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CAIE A LEVEL Chemistry Topic Questions / 9701

1.2.1-Isotopes-set-1-qp

Total Questions: 11

Note:

- For questions with answer choices as statements 1, 2 and 3, follow these instructions for selecting options A/B/C/D:
- A= 1, 2 and 3 are correct
- B=1 and 2 only are correct
- C=2 and 3 only are correct
- D=1 only is correct

Questions

Question 1:

The table shows the numbers of protons, neutrons and electrons in four different particles, W, X, Y, and Z.

	number of protons	number of neutrons	number of electrons
W	32	40	32
X	32	40	34
Y	32	42	32
Z	34	40	34

Which pair represents the atoms of two isotopes of the same element?

- A** W and Y **B** W and Z **C** X and Y **D** X and Z

Question 2:

Skin cancer can be treated using a radioactive isotope of phosphorus, $^{32}_{15}\text{P}$. A compound containing the phosphide ion $^{32}_{15}\text{P}^{3-}$, wrapped in a plastic sheet, is strapped to the affected area.

What is the composition of the phosphide ion, $^{32}_{15}\text{P}^{3-}$?

	protons	neutrons	electrons
A	15	17	18
B	15	17	32
C	17	15	17
D	32	17	15

Question 3:

Technetium (Tc) is a second row transition element that does not occur naturally on Earth. One of its isotopes has 56 neutrons.

What is the nucleon number of this isotope?

- A** 43 **B** 56 **C** 99 **D** 112

Questions (Continued)

Question 4:

Unnilpentium is an artificial element. One of its isotopes is ${}_{105}^{262}\text{Unp}$.

Which of the following statements is correct?

- A ${}_{105}^{262}\text{Unp}$ has a nucleon number of 105.
- B The atom ${}_{105}^{260}\text{X}$ is an isotope of ${}_{105}^{262}\text{Unp}$.
- C There are 262 neutrons in ${}_{105}^{262}\text{Unp}$.
- D The proton number of ${}_{105}^{262}\text{Unp}$ is 262.

Question 5:

It is now thought that where an element exists as several isotopes, the stable ones usually contain a 'magic number' of neutrons. One of these magic numbers is 126.

Which isotope is unstable?

- A ${}^{209}\text{Bi}$ B ${}^{208}\text{Pb}$ C ${}^{210}\text{Po}$ D ${}^{208}\text{Tl}$

Question 6:

The technetium-99 isotope (${}^{99}\text{Tc}$) is radioactive and has been found in lobsters and seaweed adjacent to nuclear fuel reprocessing plants.

Which statements are correct about an atom of ${}^{99}\text{Tc}$?

- 1 It has 13 more neutrons than protons.
- 2 It has 43 protons.
- 3 It has 99 nucleons.

Questions (Continued)

Question 7:

Unnilpentium is an artificial element. One of its isotopes is ${}_{105}^{262}\text{Unp}$.

Which of the following statements is correct?

- A ${}_{105}^{262}\text{Unp}$ has a nucleon number of 105.
- B The atom ${}_{105}^{260}\text{X}$ is an isotope of ${}_{105}^{262}\text{Unp}$.
- C There are 262 neutrons in ${}_{105}^{262}\text{Unp}$.
- D The proton number of ${}_{105}^{262}\text{Unp}$ is 262.

Question 8:

Use of the Data Booklet is relevant to this question.

It is now thought that where an element exists as several isotopes, the stable ones usually contain a 'magic number' of neutrons. One of these magic numbers is 126.

Which isotope is unstable?

- A ${}^{209}\text{Bi}$ B ${}^{208}\text{Pb}$ C ${}^{210}\text{Po}$ D ${}^{208}\text{Tl}$

Question 9:

A radioactive isotope of thallium, ${}_{81}^{201}\text{Tl}$, is used to assess damage in heart muscles after a heart attack.

Which statement about ${}_{81}^{201}\text{Tl}$ is correct?

- A This isotope has a nucleon number of 120.
- B The number of electrons in one atom of this isotope is 81.
- C The number of neutrons in one atom of this isotope is 201.
- D ${}_{82}^{201}\text{X}$ is an isotope of ${}_{81}^{201}\text{Tl}$.

Questions (Continued)

Question 10:

Helium, He, is the second element in the Periodic Table.

Tritium is the isotope of hydrogen ^3H .

What is the same in an atom of ^4He and an atom of ^3H ?

- A the number of electrons
- B the number of neutrons
- C the number of protons
- D the relative atomic mass

Question 11:

Use of the Data Booklet is relevant to this question.

Atoms of element X have six unpaired electrons.

What could be element X?

- A carbon
- B chromium
- C iron
- D selenium