. The value of $0.423232323\cdots(=0.4\overline{23})$ is

(A) 419/423 (B) 419/990

(C) 423/990 (D) 419/999

Solution: We have

$$0.4\overline{23} = \frac{4}{10} + \frac{23}{10^3} + \frac{23}{10^5} + \cdots + \infty$$

$$= \frac{4}{10} + \frac{23}{10^3}\left(1 + \frac{1}{10^2} + \frac{1}{10^3} + \cdots\right)$$

$$= \frac{4}{10} + \frac{23}{10^3}\left(\frac{1}{1-(1/10^2)}\right)$$

$$= \frac{4}{10} + \frac{23}{10^3}\left(\frac{10^2}{99}\right) = \frac{419}{990}$$