

- Subject Physical Chemistry
- Chapter Some Basic Concept of Chemistry

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**DPP No.- 03** 



An element, X has the following isotopic composition,

<sup>200</sup>X:90%→

<sup>199</sup>X:8%

 $^{202}X:2\%$ 

the weighted average atomic mass of the naturally occuring element 'X' is closest to

(1) 201 amu

(2) 202 amu

(3) 199 amu

**200** amu



The atomic weight of chlorine is 35.5. It has two isotopes of atomic weight 35 and 37. What is the percentage of the heavier isotope in the sample?

5 av. at. mass Cel = 35.5 = 37x + 35 (100-x) 3550 = 37x + 3500 - 35x3/25 37 Ce x 3556 - 3500 = 2x2x = 5020



# B has two isotopes ${}^{10}B(19\%)$ and ${}^{11}B(81\%)$ . The atomic mass of B is

10.81 av.at.mass of 
$$B = \frac{19 \times 10 + 81 \times 11}{100} = \frac{190 + 891}{100}$$

- 10.81

- $\left(2\right) 11.5$
- **3** 11
- 4 10.5





If an element Z exist in two isotopic form  $Z^{50}$  and  $Z^{52}$ . The average atomic mass of Z is 51.7. Calculate the abundance of each isotopic forms

$$Z^{50}(15\%), Z^{52}(85\%)$$

$$Z^{50}(15\%), Z^{52}(85\%)$$
 avat-mass of  $Z = 51.7 = 500c + 52(100-32)$ 

$$(2)_{\chi} Z^{50}(85\%), Z^{52}(15\%)$$

3 
$$Z^{50}(5\%), Z^{52}(95\%)$$

$$\frac{1}{30} = 1200$$

$$4)$$
  $\chi$ Z<sup>50</sup>(95%), Z<sup>52</sup>(5%)



Atomic mass of boron is 10.81. It has two isotopes 80% with 20% and abundance respectively. The atomic mass of the isotope having 80% abundance is 11.01. The atomic mass of the other isotope is

2) 11.01  
Not at moss of 207. isotope = 
$$\frac{7}{10.01}$$
 |  $\frac{1081 - 203 + 880 - 8}{10.01}$  |  $\frac{1081 - 880 - 8}{10.01}$  = 203

$$y = \frac{200.24}{201} = 10.01$$



Carbon occur in nature as a mixture of C12 and C13. Average atomic mass of carbon is 12.011, what is the % aboundance of C12 in nature?

(100-5)

- 1) 99.8% av at moss of  $(=12.01 = x \times 12 + (00-x) \times 3$
- 98.9%
  - 3 97.6%
  - **4** 98.5%

- 1201 = 12x + 1300 13x
  - +99 = +3C

$$x = 99 - 1.$$



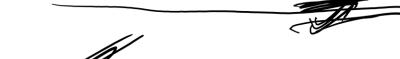
Boron has two isotopes boron-10 and boron-11 whose percentage abundances are 19.6% and 80.4% respectively. What is the average atomic mass of boron?

$$=\frac{1680.4}{100}=\frac{10.804}{100}$$

He - 4



'He' has two naturally occurring isotopes He-3 and (He-4) The average atomic mass of helium is 3.98 amu. Which isotope is more abundant in nature?



- 3 both are equally abundant
- 4 none of these

Question-9 (TEE advance)



Given that the abundances of isotopes  $^{54}$ Fe,  $^{56}$ Fe and  $^{57}$ Fe are 5%, 90% and 5%, respectively, the atomic mass of Fe is

- 55.85 avatimoss of Fe = 54x5+56x90+57x5
- 55.75
- 55.95
- 56.05

$$=\frac{270+5040+285}{100}$$

$$-5595 = 55.95$$



Atomic weight of Ne is 20.2. Ne is mixture of  $\stackrel{20}{\sim}$ Ne and  $\stackrel{22}{\sim}$ Ne, relative abundance of heavier isotope is

1 90	20.2 - xx20 + 22(100-x)
2 20	100
3 40	2020 = 20x + 2200 - 22x
10	+180 = +2 x x = 180 = 90

