suggest on the structure of atom. However, his model failed to explain some observations. State any four (4) Modifications made on Dalton's atomic theory.

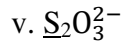
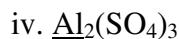
(b) If the relative atomic mass of element P is 16.2. But P has X% of ^{16}P and 90% ^{168}P . Calculate the value of x and y. (CSSC 2023)

16. Find the oxidation number of the following underlined elements.

i. Al

ii. HNO₃

iii. Cr₂ O₇²⁻



(CSSC 2023).

16. (a) State the modern periodic Law

(b) Define the term "periodicity"

Study the periodic table below:

	I						VIII	
A		II	III	IV	V	VI	VII	B
C			D					E
F						G	H	
		J						

© Use the letters shown in the periodic table above to indicate:

(i) Elements with zero valency.

(ii) The lightest atom

(iii) The alkaline earth metal.

(iv) An element with electronic configuration of 2: 8: 1

(v) Give the names of element represented by the letters A, B, C and D

(vi) Give the name of J as an element

(vii) Write the electronic configuration of J. (TAMONGSCO 2018)

17. Study carefully the electronic configuration of elements Q, R and S given below, then answer the questions that follow

Q = 2.7, R = 2.8.1, S = 2.6.

i) What type of bond will exist in a compound formed when Q combines with R?

ii) In what group and period in the periodic table does element S occupy?

iii) Write a molecular formula of a compound formed when element R combine with S.

(NJOMBE 2018)

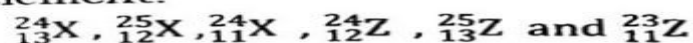
18. Element Q belong to period 3 and group VI of the periodic table.

(i) Draw the atomic structure of Q

(ii) Give the atomic number of element Q (Malinyi 2019)

19. (a) Differentiate between isotopes and isotopy.

(b) Which of the following are isotopes of the same element.



- (i)
- (ii)

(c) Atoms of ${}^{35}\text{X}$ and ${}^{37}\text{X}$ have the following percentage composition by abundance as 48.6% and 51.4% respectively. Calculate the relative atomic mass of X.

MBEYA 2019.

20.

(a) What is an atom?

.....

(b) Study carefully the chart below and answer the questions that follow:-

Element	Atomic Number	Atomic mass
F	17	35.5
G	9	19
L	20	40

- (i) Which element is most electronegative?
- (ii) Mention the least electronegative element
- (iii) Which element has largest atomic radius
- (iv) Which element is highly electropositive
- (v) How many neutrons are present in element F.....
- (vi) Mention the group of element L
- (vii) Write a chemical formula formed between element F and L
- (viii) Draw an electronic diagram of element G