

## Atoms, Elements and Compounds – 2019 Nov

1. 0620/11/O/N/19/No.5

A covalent molecule M contains four shared pairs of electrons.

What is M?

- A ammonia,  $\text{NH}_3$
- B hydrogen chloride,  $\text{HCl}$
- C methane,  $\text{CH}_4$
- D water,  $\text{H}_2\text{O}$

2. 0620/11,21/O/N/19/No.6,5

An isotope of chromium is represented by  ${}^{52}_{24}\text{Cr}$ .

Which statement about an atom of this isotope of chromium is correct?

- A It contains 24 electrons.
- B It contains 24 neutrons.
- C It contains 28 protons.
- D It contains 52 neutrons.

3. 0620/11/O/N/19/No.7

Substances P and Q both conduct electricity.

P is a mixture of two different types of atom.

Q is made of only one type of atom.

Which row describes P and Q?

	P	Q
A	alloy	element
B	alloy	compound
C	compound	alloy
D	compound	element

4. 0620/11,12,13/O/N/19/No.8  
Graphite is a form of carbon.

Why can graphite be used as a lubricant?

- A Graphite contains unbonded electrons which move through the structure.
- B Graphite contains weak covalent bonds so the atoms move easily.
- C Graphite has a low melting point so it easily turns into a liquid.
- D Graphite has weak attractive forces between layers so they can move.

5. 0620/12,22/O/N/19/No.5

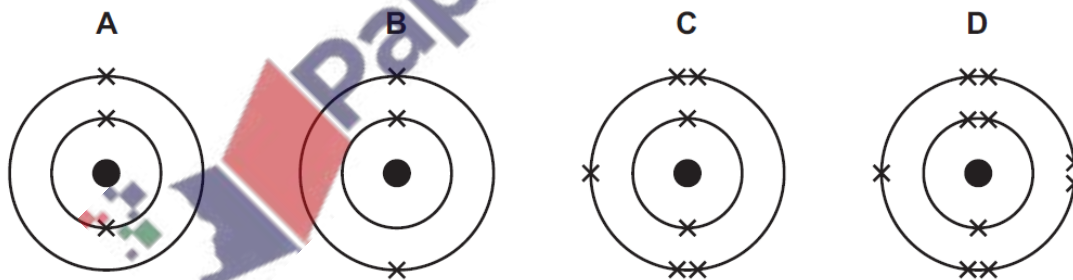
What is the total number of electrons in one molecule of ammonia,  $\text{NH}_3$ ?

- A 6
- B 8
- C 10
- D 11

6. 0620/12/O/N/19/No.6

An isotope of lithium has the symbol  ${}^7_3\text{Li}$ .

What is the arrangement of electrons in one atom of this isotope of lithium?



7. 0620/12/O/N/19/No.7

Which statement about an alloy is correct?

- A It is a compound made of two or more elements, one of which is a metal.
- B It is a layer of a metal plated onto another metal.
- C It is a mixture of a metal with other elements.
- D It is a single element.

8. 0620/13/O/N/19/No.5  
In which molecule are all the outer shell electrons involved in covalent bonding?

- A  $Cl_2$                       B  $CH_4$                       C  $HCl$                       D  $NH_3$

9. 0620/13,23/O/N/19/No.6,5

The numbers of protons, neutrons and electrons present in the atoms P, Q, R and S are shown.

atom	number of protons	number of neutrons	number of electrons
P	4	5	4
Q	5	6	5
R	6	6	6
S	6	7	6

Which atoms are isotopes of the same element?

- A P and Q only    B Q and R only    C R and S only    D P and S only

10. 0620/13/O/N/19/No.7

What is an alloy?

- A a compound of two metallic elements  
B a compound of metallic and non-metallic elements  
C a mixture of a metal and at least one other element  
D a pure metal element

11. 0620/21,22,23/O/N/19/No.4

Which statement about an ionic compound is **not** correct?

- A It conducts electricity when dissolved in water.  
B It has a high melting point due to strong attractive forces between ions.  
C It has a regular lattice of oppositely charged ions in a 'sea of electrons'.  
D The ionic bonds are formed between metallic and non-metallic elements.

12. 0620/21/O/N/19/No.6

Element X has two isotopes,  $^{12}_6\text{X}$  and  $^{14}_6\text{X}$ .

Which statement about these isotopes is correct?

- A They have different chemical properties because they have different numbers of neutrons.
- B They have the same chemical properties because they have the same number of outer shell electrons.
- C They have the same nucleon number because the sum of the number of protons and electrons is the same.
- D They have different positions in the Periodic Table because they have different numbers of neutrons.

13. 0620/21/O/N/19/No.7

How are the structures of diamond and silicon(IV) oxide similar?

- A Molecules of both diamond and silicon(IV) oxide are held together by weak attractive forces.
- B They both contain atoms arranged in planes held together by weak bonds.
- C They both contain ions that are free to move.
- D The carbon in diamond and the silicon in silicon(IV) oxide each have four covalent bonds.

14. 0620/21,22,23/O/N/19/No.8

Which statement describes the structure of copper?

- A It has a lattice of negative ions in a 'sea of electrons'.
- B It has a lattice of negative ions in a 'sea of protons'.
- C It has a lattice of positive ions in a 'sea of electrons'.
- D It has a lattice of positive ions in a 'sea of protons'.

15. 0620/22/O/N/19/No.6

Rubidium has two isotopes,  ${}^{85}_{37}\text{Rb}$  and  ${}^{87}_{37}\text{Rb}$ .

Which statement explains why both isotopes have the same chemical properties?

- A They have the same number of protons.
- B They have the same number of outer shell electrons.
- C They have different numbers of neutrons.
- D They have different mass numbers.

16. 0620/22/O/N/19/No.7

Which statement about the structure and properties of silicon(IV) oxide is **not** correct?

- A It has a giant structure similar to that of diamond.
- B It has a high melting point due to the strong attractive force between molecules.
- C There are strong covalent bonds between silicon and oxygen.
- D There are no free electrons, so silicon(IV) oxide does not conduct electricity.

17. 0620/23/O/N/19/No.6

Carbon has three isotopes,  ${}^{12}\text{C}$ ,  ${}^{13}\text{C}$  and  ${}^{14}\text{C}$ .

Why do all three isotopes have the same chemical properties?

- A They all have the same atomic mass.
- B They all have the same number of electrons in their outer shell.
- C They all have the same number of electron shells.
- D They all have the same number of nucleons.

Silicon(IV) oxide is a covalently bonded compound.

Which statements are correct?

- 1 Silicon atoms form four single bonds in silicon(IV) oxide.
- 2 Oxygen atoms form two double bonds in silicon(IV) oxide.
- 3 Silicon(IV) oxide has a high melting point.
- 4 Silicon(IV) oxide contains one silicon atom and four oxygen atoms.

**A** 1 and 2 only    **B** 1 and 3 only    **C** 2 and 3 only    **D** 3 and 4 only

