Chapter - 5
Periodic Classification of Elements

Q: 1 **Two statements are given - one labelled Assertion (A) and the other labelled Reason (R). Read the statements carefully and choose the option that correctly describes statements A and R.**

Assertion (A): In the periodic table, atomic size increases from left to right across a period.

Reason (R): In the periodic table, the number of valence shell electrons increases on moving from left to right across a period.

1 Both A and R are true and R is the correct explanation of A.
2 Both A and R are true but R is not the correct explanation of A.
3 A is true but R is false.
4 A is false but R is true.

Q: 2 **Can tritium (T) which is an isotope of hydrogen (H) be placed in the periodic table? If yes, then in which position?**
Justify your answer. **[2]**

Answer the following questions based on the given information.

Electronegativity is defined as the tendency of an atom in a molecule to attract the shared pair of electrons towards itself.

In 1932, chemist Linus Pauling developed a scale to compare the electronegativities of different elements. Given below are the electronegativities of the first 20 elements of the periodic table, according to the Pauling scale.

H 2.20							He
Li 0.98	Be 1.57	B 2.04	C 2.55	N 3.04	O 3.44	F 3.98	Ne
Na 0.93	Mg 1.31	Al 1.61	Si 1.90	P 2.19	S 2.58	Cl 3.16	Ar
K 0.82	Ca 1.00						

Q: 3 **Which type of bond is likely to be formed between atoms of elements with electronegativities 3.44 and 2.58? Justify your answer.** **[2]**

Q: 4 **Why do the noble gases in the rightmost group NOT have an electronegativity value on the Pauling scale?** **[1]**

Answer the following questions based on the given information.

A part of Dimitri Mendeleev's periodic table from the 1860s is shown below.

Group	I	II	III	IV	V	VI	VII	VIII
Oxide Hydride	R_2O RH	RO RH_2	R_2O_3 RH_3	RO_2 RH_4	R_2O_5 RH_3	RO_3 RH_2	R_2O_7 RH	RO_4
Periods ↓	A B	A B	A B	A B	A B	A B	A B	Transition series
1	H 1.008							
2	Li 6.939	Be 9.012	B 10.81	C 12.011	N 14.007	O 15.999	F 18.998	
3	Na 22.99	Mg 24.31	Al 29.98	Si 28.09	P 30.974	S 32.06	Cl 35.453	
4 First series: Second series:	K 39.102 Cu 63.54	Ca 40.08 Zn 65.37	Sc 44.96 Ga 69.72	Ti 47.90 Ge 72.59	V 50.94 As 74.92	Cr 50.20 Se 78.96	Mn 54.94 Br 79.909	Fe Co Ni 55.85 58.93 58.71

Q: 5 **(a) Which family of elements that constitutes a group in the modern periodic table is completely missing in this table?** **[1]**
(b) Give one example from this family of elements.

Q: 6 **Which property of elements does Mendeleev use for classifying elements when he refers to the formula of oxides and hydrides indicated in the top row?** **[1]**

Q: 7 **Name the property of elements which is the basis of the modern periodic table, but was NOT used by Mendeleev to make his periodic table.** **[1]**

The table below gives the correct answer for each multiple-choice question in this test.

Q.No	Correct Answers
1	4

Q.No	Teacher should award marks if students have done the following:	Marks
2	- Yes, it can be placed in the periodic table. [0.5 marks] - at the same position as hydrogen [0.5 marks] - Elements are arranged in the periodic table according to atomic number. [0.5 marks] - Tritium has the same atomic number as hydrogen. [0.5 marks]	2
3	1 mark for type of bond: - covalent bond 1 mark for either of the following reasons: - The two elements are both non-metals. - Neither or the two elements can lose electrons easily. *(Any other valid reason can be accepted.)*	2
4	1 mark for any of the following: - They do not react with other elements. - They do not form bonds with other elements.	1
5	0.5 marks for each of the following: - noble gases / inert gases - helium / neon / argon / krypton / xenon / radon	1
6	valency	1
7	1 mark for either of the following: - atomic number - electronic configuration	1