

**SMART EXAM RESOURCES**  
**9701 AS CHEMISTRY TOPIC QUESTIONS**  
**TOPIC: ATOMIC STRUCTURE**  
**SUB-TOPIC: ISOTOPES**  
**SET-2**

**1.2.1-Isotopes-Set-2-qp-ms**

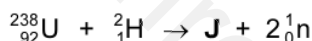
1.

When nuclear reactions take place, the elements produced are different from the elements that reacted. Nuclear equations, such as the one below, are used to represent the changes that occur.



The nucleon (mass) number total is constant at 236 and the proton number total is constant at 92.

In another nuclear reaction, uranium-238 is reacted with deuterium atoms,  ${}_1^2\text{H}$ . An isotope of a new element, **J**, is formed as well as two neutrons.



What is isotope **J**?

- A**  ${}_{92}^{238}\text{Np}$       **B**  ${}_{92}^{238}\text{Pu}$       **C**  ${}_{92}^{240}\text{Np}$       **D**  ${}_{92}^{240}\text{Pu}$

2.

The  ${}^{68}\text{Ge}$  isotope is medically useful because it undergoes a natural radioactive process to give an isotope of a different element,  ${}^{68}\text{X}$ , which can be used to detect tumours. This transformation of  ${}^{68}\text{Ge}$  occurs when an electron enters the nucleus and changes a proton into a neutron.

Which statement about the composition of an atom of  ${}^{68}\text{X}$  is correct?

- A** It has 4 electrons in its outer p orbitals.  
**B** It has 13 electrons in its outer shell.  
**C** It has 37 neutrons.  
**D** Its proton number is 32.