

**Q 2.** If  $\log_{10} 2, \log_{10}(2^x + 1), \log_{10}(2^x + 3)$  are in AP, then

(a)  $x = 0$

(b)  $x = 1$

(c)  $x = \log_{10} 2$

(d)  $x = \frac{1}{2} \log_{10} 5$

**Ans 2** As  $\log_{10} 2, \log_{10}(2^x + 1), \log_{10}(2^x + 3)$  are in AP

Therefore,  $2, 2^x + 1, 2^x + 3$  are in GP

$$\Rightarrow (2^x + 1)^2 = 2(2^x + 3)$$

$$\Rightarrow 2^{2x} = 5$$

$$\Rightarrow 2x = \log_2 5$$

**Q3** If  $\log_2 x + \log_2 y \geq 6$ , then the least value of  $x + y$  is

(a) 4

(b) 8

(c) 16

(d) 32

**Ans 3**  $\log_2 x + \log_2 y \geq 6$

$$\log_2 x + \log_2 y \geq 6$$

$$\Rightarrow \log_2 xy \geq 6$$

$$\Rightarrow xy \geq 2^6$$

$$\Rightarrow \sqrt{xy} \geq 2^3$$

As,

$$\frac{x+y}{2} \geq \sqrt{xy}$$

$$\Rightarrow x+y \geq 2\sqrt{xy} \geq 16 \quad (\because \text{AM} \geq \text{GM})$$

$$\Rightarrow x+y \geq 16$$

Hence, the correct option is (c).